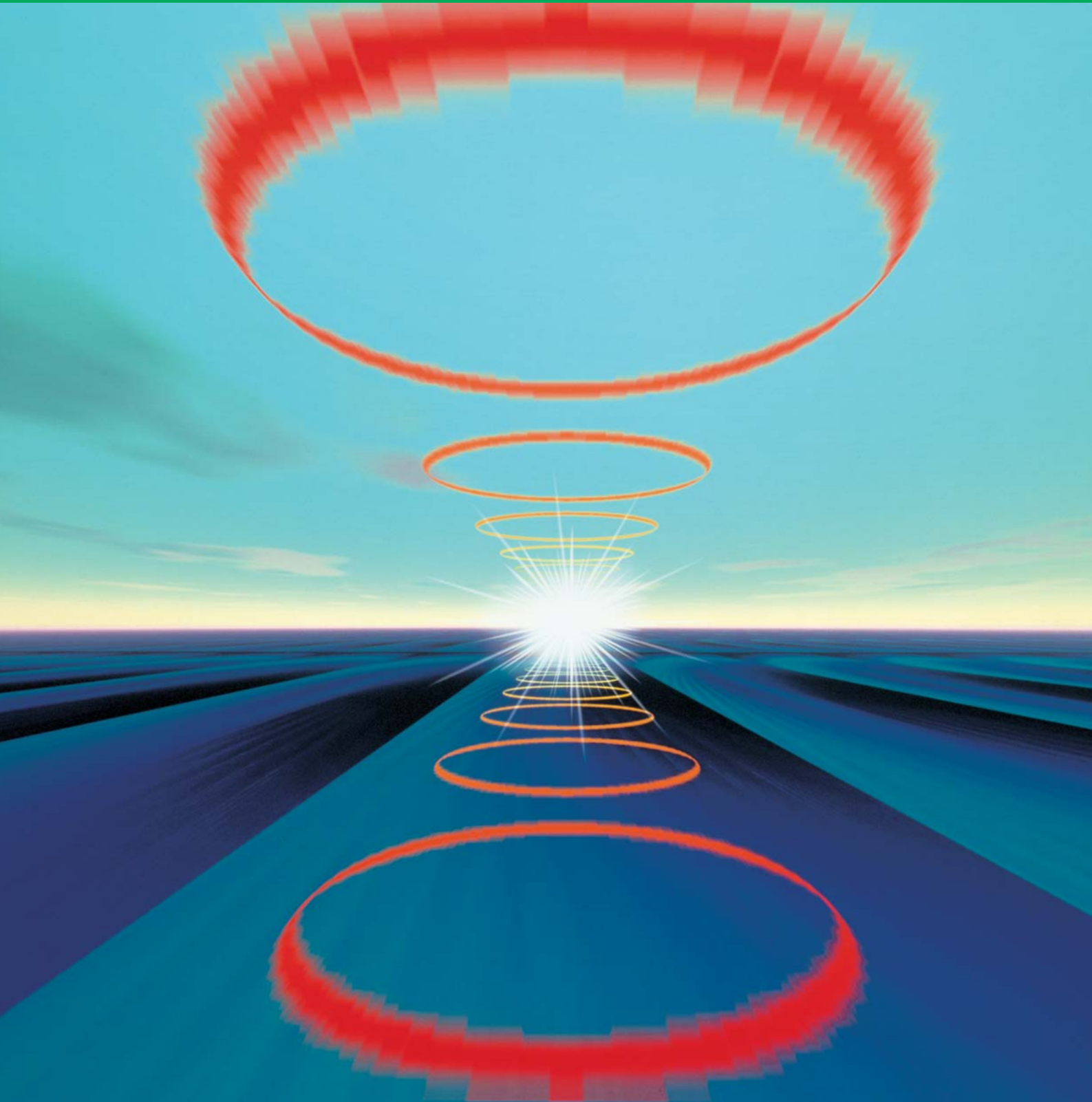


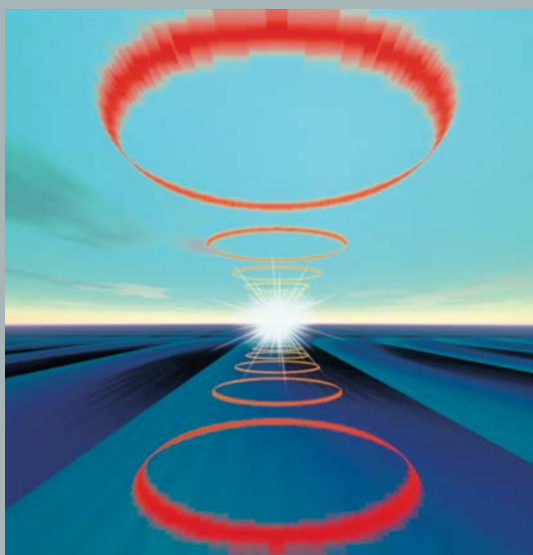


Revised in Aug.  
CATALOGUE No. ZY03

# NON-AS PRODUCTS



**NIPPON VALQUA INDUSTRIES, LTD.**



Because of its well-balanced properties, asbestos fiber has traditionally been used for a wide range of applications as the most representative inorganic fiber. Amidst recent moves to tighten the work sanitation regulations, however, there is a strong demand for the development of a new alternative material capable of meeting these requirements. Nippon VALQUA from its perspective of a general seal manufacturer, has given careful consideration to the establishment of a new material to replace asbestos in answer to these demands. Our comprehensive NON-AS Sealing Product Series has been created against this backdrop as a non-asbestos alternative. This catalogue features the NON-AS products in fuller details.

**Registered trade names:**

The following trademarks belong to Nippon Valqua Industries, Ltd.

**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 (Fluorocarbon Resin Products)

- These products have not been specially designed and manufactured for human transplantation and/or for use in or for medical appliances coming in contact with body fluids and body tissue. When used for applications of this nature, be sure to consult us beforehand.
- In high-temperature applications exceeding 200°C, ensure adequate exhaust ventilation to avoid inhaling the decomposition gases.
- For disposal, be sure to comply with the Law Concerning Waste Treatment and Sanitation and do not incinerate.

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	Type	Asbestos products (VALQUA Product No.)	NON-AS products (VALQUA Product No.)	Product name
Non-metallic gasket	Rubber sheet gasket		2010	Nitrile rubber sheet gasket
			2010	Chloroprene rubber sheet gasket
			2010	Ethylene-propylene rubber sheet gasket
			4010	Fluoro-rubber sheet gasket
			5010	Silicone rubber sheet gasket
	Rubber O ring		640	Synthetic rubber O ring
			4640	Fluoro-rubber O ring
			5640	Silicone rubber O ring
	Rubber-molded gasket		2060	Synthetic rubber horizontal U-shaped gasket
	Fabric-reinforced rubber gasket		16	Fabric-reinforced rubber sheet gasket
	Joint sheet	1500 1500AC 1501 1501AC 930etc.	6500	General NON-AS joint sheet
			6500-AC	Corrosion-protection NON-AS joint sheet
			6501	NON-AS joint sheet for machinery
			8590TN	NONA-SUPER
	Fluorocarbon resin gasket		7010	VALFLON gasket
			7010-EX	New VALFLON gasket
			7020	VALQUALON gasket
			7026	Black VALQUALON gasket
			7GP66	VALFLON soft sheet gasket
Fluorocarbon resin jacket gasket	7030 Series	N7030 (N) Series	NON-AS VALQUALON jacket gasket	
		N7030 (S) Series	NON-AS VALQUALON flow-less gasket	
Fluorocarbon resin string-shaped gasket		7GS66A	Code Seal (soft)	
Flexible graphite sheet gasket		VF-30	VALQUAFOIL-sheet gasket	
		VF-35E	Metal-sheet inserted VALQUAFOIL-sheet gasket	
		VFT-30	VALQUAFOIL-sheet gasket (PTFE laminate)	
		VFT-35E	Metal-sheet inserted VALQUAFOIL-sheet gasket (PTFE laminate)	
Rubberized woven fabric gasket	214	N214	VALQUATEX gasket (Rubberized glass fiber fabric)	
	314	N314	VALQUATEX gasket (Rubberized metal wire ceramic fiber fabric)	
Semi-metallic gasket	Spiral wound	590 Series	8590 Series	Cleantight
			8590L Series	Lined Cleantight
			6590 Series	Blacktight
			7590 Series	Whitetight
	Metal jacket gasket	510 Series	N510 Series	NON-AS corrugated metal jacket gasket
520 Series		N520 Series	NON-AS flat metal jacket gasket	
Metallic gasket	Metal flat gasket		560 Series	Metal flat gasket
	Serrated gasket		540 Series	Serrated gasket
	Ring joint gasket		550 Series	Ring joint gasket
	Metal O ring		3640	Metal O-ring (Basic shape)
			3641	Metal O-ring (Balanced shape)
		3645	Trypack	
		3645LS	Trypack (Low stress type)	

Usable range <sup>(1)</sup>		Description	Main applications	Page
Temperature (°C)	Pressure (MPa){kgf/cm <sup>2</sup> }			
-30~120	0.49 {5}	Gaskets are stamped out from rubber sheet.	Pipe flange, machinery	20
-30~120	0.49 {5}			
-40~150	0.49 {5}			
-15~200	0.49 {5}			
-60~200	0.49 {5}	All rubber materials are molded into a O-shaped section. Usable pressure range may differ from these values according to the groove design.	Machinery	-
Depends on material	29.4 {300}			
-15~200	29.4 {300}			
-60~200 Depends on material	29.4 {300} 5.88 {60}	This self-tensioned seal type gasket is manufactured from synthetic rubber molded into a horizontal U-shape with a reinforcement ring of metal or other material.	Machinery	-
Depends on material	0.98 {10}	These rubber sheet gaskets consist of NBR, CR, NR and similar materials reinforced with fabric. These gasket will need some measures to prevent seepage.	Pipe flange	-
-50~160 <sup>(2)</sup>	2.94 {30}	These are general NON-AS joint sheets.	Pipe flange, machinery	3
-50~180 <sup>(2)</sup>	2.94 {30}	These NON-AS joint sheets are used for corrosion protection.		
-50~200 <sup>(2)</sup>	2.94 {30}	These NON-AS joint sheets are used for machinery.		
-200~450	JIS 20K JPI 300Lb	These NON-AS gaskets are an replacing to joint sheets.	Pipe flange, machinery	4
-50~100	0.49 {5}	Gaskets are stamped out from PTFE sheet. (In general, they are used on grooved flanges.)	Pipe flange, machinery	7
-50~150	0.98 {10}	Gaskets are stamped out from New VALFLON.		
-200~200	3.92 {40}	These low-creep fluorocarbon resin gaskets are reinforced with a special filler.		
-200~200	3.92 {40}			
-240~260	1.96 {20}			
-100~150	1.47 {15}	These fluorocarbon resin gaskets use a NON-AS joint sheet as the center core.	Pipe flange, machinery	9
-100~200	1.96 {20}	These fluorocarbon resin gaskets use a NON-AS joint sheet and special felt as the center core.	Machinery	10
-240~260	4.90 {50}	These string-type seal materials consist of PTFE reformed into a marshmallow shape.	Pipe flange, machinery	13
-240~400	1.96 {20}	These gaskets are stamped out from an flexible graphite sheet.		
-240~400	4.90 {50}	These gaskets are stamped out from flexible graphite sheet inlaid thin metal sheet.		
-240~300	1.96 {20}	These gaskets consist of PTFE laminated VF-30 on both sides.		
-200~300	4.90 {50}	These gaskets consist of PTFE laminated VF-35E on both sides.	Manholes, ducts	20
400	0.098 {1}	These products consist of rubberized fabric fiber finished to the required flat shape.		
800	0.098 {1}	These products consist of rubberized wire-reinforced ceramic fabric fiber finished to the required flat shape.		
-200~500	29.4 {300}	These spiral wound gaskets use non-asbestos inorganic paper as the filler.	Pipe flange, machinery	11
-200~600	29.4 {300}	This gasket uses VALQUAFOIL in the center of the Cleantight filler.		
-270~450	29.4 {300}	These spiral wound gaskets use flexible graphite tape as the filler.		
-260~300	19.6 {200}	These spiral wound gaskets use PTFE tape as the filler.		
Depends on material	6.86 {70}	These corrugated metal jacket gaskets use a non-asbestos heat-resistant sheet as the center core.	Pipe flange, machinery	15
Depends on material	6.86 {70}	These flat metal jacket gaskets use a non-asbestos heat-resistant sheet as the center core.	Pipe flange, machinery	
Depends on material	13.7 {140}	These gaskets consist of a metal sheet machined to the required shape.	Pipe flange, machinery	16
Depends on material	13.7 {140}	These metal gaskets have machined concentric grooves.	Pipe flange, machinery	17
Depends on material	44.1 {450}	These products are available in two cross-sectional shapes - oval and octagonal - and are used for flanges with ring joint seats.	Pipe flange, machinery	18
Depends on material	6.86 {70}	These metal O rings are made from a thin metal tube machined to the required shape.	Pipe flange, machinery	19
Depends on material	294 {3000}	Provided with balancing holes for use in high-pressure applications.		
-270~250	6.86 {70}	These rings have a C-shaped section and are made from a coil spring covered with a thin metal sheet.		
-270~250	6.86 {70}	A seal can be achieved at an even lower tightening force than in the case of 3645.		

**Remark:** For more detailed information about the characteristics and properties of these products, please refer to our catalogues and to the product descriptions featured on our homepage on the web. Be sure also to consult out VALQUA Handbook (Technical and Dimensions Versions).

**Note 1:** The usable range gives the limit values for temperature and pressure under normal operating conditions, except for special cases. **Note 2:** If used at temperatures in excess of 100°C, be sure to adhere to the cautions given on page 4.

NON-AS Joint Sheets are sheet-type gasket materials produced by pressurized vulcanization of a blend of a special rubber binder and a small amount of filler added to an organic or inorganic fiber material. NON-AS Joint Sheets do not contain asbestos and can thus be used as an asbestos-free alternative to the conventional asbestos joint sheets.



3

### Features

- ▶ Endowed with superior softness and resilience characteristics, they are ideally suited for flange applications compared to other gaskets.
- ▶ They can be cut to size in situ with gasket cutters or scissors to suit the site conditions. They are also easy to punch.
- ▶ This type of gasket is outstandingly economic and affordable under conditions involving its use at 200°C and 2.94MPa or less.

### Standard Dimensions

VALQUA Product No.	Thickness mm	Size mm (W x L)
<b>6500</b> <b>6501</b>	0.4 0.5 0.8 1.0 1.2	1270×1270
	1.5 1.6 2.0 3.0 3.2	1270×3810 3048×3810
<b>6500-AC</b>	1.0 1.5 2.0	1270×1270
		1270×3810

#### General NON-AS Joint Sheet

VALQUA No. <b>6500</b>	Suitable as a non-asbestos gasket for all types of industrial pipe flanges. This sheet also complies with the Waterworks Law (Ministry of Health and Welfare of Japan)
Compatible Fluids	Air, water, (water) steam, petroleum-derived oils, oil-gas, neutral aqueous salt solutions, weak acids, weak alkalis, general gases, etc.
Applications	Suitable as a gasket for all types of industrial pipe flanges, including oil refineries, chemical plants and shipping, valve bonnets, and machinery contact surfaces.

#### Corrosion Protection NON-AS Joint Sheet

VALQUA No. <b>6500-AC</b>	This joint sheet has a reduced soluble chlorine level to achieve corrosion control in stainless steel flanges.
Compatible Fluids	Supply water, industrial water, warm water, steam, drained air, general gases.
Applications	Suitable as a gasket for all types of industrial pipe flanges, valve bonnets and machine contact surfaces, requiring corrosion protection.

#### NON-AS Joint Sheet for Equipment Pipes

VALQUA No. <b>6501</b>	Suitable as a gasket for equipment and pipe flanges thanks to its superior heat and oil resistance. At high temperatures, in particular, it has superior stress relieving properties.
Compatible Fluids	Petroleum-derived oils, oil-gas, air, water, (water) steam, neutral aqueous salt solutions, weak acids, weak alkalis, general gases, etc.
Applications	Suitable as a gasket for all types of industrial pipe flanges, including valve bonnets, all types of equipment contact surfaces, petrochemical industry, shipping, etc.

### Design Data

The m and y values for NON-AS joint sheet are the same as those applicable to asbestos joint sheet specified in JIS B 8273.

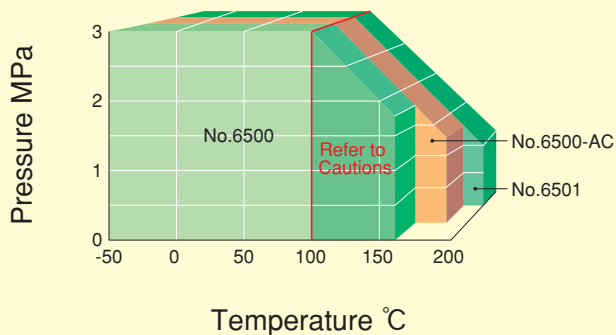
Thickness mm	m	y N/mm <sup>2</sup> [kgf/mm <sup>2</sup> ]
3.2	2.00	10.98 {1.12}
1.6	2.75	25.50 {2.60}
0.8	3.50	44.82 {4.57}

## Usable Range

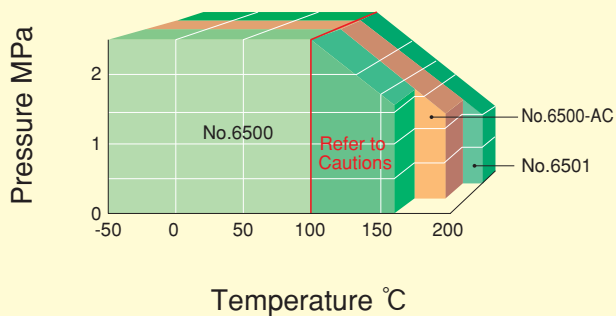
VALQUA Product No.	Temperature °C <sup>(1)</sup>	Pressure MPa (kgf/cm <sup>2</sup> ) <sup>(2)</sup>		
		Aqueous fluids	Oily fluids	Gaseous fluids
6500	-50~160			
6500-AC	-50~200	2.94 {30}	2.45 {25}	0.98 {10}
6501	-50~200			

- Remarks: Temperature and pressure data refer to the respective limit values for application.
- Note (1): The maximum application temperature may vary according to product. (See figure below.) If any of the products is used at a temperature of 100°C or above, be sure to make reference to the Cautions below.
- Note (2): The maximum pressure data may vary according to fluid class and temperature. (See figure below.)

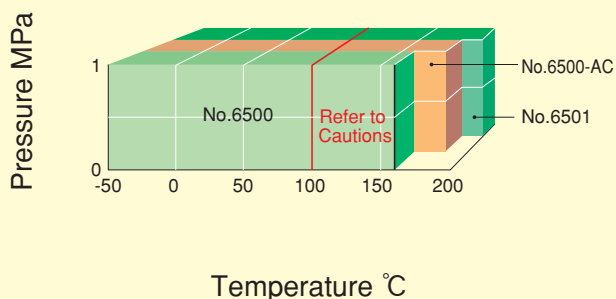
### Aqueous fluids (water, hot water, steam, etc.)



### Oily fluids (Ordinary oils, oil gases, etc.)



### Gaseous fluids (Air, nitrogen gas, inert gases, etc.)



Remark: For gas seals, it is recommended to use seal with a gasket paste and adjust the compression stress to around 34.3MPa (350kgf/cm<sup>2</sup>). Adhere to the above application ranges as a rule of thumb.

## Cautions

When NON-AS joint sheet is used at temperature of 100°C or above, be sure to adhere to the following Cautions.

VALQUA Product No.	Pressure MPa (kgf/cm <sup>2</sup> ) <sup>(2)</sup>
6500 6500-AC 6501	<ol style="list-style-type: none"> <li>① Be sure that the gasket thickness is 1.5mm or below.</li> <li>② Apply some gasket paste (Seal Paste No. 5, No. 5M, No.6, No.6M)</li> <li>③ Apply a Compression stress of 29.4MPa (300kgf/cm<sup>2</sup>) or more.</li> <li>④ Use in locations which do not easily expose the piping to stress loads and in which it is easy to replace.</li> <li>⑤ To increase the compression stress it is recommended to use an annular packing whose dimensions are such that the outer diameter of the gasket becomes the inscribed dimension of the bolt.</li> </ol>

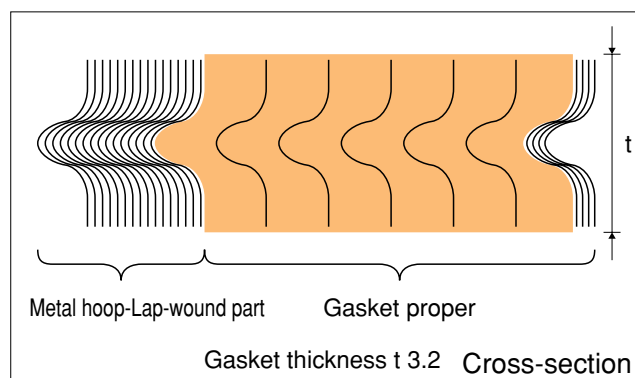
### Remarks

NON-AS joint sheet may give rise to problems in prolonged use in steam lines or similar pipes, according to the properties of the component materials and in accordance with application conditions.

When used for wall-buried steam pipes in buildings, for example, it is therefore recommended to use the more reliable Spiral wound Gaskets or Flexible Graphite Sheet Gaskets.

Gaskets may also harden as a result of prolonged thermal impact. An effective way of counteracting this may be to re-tighten immediately after commencement of use. If re-tightened after hardening, however, care should be taken as the gasket may rupture.

## NONA-SUPER (VALQUA No.8590 TN) (NON-AS Gasket replacing the asbestos joint)



\*For fuller details, please consult our special NONA-SUPER catalogue.

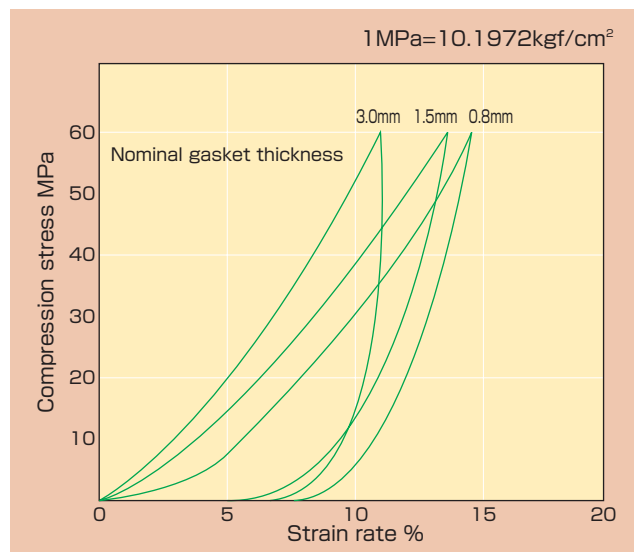
### Physical Properties

Item	VALQUA Product No.		Refer to: Asbestos Joint Sheet	
	General purpose	For equipment	JIS R 3453 Class 1 value	1500
	6500	6501		
Color	Blue	Gray		Black
Thickness mm	1.50	1.57	15	
Compressibility 34.3MPa{350kgf/cm <sup>2</sup> } %	10.0	8.9	12±5	9
Recovery 34.3MPa{350kgf/cm <sup>2</sup> } %	62.3	55.8	45 or above	55
Tensile strength, across grain MPa{350kgf/cm <sup>2</sup> }	15.0{153}	17.2{175}	15.7{160} or above	28.4{290}
Flexibility(12 times the thickness dimension)	No cracks	No cracks	Does not fracture.	No cracks
Density g/cm <sup>3</sup>	1.81	1.76		1.88
JIS No. 1 Oil 150°Cx5h				
Thickness increase %	0	1.0		
Weight increase %	4.5	7.1		
JIS No. 1 Oil 150°Cx5h				
Thickness increase %	2.2	4.2	30 or below	22.2
Weight increase %	3.9	9.0		16.8
Loss in tensile strength %	16.7	19.3	40 or below	30.9
JIS fuel oil A RT x 5h				
Rate of thickness increase %	2.4	2.8		
Rate of weight increase %	2.9	4.1		
JIS fuel oil B RT x 5h				
Thickness increase %	5.6	5.6		17.1
Weight increase %	5.6	8.3		10.5
Creep relaxation <sup>(1)</sup> %	27.5	25.2	40 or below	31.0
Creep relaxation <sup>(2)</sup> %	52.0	46.2		39.7
Sealability test JIS 10K 50A Compression stress 19.6MPa{200kgf/cm <sup>2</sup> } Internal pressure N <sub>2</sub> 0.98 MPa{10kgf/cm <sup>2</sup> }				
Sealability Pa m <sup>3</sup> /s {atm.cc/s}	5.8×10 <sup>-4</sup> {5.7×10 <sup>-3</sup> }	8.8×10 <sup>-4</sup> {8.7×10 <sup>-3</sup> }		5.4×10 <sup>-4</sup> {5.3×10 <sup>-3</sup> }

Remark: The above values are actual measurement data and not standard values.

Note (1): JIS R 3453 20.6MPa{210kgf/cm<sup>2</sup>}×100°C×22. (2): Based on JIS R 3453 20.6MPa{210kgf/cm<sup>2</sup>}×200°C×22.

### Compressibility and Recovery (No.6500)



When desired, it is recommended to apply the gasket paste in order to enhance the surface contact sealing property of the gasket and to facilitate the detachment of the gasket when the joint is removed.

This product does not contain any harmful substances or inflammable components whatsoever and will not be subject to any degenerative changes even during prolonged storage. The past product also has superior application properties and does not impair the NON-AS Joint Sheet surface.

Since a wide range of types is available to suit the various applications, it is easy to select a type that best covers the particular purpose.

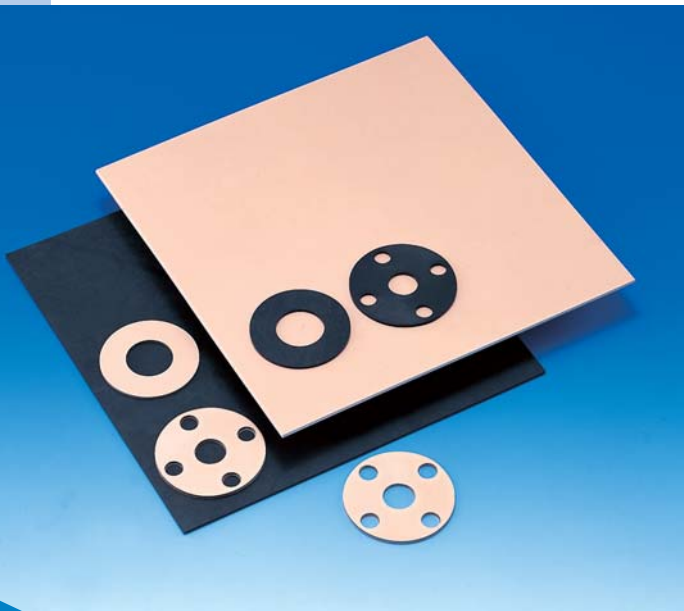


Product name	Description	Compatible fluids	Usable temperature range	Package
Gasket paste No. 5	Black paste consisting of a special oil-soluble bond with graphite particle admixture.	Aqueous fluids such as steam, hot water, cold water, brine, acids, alkalis, aqueous salt solutions, alcohol, etc.	-200~200	2.5kg Polyethylene canister
Gasket paste No. 5M	White paste consisting of a special oil-soluble bond with mica particle admixture.	Aqueous fluids such as steam, hot water, cold water, brine, acids, alkalis, aqueous salt solutions, etc. Used when whiteness is a particular requirement.	-200~200	2.5kg Polyethylene canister
Gasket paste No.6	Black paste consisting of a special water-soluble bond with a superior oil resistance and insolubility with graphite particle admixture.	Hydrocarbon type fluids such as petroleum oils, oil gases, solvents, solvent vapors, animal fats and vegetable oils, LNG, general gases.	-200~900	2.5kg Polyethylene canister
Gasket paste No. 6M	White paste consisting of a special water-soluble bond with a superior oil resistance and insolubility with mica particle admixture.	Hydrocarbon type fluids such as petroleum oils, oil gases, solvents, solvent vapors, animal fats and vegetable oils, LNG, general gases. Used when whiteness is a particular requirement.	-200~900	2.5kg Polyethylene canister
Seal paste	Light-brown paste consisting of a special non-drying oil bond with an admixture of an inorganic filler and a small amount of solvent.	Used in particular when trying to prevent corrosion occurring in gaps on stainless steel flanges when handling water, air, gasoline, kerosene, lubricants, natural gas, LPG, refrigerants, hydrogen sulfide, ethylene, butane, ethane and other hydrocarbons.	-50~300	800g Metal can
NEW VALFLON paste	This gasket paste contains a fluorocarbon resin powder hydro-dispersed using a surfactant.	Use when highly corrosive fluids such as strong acids and alkalis or halogens and when particularly highly inflammable fluids such as oxygen are required.	-200~300 (Oxygen gas, 100°C)	100g Metal tube 1kg Polyethylene canister

**Outstanding Chemical-Resistance**

These sheet and jacket gaskets use VALFLON (PTFE).

(VALFLON is a registered trademark of Nippon VALQUA for its fluorocarbon resin products.)



▲NO.7020/7026

**New VALFLON Gaskets**

VALQUA No.  
**7010-EX**

While retaining the superior heat- and chemical-resistance as well as non-adhesive properties of PTFE the New VALFLON Gaskets have been developed with the benefit of improved creep resistance to upgrade their heat cycle life and extend the service life of the gaskets.



▲NO.7010

**VALFLON Stamped Gaskets**

VALQUA No.  
**7010**

These gaskets are stamped out from a pure PTFE sheet. As they are susceptible to cold-flow they should generally be used on grooved flanges.

**VALFLON Gaskets**

VALQUA No.  
**7020**

The shortcoming of PTFE is its susceptibility to cold-flow (creep). In this type of gasket, the cold-flow property has been improved with the admixture of an organic filler and the use of a special manufacturing technique. These gaskets combine an excellent heat- and chemical-resistance with a high cold-flow resistance and are ideal for use in pipelines handling all types of chemical products (such as highly concentrated hot sulfuric and nitric acids). They cannot be used for sodium hydroxide and other highly concentrated alkalis and hydrofluoric acid. For these applications, use the equivalent product No. 7026. The No. 7020 product has been given safety and sanitation approval by the British National Water Corporation.

**Black VALQUALON Gaskets**

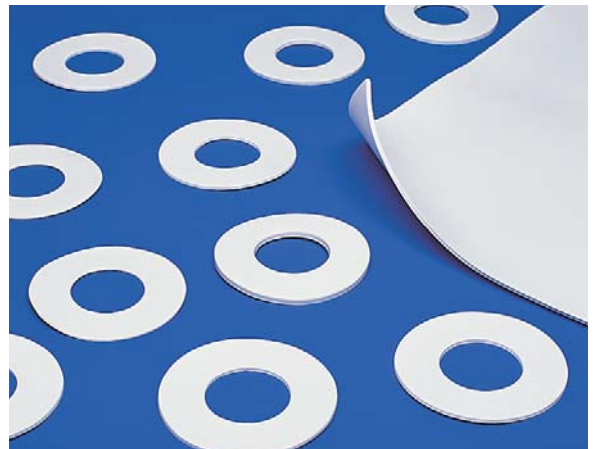
VALQUA No.  
**7026**

Similar to its equivalent - Product No. 7020 - the gaskets of this type boast an outstanding resistance to heat, chemicals and cold-flow and are therefore ideal for use in pipelines handling all types of chemicals. They are not suited for acidic fluids such as highly concentrated hot sulfuric and nitric acids. For these applications, the equivalent product No. 7020 should be used.

**VALQUALON Soft Sheet**

VALQUA No.  
**7GP61**  
(Sheet)  
**7GP66**  
(Gasket)

Benefiting from the outstanding chemical and heat resistance properties of PTFE, these sheet products with a superior flexibility (softness) have a net-type structure produced with the use of a special machining process.



▲NO.7GP61/GP66

## Usable Range

VALQUA Product No.	Temperature	Pressure MPa{kgf/cm <sup>2</sup> }
<b>7010</b> <sup>(1)</sup>	-50~100	0.49{5}
<b>7010-EX</b>	-50~150	0.98{10}
<b>7020</b> <b>7026</b>	-200~200	3.92{40}
<b>7GP66</b>	-240~260	1.96{20}

Temperature and pressure data refer to the respective limit values for application.  
Note 1: No. 7010 should generally be used for grooved flanges.

## Standard Dimensions

VALQUA Product No.	Nominal thickness	Size
<b>7010</b>	1.0, 1.5, 2.0, 3.0	Max. OD 1300
<b>7010-EX</b>	1.5, 3.0	Max. OD 1100
<b>7020</b>	1.0, 1.5	1000×1000
	2.0, 3.0	1270×1270
<b>7026</b>	1.5, 2.0, 3.0	1220×1220
<b>7GP61</b>	0.5, 1.0, 1.5	1500×1500
<b>7GP66</b>	2.0, 3.0	Max. OD 1450

## Design Data

### ▼m and y Values

VALQUA Product No.	Thickness mm	(m)	(y) N/mm <sup>2</sup> {kgf/mm <sup>2</sup> }
<b>7010</b> <b>7010-EX</b>	1.0/1.5	3.00	19.61 {2.0}
	2.0	2.50	14.71 {1.5}
	3.0	2.00	
<b>7020</b> <b>7026</b>	1.0	3.50	24.52 {2.5}
	1.5	3.20	22.55 {2.3}
	2.0	3.00	19.61 {2.0}
	3.0	2.50	
<b>7GP66</b>	0.5~3.0	2.50	19.6 {2.0}

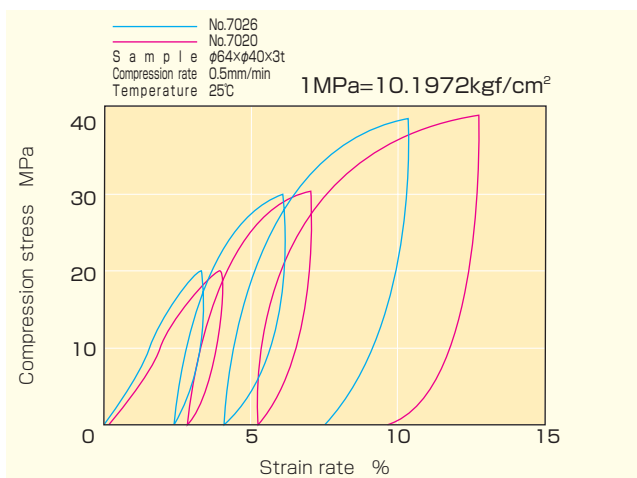
Remark: The m and y values for VALFLON gaskets are the same as those applicable to the fluorocarbon resin gaskets specified in JIS B 2206. The data quoted for 7010, 7010-EX and 7GP66 are values recommended by Nippon VALQUA.

### ▼VALFLON Gasket Characteristics

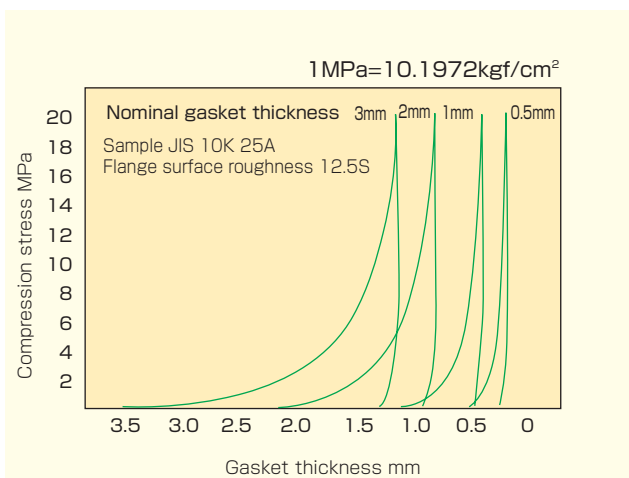
VALQUA Product No.	7020	7026	7010	Remark
Density g/cm <sup>3</sup>	2.33	2.03	2.19	JIS K 7137
Tensile strength Mpa {kgf/mm <sup>2</sup> }	15.2 {1.55}	26.5 {2.70}	25.4 {2.59}	
Elongation %	340	340	330	
Compressibility %	4.6	4.5	16.7	JIS R 3453
Recovery %	59	73	47	
Creep relaxation %	48	49	81	ASTM F38 100°C×22h, 20.6MPa{210kgf/cm <sup>2</sup> }

Remark: The above data are actual measurement results and not standard values.

### ▼VALQUALON Compressibility and Recovery (No. 7020 No. 7026)



### ▼VALFLON Soft Sheet Compressibility and Recovery (No. 7GP66)





## VALFLON Jacket Gaskets

VALQUA No.  
**N7030**  
**N7031**  
**N7035**

These wrapped gaskets use a NON-AS joint sheet instead of the conventional asbestos joint sheet as the center core.

According to the structure of the center core, these gaskets are classified into an N and S type. The N type gaskets are designed for general applications. In contrast, the S type gaskets have a more sophisticated core structure to suppress the flow characteristics that are the particular feature of PTFE jackets. They are therefore suited for high-temperature and high-pressure applications. VALFLON Jacket Gaskets are available with three different jacket shapes.

## ▼Type

VALQUA Product No.	N type	S type
<b>N7030</b> Series		
<b>N7031</b> Series		
<b>N7035</b> Series		

Remark: These VAL-FLON Jacket Gaskets can also be manufactured as special-purpose products for applications, including monomer, radiation resistant, and outer diameter attachment. For fuller details, please do not hesitate to contact us.

## ■ Usable Range ■

VALQUA Product No.	Temperature °C	Pressure MPa{kgf/cm <sup>2</sup> }
<b>N7030(N)</b>	-100~150 <sup>(1)</sup>	1.47 {15}
<b>N7031(N)</b>		
<b>N7035(N)</b>		
<b>N7030(S)</b>	-100~200 <sup>(1)</sup>	1.96 {20}
<b>N7031(S)</b>		
<b>N7035(S)</b>		

Temperature and pressure data refer to the respective limit values for application. Remark: The values above are given as a rough guide for selecting gaskets. Note 1: When the operating temperature exceeds 120°C, be sure to tighten uniformly to ensure that the piping is not subjected to stress. In applications involving frequent temperature and pressure variations, it is recommended to use Whitetite (No. 7590 Series) in locations that are difficult to access for maintenance. Refer to page 12.

## ■ Standard Dimensions ■

VALQUA Product No.	Thickness mm	Max. OD mm
<b>N7030(N)</b>	1.6~3.8	1000
<b>N7031(N)</b>		300~3000
<b>N7035(N)</b>		1000
<b>N7030(S)</b>	3.3~5.8	1000
<b>N7031(S)</b>		300~3000
<b>N7035(S)</b>		1000

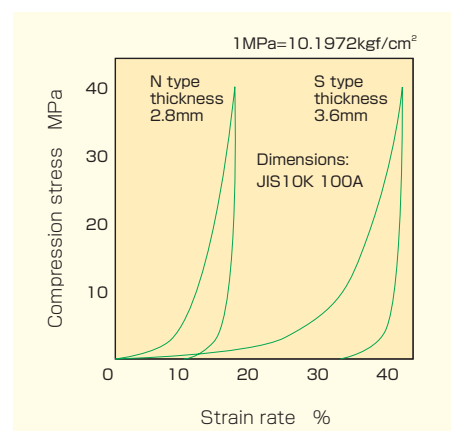
## ■ Design Data ■

## ▼m and y Values

VALQUA Product No.	(m)	(y) N/mm <sup>2</sup> {kgf/mm <sup>2</sup> }
<b>N7030</b> Series	3.50	14.71 {1.5}
<b>N7031</b> Series	4.00	19.61 {2.0}
<b>N7035</b> Series	3.50	14.71 {1.5}

Remark: The m and y values are the same as those applicable to the fluorine resin gaskets specified in JIS B 2206.

## ▼VALFLON Jacket Gasket Compressibility and Recovery (No. N.7030)



## VALQUA No. 7GS66A/7GS62A/7GS64N

The CODE SEAL (Soft) marshmallow-like free-size seal materials have the superior chemical- and heat-resistance that is the hallmark of PTFE with the added benefits of significantly improved softness and toughness properties.

They are available in three cross-sectional types: Oval, Flat and Round.



### CODE SEAL (Soft) Oval Shape

VALQUA No. **7GS66A** These string shaped products have an oval cross-section and are provided with an adhesive for easier working.

#### Standard Dimensions

Nominal dimension (Width, mm)	Thickness mm	Length m
3	0.5	30
6	3.0	15
9	4.0	8
12	5.0	5
16	6.0	
20		



Cross-section

### CODE SEAL (Soft) Tape Shape

VALQUA No. **7GS62A** These belt-shaped products have a flat (tape-shaped) section (1 ~ 3mm thickness) and are provided with an adhesive for easier working.

#### Standard Dimensions

Nominal dimension (Width, mm)	Thickness mm	Length m
20	1	15
30		
50		
20	2	5
30		
50		
20	3	5
30		
50		



Cross-section

### CODE SEAL (Soft) Rope Shape

VALQUA No. **7GS64N** The rope-shaped products have a round (rope-shaped) cross-section and are not provided with an adhesive.

#### Standard Dimensions

Nominal dimensions (Thickness, mm)	Length m
2	40
4	20
6	10
8	7
10	5
12	



Cross-section

### Usable Range

(Shown in case of No. 7GS66A)

Item	Dimension	Nominal dimension (Width, mm)		
		6	9	12
Temperature range, °C		-240~260		
Pressure limit MPa (kgf/cm <sup>2</sup> )	For gases	1.96{20}		
	For liquids	4.90{50}		

The temperature and pressure values given above refer to the respective limit values for use.

### Selection Criteria

- ▶ Provided that the flange surfaces are of a satisfactory quality, the pressure at which seals can be used is the higher the smaller their cross-sectional area is.
- ▶ The width after tightening the CODE SEAL (Soft) products **No. 7GS66A and 7GS64N** will be roughly 1.5 to 2.5 times the nominal dimension. Be sure therefore, to use a product with roughly half the contact area width of the gasket used. Use the values below as a rough guide for the nominal dimensions of the CODE SEAL (Soft) product **No. 7GS66A** with regard to the nominal flange diameter.

Nominal flange diameter	~500A	500~1000A	1000~1500A	1500A~
CODE SEAL (Soft) nominal diameter	3~9	6~12	9~12	12~20

### Applications

- ▶ Gaskets for large-diameter equipment tending to have a poor flange surface finish, a high strain and inadequate tightening force.
- ▶ Gaskets for towers, tanks, boilers, heat exchangers, and pressure vessels made of FRP, glass, glass lining, resin lining, rubber lining, ceramic or impermeable graphite.
- ▶ Gaskets for duct flanges and pipe flanges.
- ▶ Gland packing for valves

# NON-AS Spiral Wound Gaskets

Cleantite VALQUA No. 8590 Series/Cleantite Lined VALQUA No. 8590L Series

NON-AS Spiral Wound Gaskets use as the filler material NON-AS inorganic paper, VALQUAFOIL (Flexible Graphite) and VALFLON (PTFE) tape, and are distinguished by the excellent elasticity due to a V-shaped profile hoop.



## Cleantight

VALQUA No.  
**8590**  
Series

This gasket uses a non-asbestos inorganic paper instead of the conventional asbestos filler. It offers greater economy than the products using other non-asbestos fillers (VALQUAFOIL and VALFLON).

### Features:

- ▶ This product has a heat resistance equal to that of asbestos filler.
- ▶ This filler has a creamy color and does not use a coloring agent.
- ▶ It can be used for the same design as the conventional VALQUATIGHT (spiral wound gasket using a special asbestos paper as the filler). (m and y values, etc.)
- ▶ It offers a better economy than the other non-asbestos products (Blacktight and Whitetight).
- ▶ Products to nuclear energy specifications can also be manufactured.

### Applications:

Suitable for pipe flanges handling high-temperature and high-pressure fluids in petroleum refineries, chemical plants, electric power plants, gas and shipping industries as well as for a wide range of gasket applications on connecting surfaces of various types of equipment, including heat exchangers, towers and tanks, and valve bonnets.

## Lined Cleantight

VALQUA No.  
**8590L**  
Series

These spiral wound gaskets have a VALQUAFOIL-sheet tape wound in the middle of the Cleantight gasket. This VALQUAFOIL-sheet winding imparts a superior airtight seal and leads to a significant improvement in oxidation protection and heat resistance.





### Features:

- ▶ Further improvement in airtight sealing properties as compared with Cleantight.
- ▶ Heat resistance equivalent to asbestos products: Can withstand temperatures of 600°C.

### Applications:

This product is practically identical with Cleantite and is suited for applications in which airtightness and heat resistance are particularly important requirements.

## ▼Type

Name	Filler material	Basic type	With inner ring	With outer ring	With inner and outer rings
					
Cleantight VALQUA No. 8590 Series	Non-asbestos inorganic paper	No.8590	No.8592	No.8591	No.8596
Lined Cleantight VALQUA No. 8590L Series	Non-asbestos inorganic paper VALQUAFOIL-sheet tape	No.8590L	No.8592L	No.8591L	No.8596L
Blacktight VALQUA 6590 Series <sup>(1)</sup>	VALQUAFOIL-sheet tape	No.6590	No.6592	No.6591 <sup>(1)</sup>	No.6596
Whitetight VALQUA No. 7590 Series <sup>(1)</sup>	VALFLON tape	No.7590	No.7592	No.7591 <sup>(1)</sup>	No.7596

Note 1: Nos. 6591 and No. 7591 may give rise to abnormal deformation on the inner wall surface in accordance with the operating conditions. Wherever possible, inner and outer rings should be used.

# Blacktight VALQUA No. 6590 Series/Whitetight VALQUA No. 7590 Series/

**Blacktight**

**VALQUA No. 6590 Series**

**Features:** These spiral wound gaskets use the pure graphite (flexible graphite) sealing material VALQUAFOIL-sheet as the filler. They are distinguished by the outstanding sealing properties as well as their slave (follow) properties with regard to heat and pressure cycles.

- ▶ In view of their outstanding airtightness (seal), they help to substantially improve the sealing performance of gas and vacuum seals.
- ▶ In view of the outstanding slave (follow) behavior toward heat and pressure cycles, they only need minor re-tightening.
- ▶ They possess superior radiation resistance. (Products consistent with nuclear energy specifications are also available.)
- ▶ They exhibit a superior sealing performance at extremely low temperatures. (A special product No. 6596VC for extremely low temperatures is also available. Be sure to make a specific inquiry for this product.)

**Applications:** Suitable for all types of industrial pipe flanges for petroleum refineries, chemical plants, electric power plants, gas and shipping industries and iron and steel mills as well as for a wide range of gasket applications on connecting surfaces of various types of equipment, including heat exchangers and valve bonnets. They are also suited for high-temperature and high-pressure steam and LNG and the gaskets for extremely low temperatures are ideal

**Whitetight**

**VALQUA No. 7590 Series**

**Features:** These spiral wound gaskets use VALFLON® (PTFE) type with its superior chemical resistance as the filler material. Because of their superior sealing and airtightness properties for corrosive fluids for which it is not possible to use other fillers, these gaskets are suited for gas and vacuum seals.

- ▶ In view of their superior resistance to corrosion, they can be used for practically all fluids provided that a suitable hoop material is selected.
- ▶ In view of their outstanding sealing properties, they provide a major improvement in gas and vacuum seal performance.

**Applications:** Suitable for all types of industrial pipe flanges for petroleum refineries, chemical plants, electric power plants, gas and shipping industries and iron and steel mills as well as for a wide range of gasket applications on connecting surfaces of various types of equipment, including heat exchangers and valve bonnets. They are suited, in particular, for gasket applications involving corrosive fluid and oxygen seals for which it is not possible to use other spiral wound gaskets, and as gas and vacuum seals.

● In the case of low-pressure gas seals, it may not be possible to achieve an adequate tightness (seal) with the bolt load which is determined on the basis of the above m and y values. It is therefore recommended to use a tightening force in accordance with the table below as the minimum tightening pressure. Use as the minimum tightening force either the tightening force (Wm1 or Wm2) calculated on the basis of JIS B 8265 or the tightening force calculated in accordance with the recommended tightening force data given below, whichever is the largest.

Type (Filler material)	No. 6590 Series (VALQUAFOIL Tape)	No. 8590 Series (NON-AS inorganic paper)	No. 7590 Series (VALFLON Tape)
Compression force per gasket projection area N/mm <sup>2</sup> (kgf/mm <sup>2</sup> )	49.0 {5.00}	68.6 {7.00}	34.3 {3.50}

Remark: For large diameters and for applications likely to lead to flange deformation, please do not hesitate to consult us.

## Usable Range

VALQUA Product No.	Temperature °C	Pressure MPa (kgf/cm <sup>2</sup> )
<b>8590 Series</b>	-200~500*	29.4{300}
<b>8590L Series</b>	-200~600	
<b>6590 Series</b>	-270~400	
<b>7590 Series</b>	-260~300	19.6{200}

Temperature and pressure data refer to the respective limit values for application. Remark: The above temperature range may vary in accordance with the hoop and inner and outer ring materials. May be used at 500-600°C, depending on conditions. When you use the 8590 Series at 500°C or above, be sure to adhere to the following precautions. Be sure to apply a sufficient load to the Compression stress initially. Please consult us for details. Sealing performance is equivalent to the 590 Series. When a better seal is required it is recommended to use a lined product.

## Manufacturing Range

### ▼For Standard Pipe Flanges

For JIS pipe flanges: 10K, 16K, 20K, 30K, 40K and 63K  
For JPI and ANSI pipe flanges: Class 150, 300, 400, 600, 900, 1500, and 2500.

Products for other standard pipe flanges, including ASME and MSS can also be manufactured.

### ▼For Nonstandard Flanges

Nippon VALQUA also manufactures gaskets for all types of equipment, including heat exchangers, pressure vessels and valve bonnets. Refer to table on the right for products that can be manufactured.

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

Remark: Letters in parentheses ( ) give the classification symbol. Products with a gasket thickness of 1.6mm are manufactured by using SUS316 as the hoop material for the basic version.

### ▼Metal materials used for gasket parts

The following types of material are used for the hoop and for the inner and outer rings.

When materials other than these listed below are desired please do not hesitate to consult us.

Metal Material	
Carbon steel <sup>(1)</sup>	SUS321
SUS304	SUS347
SUS304L	Titanium
SUS316	Nickel
SUS316L	Monel metal

Note 1: Carbon steel is used only for the inner and outer rings.

## Design Data

### ▼For Standard Pipe Flanges

The m and y values for NON-AS spiral wound gaskets are the same as the values laid down in JIS B 8273.

(m)	(y) N/mm <sup>2</sup> (kgf/mm <sup>2</sup> )
3.00	68.94 {7.03}

These gaskets benefit from the unique features of VALQUA FOIL which is a pure graphite seal material. Its outstanding characteristics include softness and flexibility combined with a superior resistance to heat and chemicals as well as excellent sealing properties. It is also available as a laminate with a PTFE sheet on both sides.



▲VF-30

## Features

- ▶ Outstanding sealing properties.
- ▶ Suitable for use in a wide range of application temperatures from extremely low to high temperatures.
- ▶ Superior chemical resistance.
- ▶ Excellent resistance to radioactive radiation.
- ▶ Providing a satisfactory sealability even at a low compression force. (No. VFT-30, VFT-35E)
- ▶ Free from the risk of gasket adhesion to the flange surface. Easy maintenance. (No. VFT-30, VFT-35E)

## Usable Range

VALQUA Product No.	VF-30	VF-35E	VFT-30	VFT-35E
Temperature, °C	-240~400		-240~300 <sup>(1)</sup>	
Pressure MPa (kgf/cm <sup>2</sup> )	1.96{20}	4.90{50}	1.96{20}	4.90{50}

Temperature and pressure data refer to the respective limit values for application.  
Note 1: VFT gaskets may stick when used at temperature above 250°C.

## Manufacturing Range

VALQUA Product No.	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	1000×1000
	1.6	
	3.0	
VFT-30	0.5 0.8 1.0	1000×1000 (10m roll)
	1.5	1000×1000
VFT-35E	0.8 1.6 3.0	

Note: VFT-30 products with a thickness of 0.5, 0.8 and 1.0mm can also be supplied in a length of 10m. Please do not hesitate to consult us for details.

## Types of products

VALQUA Product No.	Description	Structure
VF-30 (VF sheet)	After forming VALQUA FOIL into a sheet, the gasket is produced by stamping the sheet into the required flat shape.	Flexible graphite sheet
VF-35E (VF sheet with inlaid thin stainless steel sheet)	After bonding VALQUA FOIL sheet onto both sides of a thin stainless steel sheet (thickness 0.05mm), the gasket is produced by stamping the sheet into the required flat shape.	Flexible graphite sheet Thin stainless steel sheet
VFT-30 (VFT sheet)	To improve the sealability, a PTFE sheet (soft type) is laminated onto both sides of a No. VF-30 sheet and the gasket is produced by stamping the sheet into the required flat shape.	PTFE sheet (Soft type) Flexible graphite sheet
VFT-35E (VFT sheet with inlaid thin stainless steel sheet)	To improve the sealability, a PTFE sheet (soft type) is laminated onto both sides of a No. VF-35 sheet and the gasket is produced by stamping the sheet into the required flat shape.	PTFE sheet (Soft type) Flexible graphite sheet Thin stainless steel sheet PTFE sheet (Soft type)

Remarks: Other products than the above are also available on request. These include VALQUA FOIL Gathered tape (No. VF-50), adhesive-coated flat tape (No. VF-60), and adhesive-coated Gathered tape (No. VF-70). Be sure to inquire.

## Compatible Fluids

Can be used for fluids, including all types of gases, steam, hot water, hot oils, solvents, acids, alkalis, LNG, liquefied nitrogen and liquefied hydrogen. Not suited for oxygen acids such as high-temperature concentrated sulfuric acid and concentrated nitric acid.

## Applications

Suited for gasket applications including all types of industrial equipment and covered connections.

## Design Data

### Characteristics Values

Item		VF-30	VF-35E	VFT-30	VFT-35E	
Tensile strength	MPa{kgf/cm <sup>2</sup> }	3.92{40} <sup>(1)</sup>	----	3.92{40} <sup>(1)</sup>	----	
Compressibility	34.3MPa{350kgf/cm <sup>2</sup> } %	47 <sup>(1)</sup>	----	47 <sup>(1)</sup>	----	
Recovery	34.3MPa{350kgf/cm <sup>2</sup> } %	10 <sup>(1)</sup>	----	10 <sup>(1)</sup>	----	
Creep Relaxation	20.6MPa{210kgf/cm <sup>2</sup> } 100°C × 22h %	2.5 <sup>(1)</sup>	----	2.5 <sup>(1)</sup>	----	
Gasket factor (m)		2.0 <sup>(2)</sup>				
Minimum Design Sealing Stress (y)	N/mm <sup>2</sup> {kgf/mm <sup>2</sup> }	Fluid (steam)	26.0{2.65} <sup>(2)</sup>	29.4{3.00} <sup>(2)</sup>	26.0{2.65} <sup>(2)</sup>	29.4{3.00} <sup>(2)</sup>
		Gas	39.2{4.00} <sup>(3)</sup>		26.0{2.65} <sup>(3)</sup>	29.4{3.00} <sup>(3)</sup>

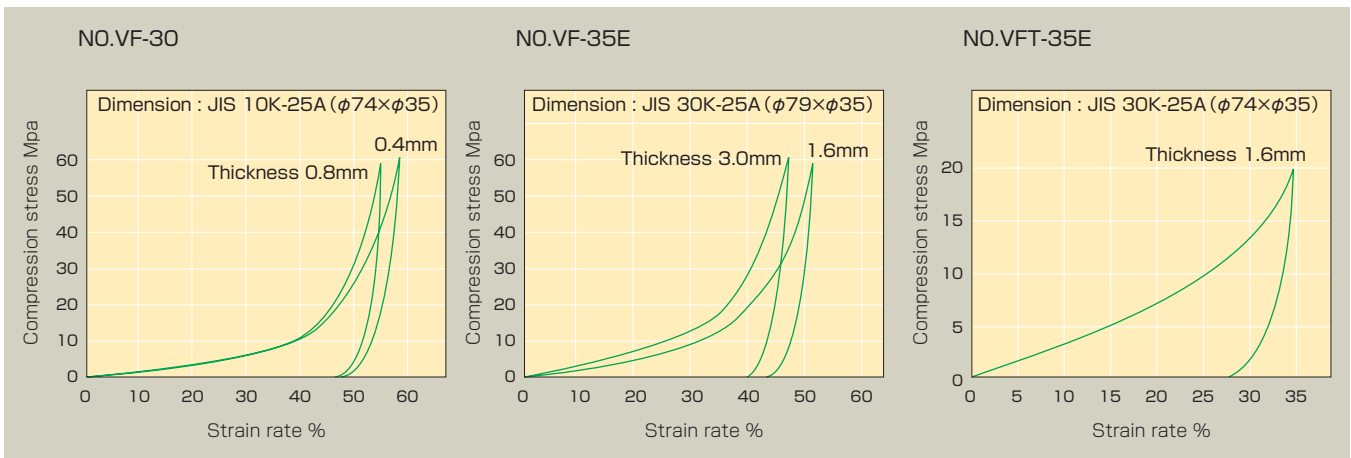
Note (1): The above values are actual measurement data and not standard values.

Note (2): Based on the data for JPI-7R-70-88. (For details about sealing properties, refer to the figures below.)

Note (3): These are Nippon VALQUA's own recommended values and indicate the tightening force per unit gasket projection area.

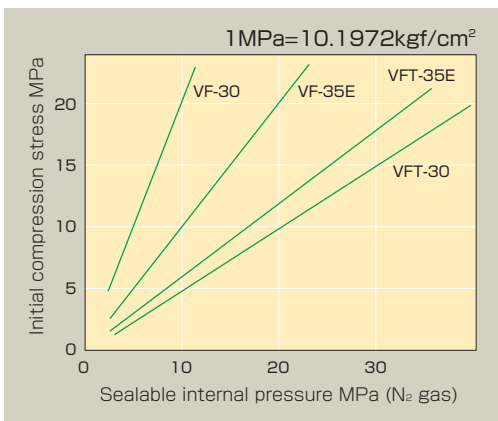
### Compressibility and Recovery

1 MPa = 10.1972 kgf/cm<sup>2</sup>



### Sealability

#### Sealable internal pressure - Initial tightening pressure



#### Test Conditions

Gasket size: JIS 10K-25A Thickness 1.6mm  
(Thickness of No. VFT-30 sheet: 1.5mm)  
Test temperature: Ambient temperature  
Leak tester: Precision membrane flowmeter  
Test fluid: Nitrogen gas  
Hermetic seal quality assessment criterion: Seal is considered gas-tight when no leak can be detected below the sensitivity limit of the flowmeter (1.7x10<sup>-4</sup>Pa · m<sup>3</sup>/s).  
Load application device: Amsler compression testing machine

#### VFT-35E Low-temperature Sealing Properties

Compression stress MPa	Leak rate Pa · m <sup>3</sup> /s {Torr · l / s}
10	6.24 × 10 <sup>-5</sup> {4.68 × 10 <sup>-4</sup> }
15	Below detection limit

#### Test Conditions

Gasket size: JIS 10K-25A - Thickness 1.6mm  
Flange: JIS 10K-25A - (SUS304)  
Bolt: M16 × 4 bolts (SUS 304)  
Test temperature: -196°C (liquefied nitrogen)  
Leak detection method: Pressure exposure method (Sensitivity limit of test: 1.28x10<sup>-5</sup>Pa · m<sup>3</sup>/s)  
Test fluid: Helium gas  
Initial internal fluid pressure: 2MPa

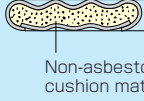
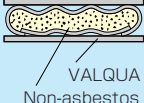
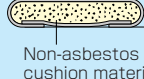
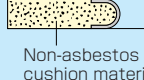
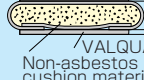
Instead of the conventionally used asbestos, the metal jacket gaskets of this series use a non-asbestos cushion of outstanding heat resistance as the core material. These gaskets are available in two types: Flat-section and corrugated section types. They can be made to any desired shape and are therefore suitable for gasket applications involving irregular flange shapes and heat exchangers.



### Features

- ▶ Flat-section types with a complicated shape and big or large size gaskets can also be produced.
- ▶ Can be used with the same design as the conventional asbestos type metal jacket gaskets.

### ▼Types of Products

Name	Cross-sectional shape	VALQUA Product No.
NON-AS Metal jacket gasket (All corrugated-section products are coated.)		<b>N510 Series</b>
		<b>N6510 Series</b>
NON-AS Metal jacket gasket (All flat-section products are coated.)		<b>N520 Series</b>
		<b>N520-C</b>
		<b>N6520 Series</b>

Remark: For products other than the adhesive-coated VALQUA FOIL series, be sure to use with gasket paste (seal paste or No. 6M).

### ■ Usable Range ■

VALQUA Product No.	N510	N520
Temperature	Differs to coating materials	
Pressure	6.86MPa{70kgf/cm <sup>2</sup> }	

Temperature and pressure data refer to the respective limit values for application. Remark: Temperature to which VALQUA FOIL adhesive-coated products are heat-resistant is 400°C.

### ■ Manufacturing Range ■

Can be manufactured to any desired shape and up to an outer diameter of approximately 3,000mm. Even larger sizes than 3000mm can be manufactured locally on request. Be sure to inquire.

Gaskets for heat exchangers or similar equipment can be manufactured with a minimal core connecting section (based on a patented manufacturing process) to upgrade reliability. Be sure to inquire.

### ▼Metal Materials Used

The main metal materials include soft steel, copper, stainless steel (304, 304L, 316, 316L 321, 347, etc.), 5Cr-0.5Mo steel alloy, Monel metal, titanium, nickel, aluminum, arms bronze, and lead.

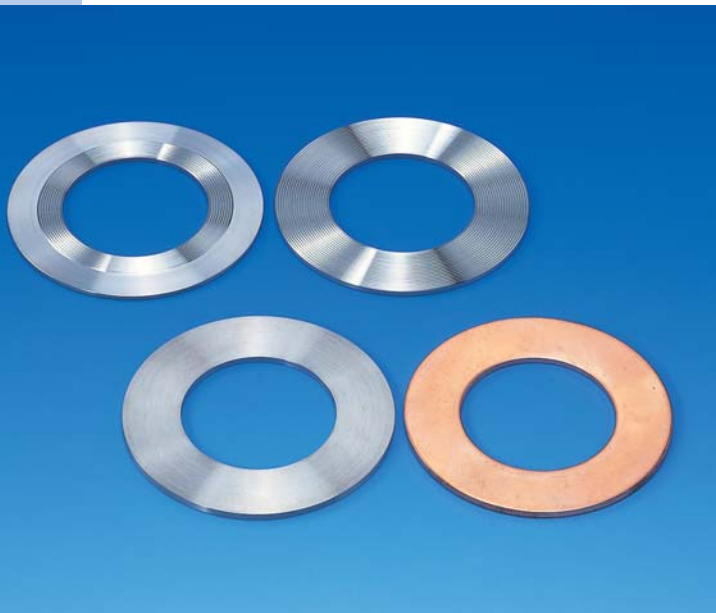
### ■ Applications ■

Suitable for gasket application in heat exchangers, pressure vessels, tower/tanks, and valve bonnets used in the petroleum refining and petrochemical /chemical sectors.

# Metal Serrated and Flat Gaskets

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

The metal gaskets come in two types: Flat-section gaskets with the metal sheet finished to the required dimensions and shape, and Serrated gaskets with concentric grooves to improve sealing.



## ▼Types of Products

Name	Cross-sectional shape	VALQUA Product No.
Metal flat-shaped gasket		<b>560 Series</b>
Serrated gasket		<b>540 Series</b>
Serrated gasket VALQUA FOIL adhesive coated product		<b>6540H Series</b>

## ■ Usable Range ■

VALQUA Product No.	540 Series	560 Series	6540H Series
Temperature	Differs according to metal used		
Pressure MPa{kgf/cm <sup>2</sup> }	13.7{140}		

Temperature and pressure data refer to the respective limit values for application. Remarks: Temperature to which VALQUA FOIL adhesive-coated products are heat-resistant is 400°C. If this temperature is exceeded, be sure to inquire separately.

## ▼Metals Materials Used

Metals used include very soft steel, soft iron, stainless steel (304, 304L, 316, 316L, 321, 347, 310S), 5Cr-0.5Mo steel alloy, copper, Monel metal, titanium, and nickel.

## ■ Applications ■

Can be used in high-temperature, high-pressure steam and process lines for tower, tanks, heat exchangers, autoclaves and valve bonnets. Can also be used for flat-seat, grooved and insert-type joints/connectors.


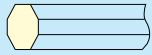


## WHEN PLACING ORDERS

Be sure to state the material, shape and dimensions as these products can be manufactured to any desired dimension. A full range of oxygen-free copper gaskets is also available for the CONFLAT flanges used in the semiconductor industry and for vacuum equipment.

These metal gasket elements are used for ring joint seat flanges with a range of applications, including pipe flanges in high-temperature and high-pressure fluid lines, pressure vessels, and valve bonnets.



### ▼Types of Products

Name	Cross-sectional shape	VALQUA Product No.
Oval cross-section		<b>550-ZO</b> Series
Octagonal cross-section		<b>550-ZS</b> Series
API-RX cross-section		<b>550-ZA</b> Series
API-RX cross-section		<b>550-ZP</b> Series

### ■ Manufacturing Range ■

#### ▼Dimensional standards

The standard product range is for ring joint seat flanges standardized in JPI, ASME, API and MSS.

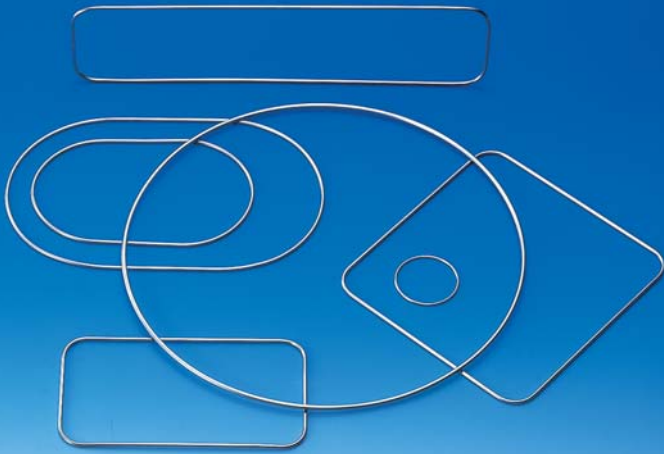
#### ▼Metal Materials Used

Metals used include very soft steel, soft iron, stainless steel (304, 304L, 316, 316L, 321, 347, 310S), 5Cr-0.5Mo steel alloy, Monel metal, titanium, and nickel.

### ■ Applications ■

These products are used for a large diversity of gaskets, including pipe flanges for lines handling high-temperature and high-pressure steam, gases, oil and solvents in the petroleum refinery and chemical industries, the electric power and shipping sectors, as well as pressure vessels, towers, tanks and valve bonnets.

The metal O-rings are produced from a thin metal tube that is imparted a round or any other specified shape, with the two ends welded together. A seal is achieved with a relatively low tightening force, allowing a relatively compact design for the gasket connecting part. The O-rings can be used for all types of high-temperature, high-pressure and high-vacuum equipment.



### ▼Types of Products

Name	Cross-sectional shape	VALQUA Product No.
Basic shape		<b>3640</b>
Balanced shape		<b>3641</b>

### ■ Usable Range ■

VALQUA Product No.	<b>3640</b>	<b>3641</b>
Pressure	High-vacuum~6.86MPa {70kgf/cm <sup>2</sup> }	Vacuum~294MPa {3000kgf/cm <sup>2</sup> }

### ■ Applications ■

These products are used for equipment gaskets in all types of industrial applications, including aviation and space equipment, vacuum equipment, semiconductor area, nuclear energy sector, electronic equipment, stirrers, melt extruders, and hydraulic equipment.

### ■ Manufacturing Range ■

Pipe symbol	Pipe dia. mm x Pipe wall thickness mm	SUS304	SUS316	SUS321	Incoloy 800	Range of OD dimensions manufactured
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			○		
C	2.4×0.25	○	○	○	○	25~350
N	2.4×0.35			○		
D	2.4×0.5	○	○	○	○	
E	3.2×0.25	○		○	○	
O	3.2×0.35			○		40~1500
F	3.2×0.5	○	○	○	○	
P	3.2×0.8			○		
I	4.8×0.5	○		○		200~2000
K	6.4×0.8	○		○		400~2500

○ Stock material

Remark: Metal O-rings are finished so that the inner beads produced when the metal tubes are welded-jointed are uniformly distributed over the entire surface.

### ▼Dimensional standards

	Material
Pipe	Stainless steel (SUS304)
	Stainless steel (SUS316)
	Stainless steel (SUS321)
	Stainless steel (SUS316L)*
	Incoloy
Coating material	VALFLON (PTFE)
	Silver-plating
	Nickel-plating
	Copper-plating
	Gold-plating

\*Only for pipe dia. of φ 0.9

These metal C-rings use a coil spring as the elastic tensing element which is coated with a thin metal sheet. They have a high elasticity and restoration (rebound) capacity, requiring a small tightening force to produce a seal. They are used in ultra-high vacuum equipment at temperatures in excess of the range in which rubber O-rings can be used, as well as in very low temperature and high-pressure application areas.



## Usable Range

Temperature <sup>1)</sup>	-270~250°C
Pressure	Ultra-high vacuum~6.86MPa{70kgf/cm <sup>2</sup> }

Temperature and pressure data refer to the respective limit values for application.  
Note 1): Temperature range is quoted for the aluminum product and will differ according to materials used.

## Manufacturing Range

Section dia. mm <sup>1)</sup>	ID, mm
3.8	25~2000
5.6	150~3000

Note1): We also manufacture to other dimension as required, including cross-sections of 1.7, 2.6, 8.0 or 10.0.

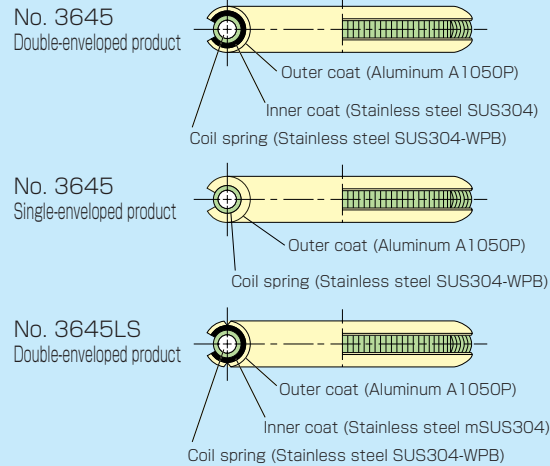
## Applications

Used in semiconductor and nuclear energy applications, in the electronic industry, in laser equipment, joints, valves and extrusion machines.

## Design Data

Section dia. mm	ID mm	Groove depth mm	Required tightening force N/mm (kgf/cm <sup>2</sup> )			
			Aluminum	Silver - Copper	Nickel - Tantalum	Stainless steel - Titanium
1.7	5~ 50	1.4	200 200	200 200	250 250	290 300
2.6	10~ 100	2.1	220 220	250 250	340 350	400 410
3.8	25~1500	3.0	250 250	310 320	490 500	590 600
5.6	150~2000	4.5	340 350	390 400	640 650	780 800
8.0	175 or more	7.0	320 350	490 500	—	—
10.0	175 or more	9.0	390 400	590 600	—	—
Flange surface roughness			3.2S	1.6S	0.8S	0.8S

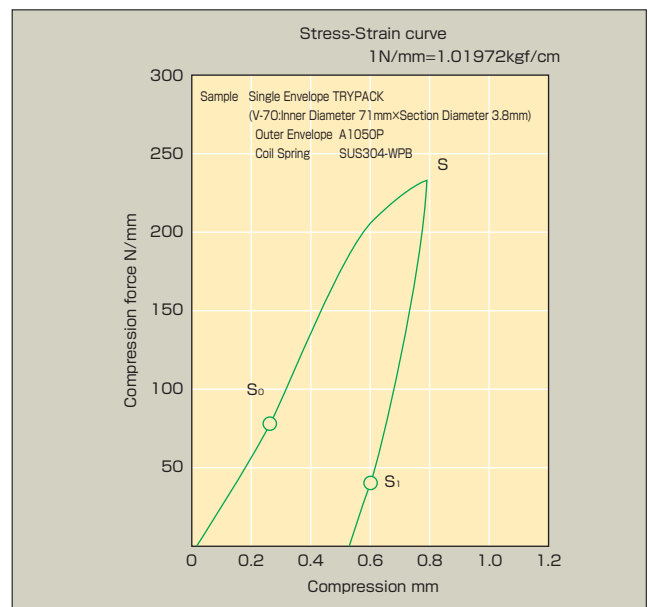
## Metal Materials Used



In addition to the standard materials, the products shown in the table below are also available upon request.

Outer coat	Stainless steel, nickel, silver, copper, tantalum
Inner coat	Inconel
Coil spring	Inconel, Nimonic

## Performance



- Maximum permissible leak rate :  $\text{He}1 \times 10^{-11} \text{ Pa} \cdot \text{m}^3/\text{S} \{10^{-10} \text{ Torr} \cdot \ell/\text{S}\}$
- Starting point of seal :  $S_0$  78.4N/mm{80kgf/cm}
- Limit point of seal :  $S_1$  44.1N/mm{45kgf/cm}
- Recovery : 0.2mm

\*  $S_0$  is the point at which the leak volume is equal to, or less than the maximum permissible leak volume and  $S_1$  is the limit at which the leak volume can be maintained at a level equal to, or below, the maximum permission leak rate.

VALQUATEX is a woven fabric using a non-asbestos material such as a ceramic instead of the conventional asbestos. VALQUATEX gaskets are used for flanges in applications such as equipment manholes and exhaust gas ducts.

### ▼Types of Products

<b>N214</b>	This type of gasket is made from a rubberized glass fiber fabric finished to the required flat shape.
<b>N314</b>	This type of gasket is made from a rubberized metal wire-reinforced ceramic fiber fabric finished to the required flat shape.

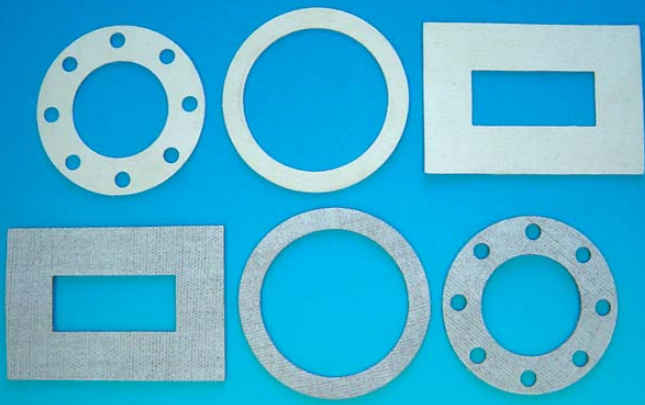
### ■ Usable Range ■

VALQUA Product No.	<b>N214</b>	<b>N314</b>
Temperature	400℃	800℃

Remark: This gasket does not provide an adequate airtight seal. Be sure to use this gasket for applications in which a certain amount of leakage is permissible.

### ■ Manufacturing Range ■

- ▶ These products can be manufactured to any desired shape and dimensions on request. Be sure to inquire.
- ▶ It is also possible to manufacture products that are surface-treated with graphite to customer requests.  
(For ease of maintenance, surface treatment is applied to improve detachment from flanges.)



## Synthetic Rubber Gasket

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

This type of gasket is stamped from various types of rubber sheets.

### ■ Types of Products and Usable Range ■

VALQUA Product No.	Rubber material	Usable range	
		Temperature, ℃	Pressure MPa (kgf/cm <sup>2</sup> )
<b>2010</b>	Nitrile rubber (NBR)	-30~120	0.49{5}
	Chloroprene rubber (CR)	-30~120	
	Ethylene-propylene rubber (EPDM)	-40~150	
<b>4010</b>	Fluoro-rubber (FKM)	-15~200	
<b>5010</b>	Silicone rubber (VMQ)	-60~200	

Remark: Use these products by taking the upper temperature values as a rough guide.

### ■ Manufacturing Range ■

Thickness mm	1.0 1.5 2.0 3.0 4.0 5.0
Size mm	1000 *Maximum OD

### WHEN PLACING ORDERS

Be sure to state the material, shape and dimensions as these products can be manufactured as sheet or stamped gaskets. Be sure to inquire.



Type	VALQUA No.	Application										Color	Page	
		Valve		Rotary pump			Reciprocating machine			Rotary 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
Carbon fiber type	<b>6201</b>			200	0.98	20				200	4.9	5	Black	27
	<b>6232</b>	260	10.3				260	9.8	5				Black	27
	<b>6234</b>			200	0.98	15				200	4.90	5	Gray	27
	<b>6262</b>			260	1.57	20				260	4.9	5	Black	27
	<b>6267</b>	350	15.5										Black	27
	<b>6345</b>	600 <sup>1)</sup>	25.9	600 <sup>1)</sup>	1.96	20	600 <sup>1)</sup>	14.7	5	600 <sup>1)</sup>	14.7	5	Black	27
	<b>6399</b>	300	25.9				300	24.5	5				Black	28
	<b>6399H</b>	300	43.1				300	39.2	5				Black	28
	<b>6399L</b>	260	25.9										Black	28
VALFLON type	<b>7202E</b>			260	1.57	16	260	4.9	5	260	4.9	5	Black	28
	<b>7202W</b>			260	1.57	16	260	4.9	5	260	4.9	5	White	29
	<b>7202</b>	260	5.1	260	1.57	20	260	4.9	5	260	4.9	5	Black	28
	<b>7203</b>	260	10.3	260	1.96	20	260	9.8	5	260	9.8	5	Black	29
	<b>7232</b>	260	5.1	260	1.57	5	260	4.9	1	260	4.9	1	White	29
	<b>7233</b>	260	10.3										White	29
	<b>7262</b>			260	1.57	5				260	4.9	1	White	29
Special fiber type	<b>8132</b>			260	0.98	10	260	4.9	1	260	4.9	1	White	30
	<b>8133</b>	260	10.3										White	30
	<b>8133L</b>	260	10.3										White	30
	<b>8137</b>	260	15.5	120	0.78	8 <sup>2)</sup>	260	14.7	1	260	14.7	1	White	30
	<b>8201</b>	260	10.3	260	1.96	16	260	14.7	5	260	14.7	5	Brown	30
	<b>8201 (NL)</b>	260	10.3	260	1.96	8	260	14.7	1	260	14.7	1	Brown	30
Graphite type	<b>VF-10</b>	650 <sup>1)</sup>	43.1										Black	31
	<b>VF-20</b>	650 <sup>1)</sup>	43.1										Black	31
	<b>VF-20L</b>	650 <sup>1)</sup>	43.1										Black	31
	<b>VF-20LF</b>	650 <sup>1)</sup>	43.1										Black	31
	<b>VFC-25</b>	650 <sup>1)</sup>	43.1										Black	31
	<b>VF-22</b>			600 <sup>1)</sup>	2.5	25	600 <sup>1)</sup>	14.7	5	600 <sup>1)</sup>	14.7	5	Black	31
	<b>VF-25</b>	650 <sup>1)</sup>	43.1										Black	31
	<b>VF-25L</b>	650 <sup>1)</sup>	25.9										Black	31
	<b>VF-25LF</b>	650 <sup>1)</sup>	43.1										Black	31
	<b>VFT-22</b>	300	10.3										Gray	31
Metal type	<b>1110</b>	350	25.9	350	1.96	20	350	24.5	5	350	24.5	5	Gray	30

Main applications
  Suitable application

Note 1: Heat resistance temperature varies according to the fluid used.  
 Note 2: In case of lubricated products.

# NON-AS Gland Packing Selection Chart for Valve Stem

◎ Recommended product ○ Recommended product combination ☆ For adapter packing		VALQUA No.											
		8133 <sup>1)</sup>	6232	7233 <sup>2)</sup>	VFT-22	8137	6399L	VF-25L	VF-10 VF-20 VF-20L VF-20LF	6267	1110	6345	VF-25 VF-25LF VFC-25
Maximum temperature °C		260	260	260	300	260	260	650 <400 <sup>4)</sup>	650 <400 <sup>4)</sup>	350	350	650 <400 <sup>4)</sup>	650 <400 <sup>4)</sup>
Maximum pressure 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		2~13	0~14	0~14	0~14	2~13	0~14	0~14	0~14	0~14	5~9	0~14	0~14
ANSI Rating- Compatible Range	Class 2500												
	Class 1500												
	Class 900												
	Class 600												
	Class 300												
	Class 150												
Water-based fluid	Freshwater, sea water, hot water				◎	◎	◎		○		☆	☆	☆
	Saturated steam, Superheated steam				◎	◎	◎		○		☆	☆	☆
Oil-based fluid	Animal and vegetable oils, mineral oils, heavy fuel oil				◎	◎	◎		○		☆	☆	☆
	heating medium								○		☆	☆	☆
Solvents	Alcohol-based solvents			◎	◎	◎			○	☆		☆	
	Aromatics			◎	◎	◎			○	☆		☆	
	Ketones, esters			◎	◎	◎			○	☆		☆	
Corrosive fluids	Weak acids, weak alkalis		◎		◎	◎	◎		○	☆		☆	
	Strong non-oxidizing acids			◎	◎				○	☆		☆	
	Oxidizing acids, oxidants 3)			◎									
	Strong alkalis		◎	◎	◎		◎		○	☆		☆	
Gaseous fluids	Incombustible gases, combustible gases								○	☆		☆	
	Combustion-supporting gases			◎									
	Liquefied gases								○		☆	☆	

Remarks: This selection chart gives the product numbers recommended for the individual conditions. The absence of a symbol does not necessarily mean that the product concerned cannot be used. In some application conditions, however, powder debris from packing wear may enter the fluid.

Note 1) Use 8133L for gaseous fluids.

Note 2) Use 7233 (O) or 7233 (SO) for gaseous fluids and 7233 (FO) for combustion-supporting fluids.

Note 3) Use only 7233 for oxidizing acids.

Note 4) In air

Note 5) When mixed with VF-10, VF-20, VF-20L, and VF-20LF.

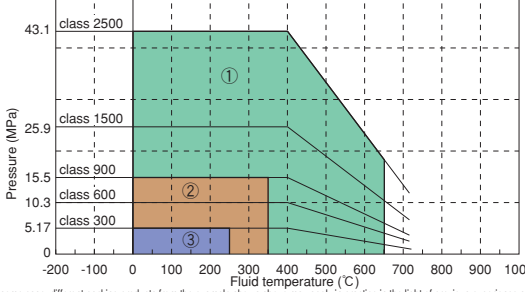
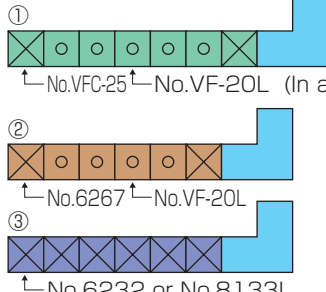
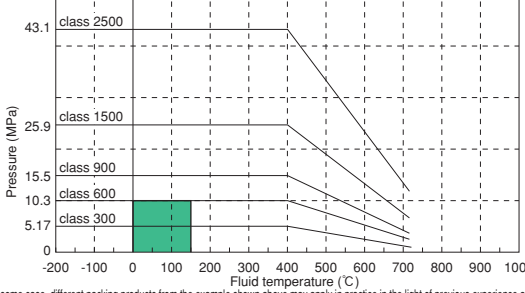
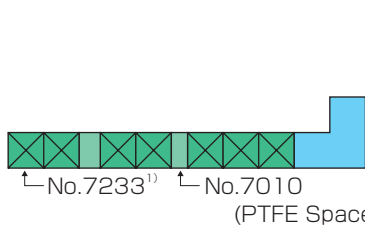
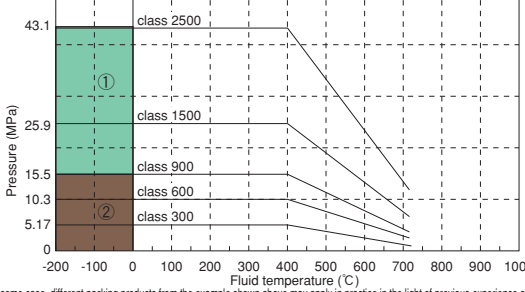
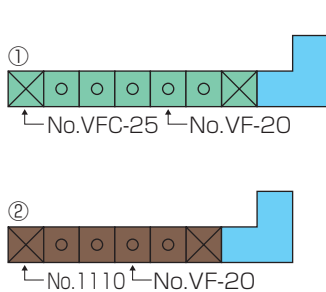
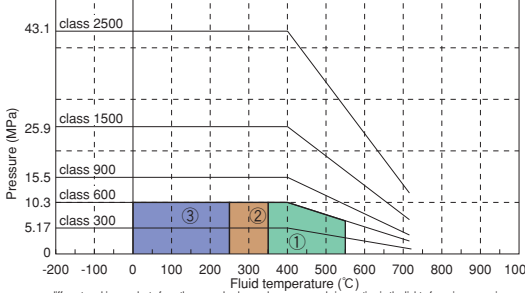
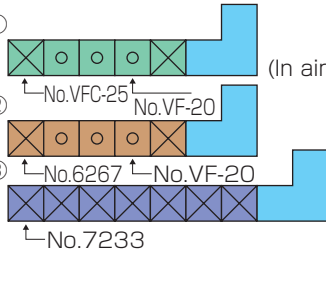
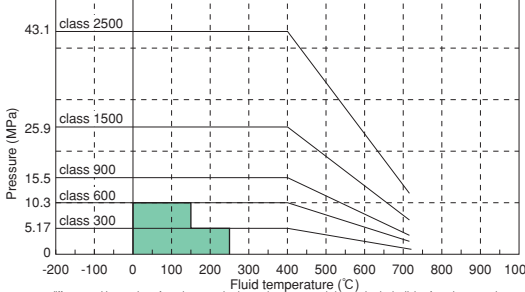
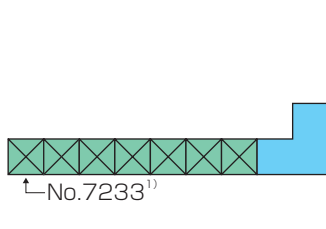
Customers using the following asbestos gland packing products are recommended to use the NON-AS gland packing equivalents given in the boxes marked with an arrow. For some application conditions, however, it may not be possible to find a perfect equivalent.

Asbestos gland packing	No.133, 136				↑								
	No.135, 1290						↑						
	No.139		↑										
	No.1120										↑		
	No.1240, 2140								↑				
	No.1271, 1345												↑
	No.7133, 7137			↑									

	Applicable fluid	Rating: ANSI	Example of combination	
<p style="writing-mode: vertical-rl; transform: rotate(180deg);"><b>Water-based fluids</b></p>	<p>Freshwater Sea water Industrial water Hot water Boiler feed water Slurry Saturated steam Superheated steam Drain water Aqueous neutral salt solutions Sodium chloride Sodium nitrate Sodium sulfate etc.</p>		<p>① (In air at 400°C) No.VFC-25 No.VF-20</p> <p>② No.6399L No.VF-20</p> <p>③ No.VFT-22</p>	
	<p>* In some case, different packing products from the example shown above may apply in practice in the light of previous experience and in the event that certain product items may no longer be available.</p>	<p style="writing-mode: vertical-rl; transform: rotate(180deg);"><b>Oil-based fluids</b></p>	<p>Mineral oils in general Gasoline Diesel oil Naphtha Heavy fuel oil Kerosene Tar Crude oil Fuel oil Gas oil Animal and vegetable oils</p>	
<p>* In some case, different packing products from the example shown above may apply in practice in the light of previous experience and in the event that certain product items may no longer be available.</p>	<p style="writing-mode: vertical-rl; transform: rotate(180deg);"><b>Heating medium</b></p>		<p>Heating medium Except for sodium nitrate &amp; other molten salts (HTS)</p>	
<p>* In some case, different packing products from the example shown above may apply in practice in the light of previous experience and in the event that certain product items may no longer be available.</p>		<p style="writing-mode: vertical-rl; transform: rotate(180deg);"><b>Solvent fluids</b></p>	<p>Aromatics Benzene, Toluene, Xylene etc. Alcohols Ketones Esters Amines</p>	
<p>* In some case, different packing products from the example shown above may apply in practice in the light of previous experience and in the event that certain product items may no longer be available.</p>				

Remark: The rating charts are based on the maximum values of ANSI B16.34, especially for special-class butt-welded valves.



	Rating: ANSI	Example of combination
<b>Applicable fluid</b> Incombustible gases Carbon dioxide Nitrogen/Air Argon etc. Combustible gases Methane/Ethane Propane Acetylene Hydrogen etc.	 <p>Pressure (MPa)</p> <p>Fluid temperature (°C)</p> <p>* In some case, different packing products from the example shown above may apply in practice in the light of previous experience and in the event that certain product items may no longer be available.</p>	 <p>①            ←No.VFC-25 ←No.VF-20L (In air at 400°C)</p> <p>②            ←No.6267 ←No.VF-20L</p> <p>③            ←No.6232 or No.8133L</p>
<b>Gaseous fluids</b> Combustion-supporting gases Oxygen/ Ozone etc.	 <p>Pressure (MPa)</p> <p>Fluid temperature (°C)</p> <p>* In some case, different packing products from the example shown above may apply in practice in the light of previous experience and in the event that certain product items may no longer be available.</p>	 <p>←No.7233<sup>1)</sup> ←No.7010            (PTFE Spacer ring)</p> <p>Note 1) Lubrication 7233 (FO)            Remark: Be sure to use with a PTFE spacer ring.</p>
Liquefied gases LPG/LNG Liquefied nitrogen, etc.	 <p>Pressure (MPa)</p> <p>Fluid temperature (°C)</p> <p>* In some case, different packing products from the example shown above may apply in practice in the light of previous experience and in the event that certain product items may no longer be available.</p>	 <p>①            ←No.VFC-25 ←No.VF-20</p> <p>②            ←No.1110 ←No.VF-20</p>
<b>Solvent fluids</b> Organic acids Acetic acid/ Lactic acid, etc. Alkalis Sodium hydroxide, etc.	 <p>Pressure (MPa)</p> <p>Fluid temperature (°C)</p> <p>* In some case, different packing products from the example shown above may apply in practice in the light of previous experience and in the event that certain product items may no longer be available.</p>	 <p>①            ←No.VFC-25 ←No.VF-20 (In air at 400°C)</p> <p>②            ←No.6267 ←No.VF-20</p> <p>③            ←No.7233</p>
Strong acids Sulfuric/nitric acids Hydrochloric/ Phosphoric acids Chromic acid Corrosive gases Chlorine/Bromine Folic acid Hydrogen sulfide Sulfurous acid gas	 <p>Pressure (MPa)</p> <p>Fluid temperature (°C)</p> <p>* In some case, different packing products from the example shown above may apply in practice in the light of previous experience and in the event that certain product items may no longer be available.</p>	 <p>←No.7233<sup>1)</sup></p> <p>Note 1) Lubrication 7233(O)</p>

◎ Recommended product ☆ For adapter packing		VALQUA No.											
		7262	8132	6234	7202E	7202W	7202	6262	8201	7203	VF-22	6345	1110
Maximum temperature °C		260	260	200	260	260	260	260	260	260	600 <400 <sup>(1)</sup> >	600 <400 <sup>(1)</sup> >	350
Maximum pressure MPa		1.57	0.98	0.98	1.57	1.57	1.57	1.57	1.96	1.96	2.50	1.96	1.96
Maximum flowrate m/s		5	10	15	16	16	20	20	16	20	25	20	20
Maximum allowable PV value MPa · m/s		4.90	6.37	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
Shaft attack		Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Possible	Satisfactory	Excellent	Excellent	Possible
Water-based fluid	Supply water, soft drinks					◎							
	Freshwater, sea water, sewage		◎	◎				◎			◎	☆	
	Slurries, sludge							◎	◎			☆	
	Hot water, boiler feed water, low-pressure steam						◎	◎	◎	◎	◎	☆	☆
Oil-based fluid	Mineral oils, animal and vegetable oils		◎	◎	◎	◎	◎						
	Heat carrier oils												
	Crude oil, heavy fuel oil							◎	◎				☆
Solvents	Alcohol-based solvents		◎		◎	◎	◎				◎	☆	
	Aromatic-based solvents				◎	◎	◎				◎	☆	
	Ketones, esters				◎	◎	◎				◎	☆	
Corrosive fluids	Weak acids, weak alkalis		◎	◎									
	Non-oxidizing acids				◎	◎	◎	◎			◎	☆	
	Strong oxidizing acids, oxidants	◎											
	Strong alkalis				◎	◎	◎	◎			◎	☆	
	Pulp solution						◎		◎	◎		☆	
Miscellaneous	Coolant (CFCs)				◎	◎	◎				◎	☆	☆
	Low-temperature liquefied fluids				◎	◎	◎				◎	☆	☆

Note 1) Lubricated products  
 2) Maximum temperature in air

Customers using the following asbestos products are recommended to use the NON-AS equivalents given in the boxes marked with an arrow.  
 For some application conditions, however, it may not be possible to find a perfect equivalent.

Asbestos gland packings	No.132, 134		↑										
	No.1134		↑										
	No.137			↑	↑		↑						
	No.1140												↑
	No.2140									↑			
	No.7132		↑			↑							
	No.7137								↑				

Remarks: This selection chart gives the product numbers recommended for the individual conditions. The absence of a symbol does not necessarily mean that the product concerned cannot be used.

# NON-AS Gland Packing Selection Chart for Machines

◎ Recommended product ☆ For adapter packing		VALQUA No.																
		7232	6234	8132	6262	7202E	7202W	7202	8201 (NL)	7203	8201	6232	8137	VF-22	6399	6345	6399H	1110
Maximum temperature °C		260	260	260	260	260	260	260	260	260	260	260	600 (400 <sup>1)</sup> )	300	600 (400 <sup>1)</sup> )	300	350	
Maximum pressure MPa		4.90	4.90	4.90	4.90	4.90	4.90	4.90	9.80	9.80	9.80	9.80	14.7	14.7	24.5	14.7	39.2	24.5
Maximum flowrate 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
Shaft attack		Excellent	Excellent	Excellent	Satisfactory	Excellent	Excellent	Excellent	Possible	Satisfactory	Possible	Satisfactory	Excellent	Excellent	Satisfactory	Satisfactory	Possible	Possible
Type of Application	Reciprocating m/c	Plunger pumps							◎	◎	◎		◎	◎	◎	☆	☆	☆
		Soot blower										◎		◎	◎	☆	☆	☆
		Expansion			◎									◎	◎	☆	☆	☆
	Rotary machine	Agitator	◎	◎	◎		◎	◎	◎	◎	◎		◎	◎		☆		☆
		Screw feeders							◎	◎			◎	◎		☆		☆
		Dryers	◎	◎			◎	◎	◎		◎			◎		☆		
		Gear pumps, etc.				◎			◎	◎	◎		◎	◎		☆		☆
Water-based fluid	Freshwater, sea water		◎	◎		◎	◎	◎					◎	◎	◎	☆	☆	☆
	Sewage, sludge								◎	◎	◎		◎	◎	◎	☆	☆	
	Hot water, boiler feed water, low-pressure steam		◎		◎	◎	◎	◎	◎	◎	◎	◎		◎	◎	☆	☆	☆
Oil-based fluid	Mineral oils, animal and vegetable oils			◎						◎	◎		◎				☆	☆
	Heat carrier oils																	
	Crude oil, heavy fuel oil								◎	◎	◎		◎				☆	☆
Powders	Powders									◎	◎		◎				☆	
	Slurry fluids								◎	◎	◎		◎			☆	☆	
	Polymers	◎							◎				◎		◎		☆	☆
Gases	Air, gases	◎	◎			◎	◎	◎					◎			☆		
	Solvent vapor	◎	◎	◎		◎	◎	◎					◎	◎	◎	☆	☆	

Note 1) Maximum temperature in air

Customers using the following asbestos products are recommended to use the NON-AS equivalents given in the boxes marked with an arrow. For some application conditions, however, it may not be possible to find a perfect equivalent.

Asbestos gland packing	7232	6234	8132	6262	7202E	7202W	7202	8201 (NL)	7203	8201	6232	8137	VF-22	6399	6345	6399H	1110	
<b>No.125, 135</b>																	↑	
<b>No.1120</b>																		↑
<b>No.2140</b>							↑							↑				
<b>No.7132</b>			↑			↑	↑											
<b>No.7137</b>													↑					

Remarks: This selection chart gives the product numbers recommended for the individual conditions. The absence of a symbol does not necessarily mean that the product concerned cannot be used.



▲NO.6201



▲NO.6232



▲NO.6234

## Carbon Fiber Series

### For water and oil Pumps

VALQUA No.  
**6201**

This coil packing is manufactured by treating carbonized fiber with a PTFE dispersion and lubricant oil with subsequent plaiting of the strands to an angular cross-section and finishing with PTFE, colloidal graphite dispersion, and lubricant oil.

- ▶ Can accommodate a relatively large variety of fluids.
- ▶ Permits a large maximum PV value and maximum peripheral speed.
- ▶ Reduces shaft wear by packing.

### For universal valves and reciprocating machines

VALQUA No.  
**6232**

This coil packing is manufactured by treating carbon fiber with a PTFE dispersion and lubricant oil with subsequent plaiting of the strands to an angular cross-section and finishing with PTFE, colloidal graphite dispersion, and lubricant oil.

- ▶ Because it is an easy fit with the shaft it is possible to achieve a good seal even with a low tightening force.
- ▶ Is suitable for practically all fluids, except for strongly oxidizing fluids.

### For chemical pumps

VALQUA No.  
**6262**

This coil packing is manufactured by treating carbon fiber with a PTFE dispersion and lubricant oil with subsequent plaiting of the strands to an angular cross-section and finishing with PTFE, colloidal graphite dispersion, and lubricant oil.

- ▶ Permits a large maximum PV value and maximum peripheral speed.
- ▶ Reduces shaft wear by packing.
- ▶ Is suitable for practically all fluids, except for strongly oxidizing fluids.

### For high-pressure, high-temperature water and oil-based fluid valves

VALQUA No.  
**6267**

This coil packing is manufactured by treating carbon fiber with graphite with subsequent plaiting of the strands to an angular cross-section and finishing with graphite.

- ▶ This packing is for exclusive adapter use. Be sure to use it in combination with a graphite packing.
- ▶ Suitable for shaft seals in valves for fluids such as water, oil-based fluids, incombustible and combustible fluids and liquefied gases.

### For waste heat duct joints, dampers and for seals of drier doors

VALQUA No.  
**6345**

This coil packing is manufactured by treating high-grade carbon fiber with graphite with subsequent plaiting of the strands to an angular cross-section and finishing with graphite.

- ▶ This low-price NON-AS product is used for damper seals and for drier door seals.
- ▶ Manufactured from carbon fiber and graphite, it has an excellent fiber strength and superior elasticity and heat resistance.
- ▶ The addition of organic substances is minimized to ensure that virtually no fumes are generated when heated.

### For water pumps, oil pumps and rotary machines

VALQUA No.  
**6234**

\* Patented Product

This coil packing manufactured treating carbonized fiber with PTFE dispersion, coated with PTFE film, with subsequent plaiting of the strands to an angular cross-section and finishing with PTFE dispersion, inorganic filler and lubricant oil.

- ▶ Burn-resistant which dramatically improves handness.
- ▶ PTFE film prevents generation of abrasin powder of carbonized fiber.
- ▶ Can accommodate a relatively large variety of fluids.



▲NO.6399



▲NO.6399H



▲NO.7202



▲NO.7202E

For plunger pumps

VALQUA No.  
**6399**

This coil packing is manufactured by treating high-strength carbon fiber with a PTFE dispersion with subsequent plaiting of the strands to an angular cross-section and finishing with PTFE and colloidal graphite dispersion.

- ▶The high strength properties of the carbon fiber material ensure outstanding endurance and elasticity properties and make the product ideal for use as a shaft seal for reciprocating machines handling fluids such as water and oil based fluids and solvent vapors.

For plunger pumps

VALQUA No.  
**6399H**

This endless packing consists of No. 6399 hard-molded to the required dimensions.

- ▶Suitable as a shaft seal for high-pressure reciprocating machines handling fluids such as water and oil based fluids and solvent vapors.
- ▶Can be used generally in combination with carbon bushes, No. 6399 and/or No. 8201.
- ▶Can also be used as an adapter packing for valve shaft seals.

For control valves

VALQUA No.  
**6399L**

This ring-shaped packing is manufactured by treating high-strength carbon fiber with a PTFE dispersion with subsequent plaiting of the strands to an angular cross-section and finishing with PTFE and lubricant oil.

- ▶Can be used as a shaft seal for control valves and directly as an adapter packing.
- ▶Can also be used on its own for control valves of class 1500 or below.

## ■ VALFLON Series ■

For universal chemical fluid applications and high-speed rotary shafts

VALQUA No.  
**7202**

This coil packing is manufactured by fiber strands processed to integrate graphite and lubricant oil with PTFE and rigidly plaiting them to an angular cross-section.

- ▶Structured to allow for superior elasticity and wear resistance, this product is ideally suited for large-diameter and high-load applications.
- ▶Thanks to its outstanding heat transfer properties and chemical resistance, this product is ideal for rotary shafts rotating at a high peripheral speed in systems handling water and oil based as well as chemical fluids.
- ▶The packing causes virtually no shaft wear.
- ▶Manufactured to section dimensions of 6.5mm or more.

For universal chemical fluid applications and high-speed rotary shafts

VALQUA No.  
**7202E**

This coil packing is manufactured by treating PTFE fiber that contains graphite and lubricant with subsequent plaiting of the strands to an angular cross-section.

- ▶Thank to its outstanding heat transfer properties and chemical resistance, this product is ideal for rotary shafts rotating at a high peripheral speed in systems handling water and oil based as well as chemical fluids.
- ▶The packing causes virtually no shaft wear.



▲NO.7202W



▲NO.7203



▲NO.7232



▲NO.7262

#### For chemical fluids in general-High-peripheral speed rotating shafts

##### VALQUA No. **7202W**

This coil packing product consists of PTFE fibers firmly combined to an angular section. The PTFE fibers contain a white filler and lubricant.

- ▶ It has superior thermal expansion, thermal conductivity and chemical resistance properties.
- ▶ The packing causes virtually no shaft friction.
- ▶ The use of a 100% PTFE gland packing permits use at higher peripheral speeds.
- ▶ Meets the Food Hygiene Law and the specifications and standards applicable to food products and additives.

#### For rotary shafts, incl. stirrers

##### VALQUA No. **7203**

This coil packing is manufactured by treating fiber strands processed to integrate graphite and lubricant oil with PTFE and aramide fiber strands with PTFE and lubricant oil and arranging the strands in such a manner that the corner sections are occupied by aramide fiber and rigidly plaiting them to an angular cross-section.

- ▶ This hybrid packing features outstanding performance qualities combining the strength of aramide fiber strands with the lubricant properties of graphitized PTFE fiber strands.
- ▶ Has practically the same properties as No. 7202 and is suited as a shaft seal material for rotary and reciprocating machines subjected to higher pressures and loads.
- ▶ Is manufactured to section dimensions of 6.5mm or more.

#### For corrosive fluids

##### VALQUA No. **7232**

This coil packing is manufactured by treating PTFE fiber strands with a PTFE dispersion with subsequent plaiting to an angular cross-section.

- ▶ Consisting 100% of PTFE, it is not attacked by virtually any corrosive fluid.
- ▶ Ideally suited as a shaft seal for rotating machines such as stirrers handling corrosive fluids. Can also be used as a shaft seal for valves, and reciprocating machines, depending on the operating conditions.
- ▶ Use No. 7232 (SO) for applications requiring a low torque and gas-tight sealing properties.

#### For corrosive fluid valves

##### VALQUA No. **7233**

This coil packing is manufactured by treating PTFE fiber strands with a PTFE dispersion with subsequent plaiting to an angular cross-section.

- ▶ Consisting 100% of PTFE, it is not attacked by virtually any corrosive fluid.
- ▶ Ideally suited as a chemical valve shaft seal handling corrosive fluids.
- ▶ Use the following lubricant oil treated products for applications requiring a low torque and gas-tight sealing properties.  
No. 7233 (O): For general gaseous fluids.  
No. 7233 (SO): For combustible gases and low-temperature applications such as liquefied gases.  
No. 7233 (FO): For combustion-supporting fluids such as oxygen and ozone.

#### For rotary shafts rotating at low and medium speeds, handling corrosive fluids -

##### VALQUA No. **7262**

This coil packing is manufactured by treating PTFE fiber strands with a PTFE dispersion with subsequent plaiting to an angular cross-section.

- ▶ Apart from its outstanding flexibility and snug-fit with the shaft, it also boasts superior sealing properties.
- ▶ Thanks to its superior chemical resistance, it is ideally suited for pumps handling corrosive fluids.



▲NO.8132



▲NO.8137



▲NO.8201



▲NO.1110

## Special Fiber Series

### For low and middle speed

VALQUA No.  
**8132**

This coil packing is manufactured by treating a mixed yarn of aramide and manmade inorganic fibers with a PTFE dispersion with subsequent plaiting to an angular cross-section and finishing a PTFE dispersion and a lubricant oil.

- ▶ It excels to flexibility, and snug-fit to the axis is good.
- ▶ Since the color tone is white, designed for uses which are hostile black
- ▶ It is the best for the Non-asbestos products substitute of No.7132.
- ▶ Suitable as a shaft seals in pumps for fluids such as water, oil-based fluids, Weak acids fluids, weak alkalis fluids
- ▶ It is possible to use it as a mixer that dislikes contamination and an shaft seal material of the rotary machines such as agitators.

### For universal valves

VALQUA No.  
**8133**

This coil packing is manufactured by treating a mixed yarn of aramide and manmade inorganic fibers with an inorganic filler with subsequent plaiting to an angular cross-section and finishing with a PTFE dispersion.

- ▶ This white, "clean" packing does not use lubricant oil.
- ▶ Suitable as a seal for universal valves handling water and oil based fluids.

### For universal valves

VALQUA No.  
**8133L**

This coil packing is manufactured by treating a mixed yarn of aramide and manmade inorganic fibers with an inorganic filler with subsequent plaiting to an angular cross-section and finishing with a PTFE dispersion and a lubricant oil.

- ▶ Thanks to its low shaft resistance and outstanding sealing properties, it is ideally suited for valves.
- ▶ It has practically the same properties as No. 8133 and is particular suited for shaft seals in universal valves handling gaseous fluids.

### For diverse applications

VALQUA No.  
**8137**

This coil packing is manufactured by treating a mixed yarn of aramide and manmade inorganic fibers with a PTFE dispersion with subsequent plaiting to an angular cross-section and finishing with a PTFE dispersion.

- ▶ This white, "clean" packing does not use lubricant oil.
- ▶ Superior cost performance.
- ▶ Can be used for a large diversity of applications, including shaft seals of universal pumps, stirrers and plunger pumps.

### For pumps, rotary and reciprocating machines

VALQUA No.  
**8201**

This coil packing is manufactured by treating aramide fiber strands with a PTFE dispersion and a lubricant oil with subsequent plaiting to an angular cross-section.

- ▶ Featuring the benefits of superior wear resistance and an unprecedented endurance, this packing is the closest thing to a maintenance-free seal achieved so far.
- ▶ Outstanding performance characteristics as a rotary shaft seal for slurries and high-viscosity fluids.

### For low-speed rotary shafts and reciprocating machines

VALQUA No.  
**8201(NL)**

This coil packing is manufactured by treating aramide fiber strands with a PTFE dispersion with subsequent plaiting to an angular cross-section.

- ▶ Featuring the benefits of superior wear resistance and an unprecedented endurance, this packing is the closest thing to a maintenance-free seal achieved so far.
- ▶ Outstanding performance characteristics as a rotary shaft seal for slurries and high-viscosity fluids.
- ▶ It contains no lubricant oil and is therefore ideal in applications where oil contamination is an unacceptable nuisance.

## Metal Series

### For high-temperature and high-pressure valves

VALQUA No.  
**1110**

- ▶ This spiral packing is manufactured by shaping graphite and lubricant oil treated aluminum ribbon to an angular cross-section.
- ▶ Suitable for use as an adapter packing to prevent elastic packing overhang.



▲NO.VF-10



▲NO.VFC-25



▲NO.VFT-22

## For high-temperature and high-pressure valves

VALQUA No.  
**VFT-22**  
For universal valves

\* Patented Product

This coil packing is manufactured by coating a flexible graphite yarn with PTFE film, with subsequent plaiting to an angular cross-section. This gland packing makes full use of the benefits of each of its component materials.

- ▶ The use of graphite as the main component material ensures outstanding sealing and endurance properties.
- ▶ The use of PTFE as the surface coating material helps to minimize shaft resistance.

## For high-temperature, high-pressure valves

VALQUA No.  
**VFC-25**

\* Patented Product

This coil packing product is manufactured by weaving yarn consisting of expanded graphite, carbon fiber and Inconel fiber integrated into a single thread, to an angular section with a subsequent proprietary surface finishing process.

- ▶ The total absence of exposed metal threads helps reduce the aggressiveness of the shaft.
- ▶ Has superior sliding properties.
- ▶ This product is exclusively intended as an adapter packing.

## Flexible Graphite Series

## For high-temperature and high-pressure valves

VALQUA No.  
**VF-10**

The soft, outstandingly elastic pure-graphite packing boasts a superior chemical resistance and favorable sealing properties.

- ▶ Outstanding sealing performance even at a low tightening force (torque), with superior endurance in continuous use conditions over a wide range of temperature conditions.
- ▶ In combination with an adapter packing, it can be used for all types of fluids, including water and oil based fluids, chemicals, and gaseous fluids.

## For high-temperature and high-pressure valves

VALQUA No.  
**VF-20**

This coil packing is manufactured by reinforcing flexible graphite yarn with Inconel wire, with subsequent plaiting to an angular cross-section.

- ▶ Superior resistance to heat, chemicals and radioactive radiation and outstanding sealing properties make this maintenance-free packing ideal for use in all types of industrial fields.
- ▶ Used as a shaft seal material for valves handling water, steam, oil, acids, alkalis, heat-carriers, solvents and gases (except for oxygen, oxidants, and strong oxidizing acids).
- ▶ Can be used generally in combinations with adapter packing products such as No. 6399H and VF-25.

## For high-temperature and high-pressure valves

VALQUA No.  
**VF-20L**

This packing consists of No. VF-20 treated with a lubricant.

- ▶ This product has practically the same properties as No. VF-20 and offers improved gas sealing properties with a low shaft resistance.

## For high-temperature and high-pressure valves

VALQUA No.  
**VF-20LF**

\* Patents applied for

This packing consists of No. VF-20 subjected to a special treatment process.

- ▶ As it contains almost no lubricant oil, it generates little heat at high temperatures and possess stable low-sliding properties over a long time.

## For high-temperature rotary and reciprocating machine

VALQUA No.  
**VF-22**

This coil packing consists of an flexible graphite yarn plaited to an angular cross-section.

- ▶ As it does not use metal wires for reinforcement, it is ideal as a seal material for the sliding parts of high-temperature rotary machines.
- ▶ When used in reciprocating machines, use in combination with an adapter packing product such as No. 1110.

## For high-temperature and high-pressure valves

VALQUA No.  
**VF-25**

This coil packing is manufactured by reinforcing flexible graphite yarn with Inconel wire and then coating with Inconel wire to upgrade the packing's mechanical strength.

- ▶ Used as a valve shaft seal and adapter packing, including No. VF-20, VF-20L (exclusively for packing).
- ▶ Suitable for fluids, including water, steam, oil, acids, alkalis, heat-carriers, solvents and gases (except for oxygen, oxidants, and strong oxidizing acids).

## For high-temperature and high-pressure valves

VALQUA No.  
**VF-25L**

This packing is manufactured by applying a special treatment process to the coil surface of No. VF-25.

- ▶ This product has practically the same properties as No. VF-25 and offers improved gas sealing properties with a low shaft resistance.
- ▶ Can be used on its own (No. VF-25L only).

## For high-temperature and high-pressure valves

VALQUA No.  
**VF-25LF**

\* Patents applied for

This packing is manufactured by applying a special treatment process to the surface of No. VF-25.

- ▶ As it contains almost no lubricant oil, it generates little heat at high temperatures and possess stable low-sliding properties over a long time.

# Nuclear Power Plant Gland Packing Products

- VALQUA No. **6399AE**  
(Carbon fiber type adapter packing for nuclear power plants)
- VALQUA No. **6399LAE**  
(Carbon fiber type control valve packing for nuclear power plants)
- VALQUA No. **VF-10AE**  
(VALQUA FOIL for nuclear power plants)
- VALQUA No. **VF-20LAE**  
(VF braid for nuclear power plants)
- VALQUA No. **VFC-25AE**  
(VF braid Adapter packing for nuclear power plants)

Application conditions (within the operating conditions of ABWRs and APWRs)  
 Maximum operating temperature: 363°C  
 Maximum operating pressure: 18.9MPa

Gland packing products are extensively used also in the nuclear power sector.

Our nuclear power gland packing products use materials selected to rigorous criteria to control the concentration of component materials such as halogen ions, sulfur, and low-boiling metals and to exclude deterioration on exposure to radioactive radiation.

These packing products are manufactured on the basis of a stringent quality assurance system and special quality targets.

Be sure to consult the manufacturer when placing orders for gland packing products for nuclear power applications.

## Manufacturing Range

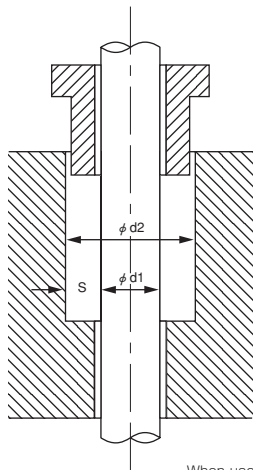
Nominal dimensions, mm	3	4	5	6	6.5	8	9.5	10	11	12.5	14.5	16	19	20	22	25
6201	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
6232	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
6234				○	○	○	○	○	○	○	○	○	○	○	○	○
6262	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
6267	○	○	○		○	○	○	○	○	○	○	○	○		○	○
6345							○	○	○	○	○	○	○		○	○
6399	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
6399L	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
7202E			○	○	○	○	○	○	○	○	○	○	○	○	○	○
7202W	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
7202					○	○	○	○	○	○	○	○	○	○	○	○
7203					○	○	○	○	○	○	○	○	○	○	○	○
7232	○	○	○		○	○	○	○	○	○	○	○	○	○	○	○
7233	○	○	○		○	○	○	○	○	○	○	○	○	○	○	○
7262	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
8132	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
8133			○	○		○	○	○	○	○	○	○	○	○	○	○
8137	○ <sup>(1)</sup>	○	○		○	○	○	○	○	○	○	○	○	○	○	○
8133L		○	○		○	○	○		○	○	○	○	○	○	○	○
8201	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
8201NL	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
VF-10	Only molded products are available.															
VF-20	○		○		○	○	○		○	○	○	○	○		○	○
VF-20L	○		○		○	○	○		○	○	○	○	○		○	○
VF-20LF	○		○		○	○	○		○	○	○	○	○		○	○
VF-22				○	○	○	○		○	○	○	○	○	○	○	○
VF-25	○		○		○	○	○		○	○	○	○	○		○	○
VF-25L	○		○		○	○	○		○	○	○	○	○		○	○
VF-25LF	○		○		○	○	○		○	○	○	○	○		○	○
VFC-25	Only molded products are available.															
VFT-22	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
1110	●	●	●		●	●	●	●	●	●	●	●	●	●	●	●

Remark 1) ○ 3m/box ● 3.65m/box

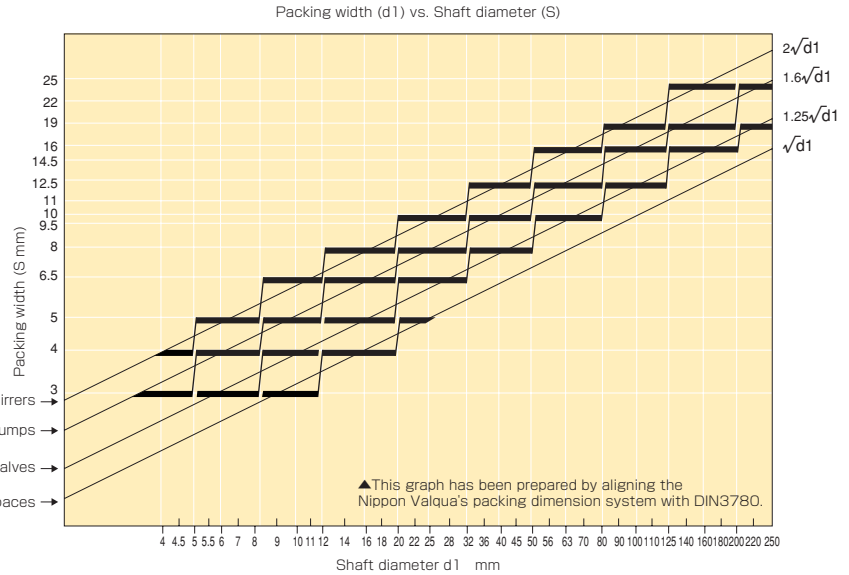
Remark 2) No. 6399H available only as a ring-shaped product.

Note 1) For reasons due to our manufacturing process, products are in rectangular cross-section which dimensions are 3mm x 5mm.

## Relationship between Shaft Diameter and Packing Box Inner Diameter/Packing Width



When used mainly for stirrers  
 When used mainly for pumps  
 When used mainly for valves  
 When used in particularly narrow spaces



## Fluid Pressure and Ring Number

The ring number of packing products that are normally used is determined in accordance with the fluid pressure. The ring numbers shown here are rough indications of the installation length when using the correct packing width.

The ring numbers also vary in accordance with the packing material, the fluid condition (type, temperature, speed), and other ambient conditions (cooling jacket, flushing, with or without oil supply, etc.). The values given should therefore be considered as reference values.

### When used as a valve seal

ANSI Class	Fluid pressure MPa	Number of rings
150	2.0 or less	4
300	Above 2.0 to 5.1 or less	6 (5)
600	Above 5.1 to 10.3 or less	7 (5)
900	Above 10.3 to 15.5 or less	8 (6)
1500	Above 15.5 to 25.9 or less	10 (6)
2500	Above 25.9 to 43.1 or less	12 (7)

Remark: Figures in parentheses ( ) refer to combined use with VF-20 and VF-20L. The ring number for VF-20 and VF-20L is obtained when deducting the two rings of the adapter packing from the ring number given in parentheses ( ).

### When used as a shaft seal for rotary pumps

Fluid pressure MPa	Number of rings
Above 0.10 to 0.49 or less	3~5
Above 0.49 to 0.98 or less	4~6
Above 0.98 to 1.96 or less	5~8
In excess of 1.96	6~9

## Standard Gland Load of Gland Packing for Valve Stems

The standard gland load data given below are designed to meet the ANSI hydraulic test requirements. Use them as rough indications.

### Data for NON-AS gland packings

Unit: MPa

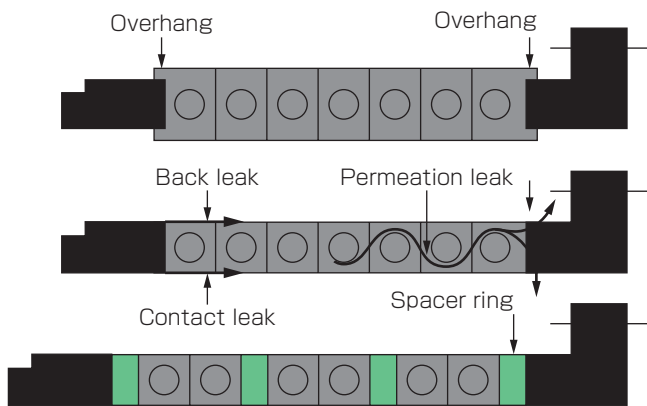
Main applications	VALQUA No.	ANSI Class					
		150	300	600	900	1500	2500
Universal applications	<b>No.8133/No.8133L</b>	19.6	24.5				
	<b>No.VFT-22</b>		24.5				
Anti-corrosive applications	<b>No.7233</b>	19.6					
High-temperature and high-pressure use	<b>No.6345+No.VF-20</b>		24.5		39.2		
	<b>No.VFC-25+No.VF-20</b>		24.5		39.2	58.8	
For control valve use	<b>No.6339L+No.VF-20L</b>	19.6			34.3		
	<b>No.VFC-25+No.VF-20LF</b>	19.6			34.3	39.2	

### ■ Effect of Spacer Rings ■

Spacer rings have the benefit of preventing packing overhang as shown in the figure below and are effective in preventing seepage leaks and back leaks. One method is to position spacers at both ends of the packing to prevent overhang, and the second method is to insert spacers between one packing and the other in order to prevent fluid leaks seeping through the packing.

Thus, when spacer rings are used to prevent seepage leaks, the most effective way is to place them between the packings when 2 or more types of packing are used in combination.

The spacer ring materials are mainly PTFE, PVdF on its own and filler PTFE as well as joint sheets. The spacer rings have a thickness of normally approx. 1 - 3mm.



### ■ Use of Ring-shaped Products Recommended ■

Ring-shaped products are not only advantageous in that they help to reduce the time needed for installation but also in view of their very important role in ensuring a favorable seal. Using a packing in the coil shaped condition has the disadvantage that the tightening force (torque) is not easily transmitted to the remote parts, with the result that there is a considerable difference in the tightening force (torque) in front of the stuffing box and the parts farther away. This pressure differential leads to stress relief and ultimately to seal failure or leaks. In the case of pumps, in particular, the tightening force is relatively small compared with the valve.

As a result, the stuffing box and the rear of the packing do not form a snug fit and this will lead to leaks from the rear of the packing.

To achieve the maximum possible performance from your packing, we therefore strongly advise you to use ring-shaped packing products.

### ■ Our Packing Products are Anti-Corrosion Treated. ■

Graphite type packing products may accelerate corrosion of the mating metal surfaces they are in contact with. This corrosion behavior is due to the potential difference that is generated between the graphite-carbon (C) contained in the packing and the metal. The graphite acts as a cathode material in relation to the anode formed by the mating material that has been activated and causes the current density to rise.

Our graphite type packing products contain suitable amounts of an anode inhibitor that suppresses the activation of the mating metal material and of a cathode protector that protects the metal. In this way our packing products are capable of preventing (anodic) corrosion in a wide range of application environments.

## 1 Determining the Packing Dimensions

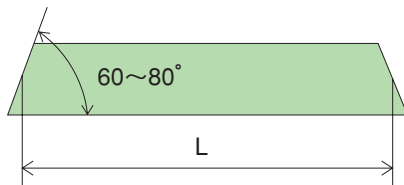
- We definitely recommend the use of ring-shaped packing products as the best way of achieving stable performance. Ring-shaped products are not only advantageous in that they help to reduce the time needed for installation but also in view of their very important role in ensuring a favorable seal. In contrast, the direct use of rope-type packing materials has the disadvantage that the tightening force (torque) is not easily transmitted to the remote parts, with the result that there is a considerable difference in the tightening force (torque) in front of the stuffing box and the parts farther away. This pressure differential leads to stress relief and ultimately to seal failure or leaks.
- Be sure to check the shaft diameters and the inner diameter of the stuffing box. If there is no alternative but to use a rope-type packing, select one that has the same dimension (thickness) as the width of the stuffing box.
- If there is no suitable size packing available, you need to use an "oversize" packing. So, if the stuffing box has a width of 9.5mm, for example, you need to select a packing with a nominal dimension of 10mm. Spread the packing on a flat sheet and wind it to the shape of round bar by applying a uniform force to make it about 0.5mm short of the width of the stuffing box. In this particular case, you should wind the rope packing to cover about 9.0mm.

## 2 Cutting the Packing

When you use a rope type packing, you determine the length per packing ring in the following manner. Cut at an appropriate angle so that no gap can form even when butt-jointed.

$$L = 1.62 - 1.65 (d + D)$$

where L: length per packing ring (mm)  
 d: shaft diameter (mm)  
 D: Stuffing box diameter (mm)



## 3 Installing the packing

- Remove the old packing completely. You may find it easier to remove the old packing with a packing tool. If you do, be sure not to damage the shaft with this tool.
- When you install the new packing be sure to check the number of packing rings and their combination.
- Push each packing ring "home" and tighten. Place all rings in position by staggering their cutting ends by 90 - 120° at a time.

## 4 Tightening and Adjustment

### For pumps

- When you have finished positioning the packing rings be sure to avoid uneven tightening. You tighten the nuts in alternate succession by tightening diagonally opposed nuts. The tightening torque is 10 - 20kgf/m<sup>2</sup>. particular case, you should wind the rope packing to cover about 9.0mm.
- When you apply the fluid, let it leak to a somewhat generous extent first and after you have checked that the packing has been properly lubricated with leaking fluid, retighten the packing. Do not increase the tightening torque suddenly or loosen the nuts. Be sure to tighten the nuts uniformly by one or half a corner of the (hexagonal) nut (in other words by 1/6th - 1/12th turn).

### For valves

- When you have finished positioning the packing rings be sure to avoid uneven tightening. You tighten the nuts in alternate succession. For details about the tightening torque, refer to the Design Standard Tightening Force (Torque) Values on page 33.
- When the fluid has leaked, increase the torque (retighten). The best way to do this is to ease the inner pressure to zero and then tighten. Be sure not to tighten unevenly or over-tighten.

## 5 Cautions during Storage

### ● Prevent qualitative changes of the packing material

The component materials of the packing products are vulnerable to ambient conditions such as direct sunlight or the oxygen or ozone of the air or to high temperature and high humidity conditions. To prevent qualitative changes in the packing materials be sure to store packing products in a cool and dark room. Anti-corrosion treated packing products, in particular, are susceptible to acidic ambient conditions and to high-humidity and high-temperature environments.

### ● Prevent sand and dust accumulation

Take particular care to prevent the deposition and accumulation of foreign matter such as sand and dust particles during storage in a warehouse or during use without appropriate caution. Once such foreign matter has settled on the packing material it will be difficult or even impossible to remove. The presence of foreign matter will cause damage to the shaft and ultimately result in leaks. Be sure therefore to take the necessary care and caution.

## WHEN PLACING ORDERS

### ● For Coil Products

Be sure to specify the Product Number and state the nominal dimensions and quantities. For specially treated products, specify the lubricant oil treatment product (O), (SO), or (FO).

Example: 1. VALQUA No. 7233  
10mm - 3m 1 coil

### ● For Ring-shaped Products

Be sure to specify the Product Number and state the ring dimensions (ID x OD x Height) and the number of rings (quantity) required.

The following products are available only in ring form:

**No. 6399H, No. VF-10 and No.VFC-25**

Flameproof carbon fiber are manufactured by thermally treating special copolymer polyacrylonitrile (PAN). Thanks to their outstanding flameproof and heat-resistant properties as well as superior toughness and elasticity, they are more than a match for the top-class asbestos textile products. Because of their low heat transfer coefficient, they are not only ideal as a seal material with superior flame and heat resistance but also lend themselves for a wide range of applications in which their heat insulating and thermostatic properties are important. When used as a seal material, these products are heat resistant to temperatures of up to 250°C.



## Features

- ▶ Even when in contact with intense direct flames they will merely become red-hot without sticking or melting-on.
- ▶ These products have a superior thermal insulation properties and a low heat transfer coefficient which is less than that of glass fiber and roughly the same as that of wool.
- ▶ Outstanding heat resistance. (Maximum temperature for use: 250°C.)
- ▶ Outstanding chemical resistance. Even when exposed to organic solvent, these products will show practically no loss in weight and even in contact with inorganic chemical their weight loss will be only in the order of 2 - 3%.
- ▶ They have excellent drape properties that glass fiber and asbestos materials do not possess. This makes them easier to handle and impart a soft feel.

### Yarn

VALQUA No. **101C** Applications: Heat-resistant seal material etc.

### Standard Dimensions

Nominal thickness mm			Weight
φ3	φ5	φ6.5	1.0kg coil
φ8	φ9.5		
φ12.5	φ16	φ19	
φ22	φ25		

### Cloth

VALQUA No. **105C** Applications: Heat and cold lagging for pipes and ducts, thermal insulation for engine and boiler areas, heat curtain/cover for heat-screening, lagging for air-conditioning ducts and bellows, heat-resistant protective cloth, aprons, head cloth, etc.

### Standard Dimensions

Nominal thickness mm	Dimensions	Weight g/m <sup>2</sup> (for reference)	Type of weave
1.2	1,000mm×30m	670	Flat weave

### Special Anti-sputter Cloth

VALQUA No. **105CS** This cloth is made from flameproof carbon fiber and its surface is sealed with a special inorganic filler. It boasts superior anti-sputter properties and is resistant to sputter accretion, tear and perforation. It is ideally suited as a protection for places directly exposed to flames and sparks and as a protection against chemical splashes.

Applications: Welding spark protection cloth, weld curing sheet, weld heat screen curtain, fire protection curtain, etc.

### Standard Dimensions

Nominal thickness mm	Dimensions	Weight g/m <sup>2</sup> (for reference)	Type of weave
1.0	980mm×30m	720	Twill
1.5	950mm×30m	950	Flat weave

### Ribbon

VALQUA No. **112C** Applications: Heat and cold lagging for pipes and ducts, thermal insulation for engine and boiler areas, heat curtain/cover for heat-screening, lagging for air-conditioning ducts and bellows, heat-resistant protective cloth, aprons, head cloth, etc.

### Standard Dimensions

Nominal thickness mm	Width, mm	Length, m	Weight g/m <sup>2</sup> (for reference)			Type of weave
			Width, 25	Width, 50	Width, 75	
1.0	25	30	17	37	53	Flat weave
	50		30	57	87	
2.0	75					

Thanks to the use of bulky-processed yarn, these products have a much better softness and heat insulation capability (heat-resistant up to temperatures of 350°C) compared with the conventional glass cloth, and are therefore suited as replacement of top-grade asbestos products in outer lining applications as a heat and cold lagging material.



## Features

- ▶ Non-combustible material with a heat resistance equal to, or better than, grade AAA asbestos cloth. (Heat-resistant up to a temperature of 350°C. When used in excess of 350°C, be sure to consult Nippon VALQUA.)
- ▶ Outstanding heat insulating properties with a heat transfer coefficient equal to, or less than, 1/2 that of asbestos cloth.)
- ▶ High tensile strength imparts a mechanical strength several times that of asbestos at normal temperatures.

### Packing

VALQUA No. **102G** Applications: Heat-resistant seal material, door packing, etc.

### Standard Dimensions

Nominal diameter, mm	Length, m	Weight g/m (for reference)
6.4 angle	30	53
7.9		83
9.5		117
12.7		200
15.9		317
19.0		467
22.0		584
25.4		734

Remark: Can also be manufactured in round form.

### Cloth

VALQUA No. **105G**  
(Cloth)

VALQUA No. **105GF**  
(Heat-resistant metal wire reinforced cloth)

#### Applications:

Heat and cold lagging for pipes and ducts, thermal insulation for engine and boiler areas, heat curtain/cover for heat-screening, lagging for air-conditioning ducts and bellows, heat-resistant protective cloth, aprons, head cloth, etc.

### Standard Dimensions

Nominal thickness, mm	Width, mm	Length, m	Weight, g/m <sup>2</sup> (for reference)	Type of weave
0.5	1,000	50	450	Twill
0.7			490	
1.7	1,000	30	920	Flat weave
2.7			1,750	

Remark: 105GF is available only in a nominal thickness of 1.5t.

### Ribbon

VALQUA No. **112G**  
(Ribbon)

VALQUA No. **112GA**  
(Aluminum ribbon on one side)

VALQUA No. **112GC**  
(Adhesive-coated ribbon on one side)

#### Applications:

Heat and cold lagging for pipes and ducts. Thermal insulation for engine and boiler areas, heat curtain/cover for heat-screening, furnace lining, water-repellent coated tape, furnace conveyor cover, protection for thermocouples, protective material for high-temperature work, etc.

### Standard Dimensions

Nominal thickness, mm	Width, mm	Length, m	Weight, g/m (for reference)						Type of weave	
			Width, 25	Width, 32	Width, 38	Width, 50	Width, 65	Width, 75		Width, 100
0.4	50	50	-	-	-	17	-	29	34	Twill
	75		-	-	-	26	-	38	52	
0.7	100	30	-	-	-	26	-	38	52	Flat weave
	25		22	30	34	45	59	68	90	
1.7	32	30	22	30	34	45	59	68	90	Flat weave
	38		22	30	34	45	59	68	90	
2.7	50	30	22	30	34	45	59	68	90	Flat weave
	65		22	30	34	45	59	68	90	
2.7	75	30	42	53	64	85	106	128	170	Flat weave
	100		42	53	64	85	106	128	170	

Remark: 112GA and 112GC are available in 3 types with nominal thickness dimensions of 0.7, 1.7 and 2.7mm, respectively.

These products are made of ceramic fiber (ultra-high heat resistant inorganic textile). Thanks to their flexibility, and high-temperature heat resistance, they are suited for applications as seal materials and as heat-retaining, heat-insulating, screening, and protecting materials. They contain minor amounts of organic fibers imparted during processing, so that they will give off some fumes in the initial heating process. The Cloth 105SN and Ribbon 112SN (dark-brown) products are treated to prevent fume generation. Stainless wire material is used as the core material for some cloth and ribbon products while others are reinforced with glass fiber.



## Features

- ▶ Superior heat resistance and fireproof properties (Maximum temperature of use: 1,260°C. 102F is heat-resistant to 600°C.)
- ▶ Outstanding heat insulating capability thanks to a low heat transfer coefficient.
- ▶ Softness and flexibility for superior ease of processing.
- ▶ Outstanding chemical stability.

### Cloth

VALQUA No.  
**105S**  
(Cloth)  
VALQUA No.  
**105SN**  
(Anti-fume treated cloth)

**Applications:**  
High-temperature curtain, high-temperature seal material, gaskets, all types of high-temperature lagging and insulation, weld spark protection, etc.

### Standard Dimensions

VALQUA Product No.	105S	105SN
Color	White	Dark-brown
Type of weave	Flat weave	Flat weave
Reinforcement material	Stainless steel wire	Stainless steel wire
Maximum temperature of use, °C	1,260	1,260
Intense heat reduction rate, %	<28	<10
Thickness, mm	2	1.8
Width, mm	1,000	1,000
Weight, g/m <sup>2</sup> (for reference)	>900	>720
Length per coil, m	30	30

### Ribbon

VALQUA No.  
**112S**  
(Ribbon)  
VALQUA No.  
**112SN**  
(Anti-fume treated ribbon)

**Applications:**  
High-temperature seal material, all types of high-temperature lagging and insulation, etc.

### Standard Dimensions

VALQUA Product No.	112S	112SN
Color	White	Dark-brown
Type of weave	Flat weave	Flat weave
Reinforcement material	Stainless steel wire	Stainless steel wire
Maximum temperature of use, °C	1,260	1,260
Intense heat reduction rate, %	<28	<10
Thickness, mm	2	1.8
Width, mm	25 50 75 100	25 50 75 100
Weight, g/m <sup>2</sup> (for reference)	22 45 67 90	18 36 54 72
Length per coil, m	30	30

### Yarn and Rope

VALQUA No.  
**101S**  
(Yarn)  
VALQUA No.  
**102SF**  
(Braided rope)

**Applications:**  
All types of high-temperature lagging and insulation, weaving material, etc.

**Applications:**  
High-temperature seal material, all types of high-temperature lagging and insulation, etc.

**Component Materials:**  
Core: Ceramic fiber, Outer coating: Glass fiber

**102S**  
(Braided rope)

**Applications:**  
High-temperature seal

### Standard Dimensions

VALQUA Product No.	101S	102SF
Color	White	
Reinforcement material	—	Stainless steel wire
Maximum temperature of use, °C	1,260	600
Intense heat reduction rate, %	<25	

VALQUA Product No.	102S and 102SF
Nominal diameter, mm	Length
φ 6	Any length over 1m
φ 9	
φ 12.5	
φ 16	
φ 19	
φ 22	
φ 25	
φ 30	
φ 38	
φ 50	

VALQUA Product No.	102S (inlaid stainless steel wire)
Nominal diameter, mm	Length
6.4	30m
9.6	
12.7	
15.9	
19.0	
22.0	
25.0	

Remark: 101S (yarn) is also available in a diameter size of 3mm



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

The above trade mark is registered in Japan, Australia, China, India, Indonesia,  
Korea, Malaysia, Philippines, Singapore, Taiwan, Thailand and U.S.A.

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