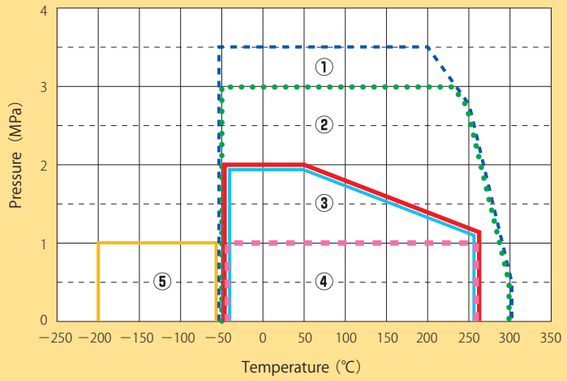
High Performance Non-Asbestos Sheet

VALQUA No. MF300 / GF300 / SF300

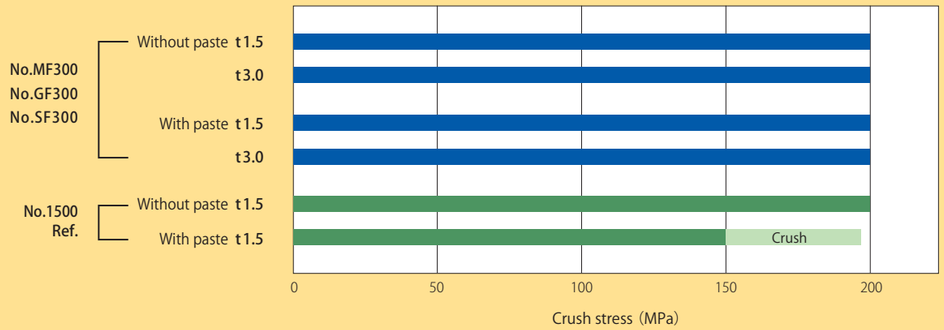
■ Available ranges per fluid ■



① Water based fluid
② Oil based fluid
③ Acid, alkali and solvent
Air, nitrogen gas, inert gas
④ Inflammable gas
⑤ Low temperature fluid

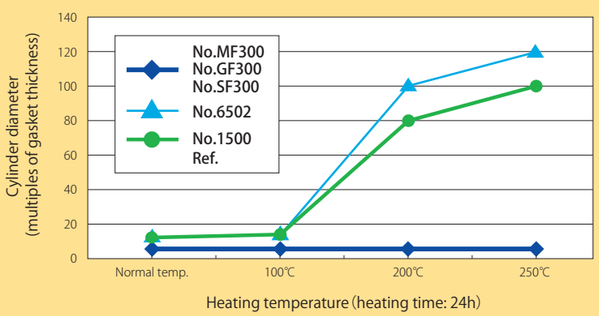
Remark When using gas application, we recommend applying gasket paste to the flange and the inner diameter section before applying a tightening stress of about 35 MPa.
When using gasket paste, please use NEW VALFLON® paste. Please note, No.6 and No.6M are not suitable.

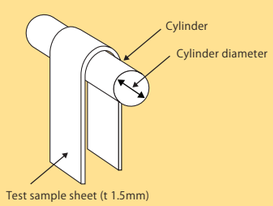
■ Crush strength comparison ■



Remark Tested by applying a recommended paste to the surface of each product.
No.MF300, GF300, SF300 : NEW VALFLON® Paste
No.1500 : SEAL PASTE™

■ Comparison of high temperature hardening properties ■





A heated sheet is wound around a cylinder with a specified diameter to check the occurrences of "cracks".

Compressed Non-Asbestos Fiber Sheet

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

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

BLACK SUPER™

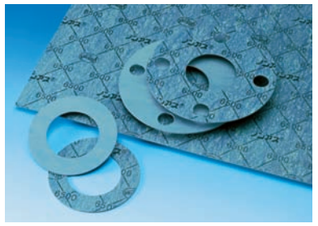
VALQUA No. 6502

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

Unsuitable fluids: Strong acid, strong alkali, and various solvents, inflammable gas, gas susceptible to burn and toxic gas

Applications: Joint areas of steam lines, pipe flanges, valve bonnets and other equipment used in oil refineries and chemical industries

Dimensions:
〈Width × Length〉(mm)
1270 × 1270、1270 × 3810、2540 × 3810、3048 × 3810
〈Thickness〉(mm)
0.5、0.8、1.0、1.5、2.0、3.0
〈Color type〉gray
〈Print color〉black



Compressed Non-Asbestos Fiber Sheet for general use

VALQUA No. 6500

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

Unsuitable fluids: Strong acid, strong alkali, and various solvents, inflammable gas, gas susceptible to burn and toxic gas

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

Dimensions:
〈Width × Length〉(mm)
1270 × 1270、1270 × 3810、2540 × 3810、3048 × 3810
〈Thickness〉(mm)
0.4、0.5、0.8、1.0、1.5、2.0、3.0
〈Color type〉blue
〈Print color〉black

Anti-corrosion Compressed Non-Asbestos Fiber Sheet

VALQUA No. 6500AC

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

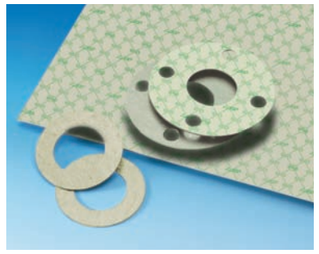
Unsuitable fluids: Strong acid, strong alkali, and various solvents, inflammable gas, gas susceptible to burn and toxic gas

Applications: Stainless steel pipe flanges, valve bonnets and other equipment used in various industries requiring corrosion resistance.

Dimensions:
〈Width × Length〉(mm)
1270 × 1270、1270 × 3810、2540 × 3810
〈Thickness〉(mm)
1.0、1.5、2.0、3.0
〈Color type〉blue
〈Print color〉orange

Compressed Non-Asbestos Fiber Sheet

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



White Compressed Non-Asbestos Fiber Sheet

VALQUA No. 6503

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

Unsuitable fluids

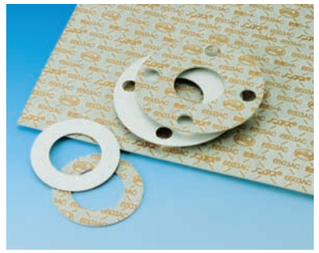
Strong acid, strong alkali, and various solvents, inflammable gas, gas susceptible to burn and toxic gas

Applications

Applications should be avoided in which black foreign substances are included into process fluids, such as in petrochemical industry.

Dimensions

〈Width × Length〉(mm)
1270 × 1270、1270 × 3810、2540 × 3810、3048 × 3810
〈Thickness〉(mm)
0.5、0.8、1.0、1.5、2.0、3.0
〈Color type〉white
〈Print color〉green



Anti-corrosion white Compressed Non-Asbestos Fiber Sheet

VALQUA No. 6503AC

With reduced amount of leachable chloride, these white Compressed Fiber Sheets have corrosion suppression effect on stainless steel flanges. Surface finishing reduces sticking to the flange

Unsuitable fluids

Strong acid, strong alkali, and various solvents, inflammable gas, gas susceptible to burn and toxic gas

Applications

Pipe flanges, valve bonnets and other equipment used in various industries requiring corrosion resistance for white applications.

Dimensions

〈Width × Length〉(mm)
1270 × 1270、1270 × 3810、2540 × 3810
〈Thickness〉(mm)
0.5、0.8、1.0、1.5、2.0、3.0
〈Color type〉white
〈Print color〉orange

■ Design data ■

▼Recommended tightening stress

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

Fluid	Recommended tightening stress (MPa)
Liquid	25.5
Gas	40.0

▼m,y values

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

Thickness (mm)	Gasket factor "m"	Minimum design seating stress "y" (N/mm²)
3.0	2.00	11.0
1.5	2.75	25.5
1.0	3.50	44.8

▼Available ranges

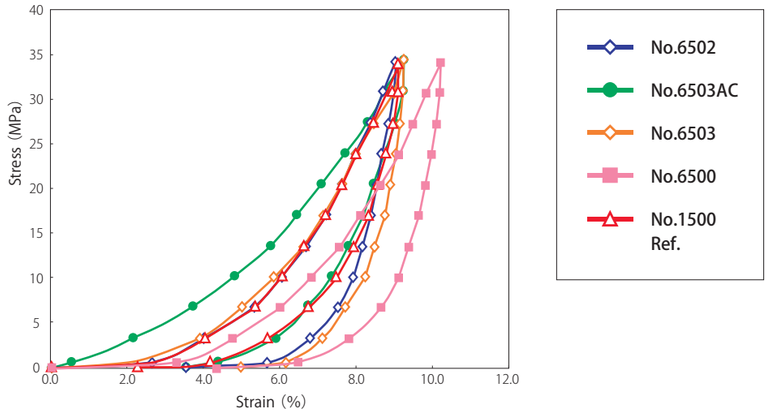
Temperature and pressure classifications show individual service limits.

VALQUA No.	Temperature (℃) (1)	Pressure (MPa)		
		Water based	Oil based (2)	Gas
6500 / 6500AC	−50～183	3.0	3.0	1.0
6502 / 6503 / 6503AC	−50～214	3.0	3.0	1.0

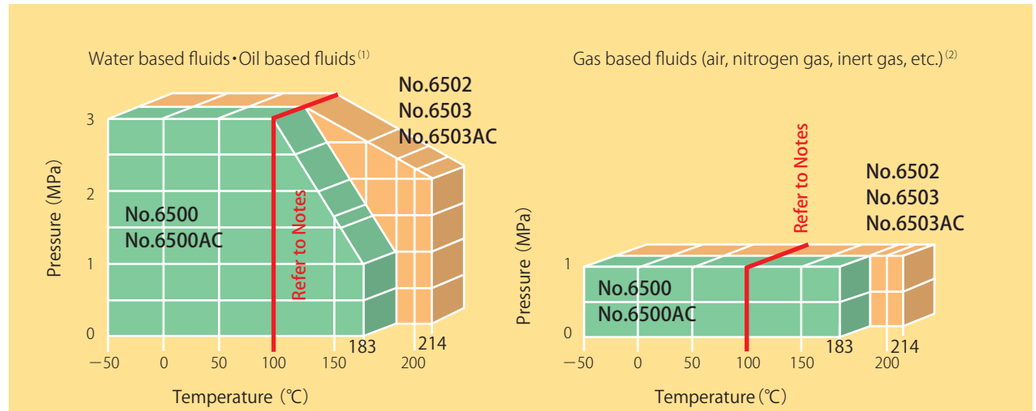
Notes (1) For service conditions exceeding 100°C, please refer to the notes on page 10.
(2) Regarding oil gas, solvent and corrosive fluid, separate consultation is required

■ Stress strain characteristics of Compressed Non-Asbestos Fiber Sheet

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



■ Temperature & Pressure ranges per fluid ■



Notes (1) Oil gas, solvents and corrosive fluids are not included and therefore require separate consultation.
Notes (2) Inflammable gas, gas susceptible to burn and toxic gas are not included and therefore require separate consultation.

▼ Note

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

① Gasket thickness should be 1.5 mm or less.
② Gasket paste (SEAL PASTE™ etc.) should be used.
③ Tightening stress should be 30 MPa or higher.
④ These gaskets should be used in places unlikely to bear piping load, or in places that may be easily replaced.
⑤ Whenever possible, use ring gaskets. Full face gaskets have more surface area, requiring additional compressive load on the gasket.

High Performance Non-Asbestos Sheet / Compressed Non-Asbestos Fiber Sheet

VALQUA No. MF300 / GF300 / SF300 / 6502 / 6500 / 6500AC / 6503 / 6503AC

■ Comparison of physical properties ■

Item		High Performance Non-Asbestos Sheet						Compressed Non-Asbestos Fiber Sheet								No.1500 [Ref.]	
		No.MF300		No.GF300		No.SF300		No.6502		No.6503		No.6500		No.6503AC			
Thickness	(mm)	1.5	3.0	1.5	3.0	1.5	3.0	1.5	3.0	1.5	3.0	1.5	3.0	1.5	3.0	1.5	3.0
Physical Properties																	
Tensile strength (CD)	(MPa)	12.0	14.1	12.4	10.9	16.0	15.8	13.1	12.5	19.2	18.1	17.0	15.3	18.6	17.8	28.4	27.3
Compressibility (34.3MPa)	(%)	5	4	5	4	5	6	9	10	9	6	10	10	8	8	9	8
Recovery (34.3MPa)	(%)	32	36	53	54	42	50	67	64	60	61	57	55	58	54	61	55
Flexibility (MD)(1)		<2	<2	<2	<2	<2	<2	11	12	10	10	9	9	12	12	11	12
Density	(kg/m^3)	2910	2839	2315	2262	2319	2280	1761	1759	1803	1857	1810	1813	1821	1807	1880	1924
Oil resistance〈IRM903 OIL 150℃×5h〉																	
Tensile strength loss	(%)	1.5	5.9	−8.9	7.6	3.8	5.1	9.2	9.6	13.0	0	16.7	−1.1	15.1	7.9	26.8	16.8
Thickness increase	(%)	0.2	0.2	0.9	0.1	0.0	0.0	1.3	1.0	2.1	0.6	2.2	0.9	2.2	0.7	20.1	12.4
Weight increase	(%)	1.1	1.4	0.7	0.6	0.5	0.7	4.4	3.0	4.2	1.7	3.9	2.2	4.7	3.5	24.9	10.2
Fuel oil resistance〈JIS Fuel oil B RT×5h〉																	
Thickness increase	(%)	0.2	0.5	1.1	0.3	0.4	0.1	4.3	2.6	5.4	2.3	5.6	2.8	4.9	3.1	14.5	10.6
Weight increase	(%)	0.9	1.8	1.8	1.2	0.9	1.3	6.7	6.0	7.0	3.2	5.6	4.0	6.4	4.9	9.4	8.2
Creep relaxation〈JIS R 3453 Tightening stress 20.6MPa〉																	
100℃×22h	(%)	16.9	30.2	16.2	37.0	16.1	42.7	23.5	37.8	27.3	45.0	27.5	47.0	25.5	43.0	31.0	46.1
200℃×22h	(%)	35.8	55.0	35.3	65.8	40.5	68.8	41.1	65.5	43.6	60.5	52.0	78.8	43.4	69.5	39.7	53.4
Sealability〈φ46×φ67×t1.5, Tightening stress 19.6MPa, Internal pressure 0.98MPa N2 gas〉																	
With paste	($Pa \cdot m^3/s$)	1.7×10^{-5} or below		1.7×10^{-5} or below		1.7×10^{-5} or below		3.0×10^{-5}		2.0×10^{-4}		6.0×10^{-4}		2.0×10^{-4}		6.0×10^{-5}	
	(atm·cc/min.)	0.01 or below		0.01 or below		0.01 or below		0.02		0.12		0.36		0.12		0.04	
Without paste	($Pa \cdot m^3/s$)	1.7×10^{-5} or below		4.0×10^{-4}		3.5×10^{-4}		1.5×10^{-4}		1.0×10^{-3}		3.0×10^{-3}		9.3×10^{-4}		1.5×10^{-4}	
	(atm·cc/min.)	0.01 or below		0.24		0.21		0.09		0.59		1.78		0.55		0.09	

Note (1) Flexibility is in accordance with JIS R 3453 6.2.5. Refer to "Comparison of high temperature hardening properties" on page 7.
Remark All the above physical properties are measurement examples, and not regulatory values.

■ Notes to be observed in design and usage ■

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

▼ Notes to be observed in design

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

▼ Notes to be observed in storage

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

▼ Notes to be observed before installation

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

▼ Notes to be observed during installation work

1. When installing gas seals, refer to the following "Countermeasures against permeation leakage".
2. Install the gaskets in a clean environment so as to prevent entry of foreign substances between the gaskets and the flanges.
3. Flange bolts shall be gradually tightened each time, and repeat this process 4 to 5 times, so as to finally ensure uniform tightening.
4. When tightening, pay attention to prevent the occurrence of crush.
5. In particular, when using gaskets of 150 Lb, 1B or smaller, or those of smaller gasket width, care shall be given as gasket stress is likely to be excessive.
6. At the time of load up or restarting, check for any loose bolts.
7. If retightening of gaskets that have already once experienced leakage fails in preventing leakage, replace them with new ones.

■ Countermeasures against permeation leakage ■

Since permeation leakage also occurs in Sheet Gasket as in the case of conventional asbestos joints, the following points shall be observed for gas seals:

▼ For High Performance Non-Asbestos Sheet (No.MF300/GF300/SF300)

1. Apply gasket paste to the contact surface of the gasket and the flange and on the cut surface of the inner diameter of gasket.
2. Maintain the tightening stress to be around 35 MPa. Also use ring gaskets instead of full-face gaskets, so as to ensure proper tightening stress.
3. Use gaskets with a minimum thickness as much as possible (1.5 mm or less).
4. When using gasket paste, please use "NEW VALFLON® Paste". No.6 and No.6M for BLACKHYPER™ and WHITEHYPER™ are not recommended.

▼ For Compressed Non-Asbestos Fiber Sheet (No.6502/6500/6500AC/6503/6503AC)

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