



Comparison of fluororesin gaskets

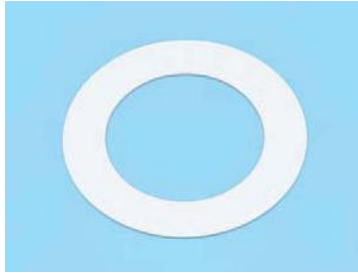
Product name
Features
Construction
Service range
Recommended service range
Usable range (The usable range depends upon the conditions. Be sure to consult us in advance.)

TOMBO No.

1133

CLINSIL™ Clean

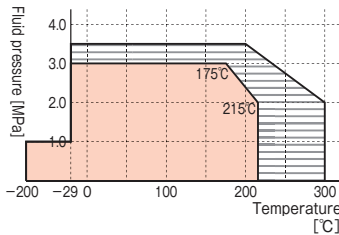
Conforms to the Standards and criteria for food and food additives, etc. (3-D-2, Public Notice No. 370 of the Ministry of Health & Welfare, 1959) stipulated by the Food Sanitation Act



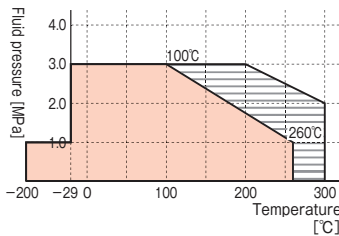
- Can be used with a wide range of fluids including acids, alkalis, petroleum, petrochemical products, organic solvents, hot oil, heating medium gas, and steam. (Excluding some strong alkalis and strong acids.)
- Has the highest heat resistance of all fluororesin gaskets.
- Can also be used where electrical insulating performance is necessary.

Main constituents: PTFE, alumina

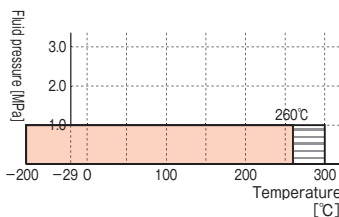
Water-type fluid



Oil-type or corrosive fluids



Gas-type fluid



* The greater the thickness, the larger is the deformation due to creep. For this reason, it is recommended that you select a gasket of 1.5 mm in thickness for a gas line which exceeds 200°C.

TOMBO No.

9007-SC

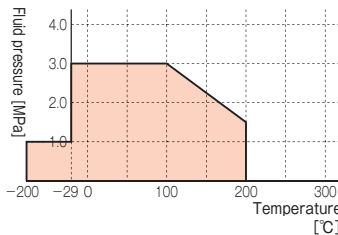
NAFLON™ special carbon filler filled PTFE cut gasket



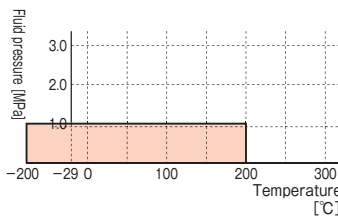
- Can be used with strong alkaline fluids that do not permit TOMBO No.1133 to be used. (It cannot be used with nitric acid, concentrated sulfuric acid, chromic acid, or other oxidizing fluids.)

Main constituents: PTFE, carbon

Water-type, oil-type or corrosive fluids



Gas-type fluid



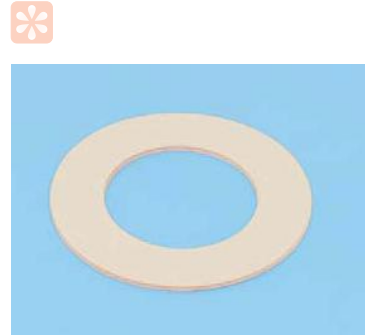
Information

Creep is deformation that occurs after the lapse of a certain time after a material has been exposed to a certain temperature and stress. Creep at normal temperature is also called "cold flow".

TOMBO No.

9007-LC

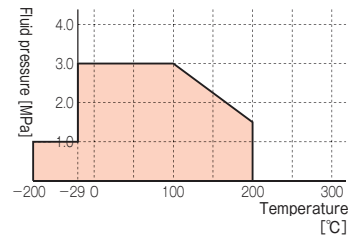
NAFLON™ special filler filled PTFE cut gasket



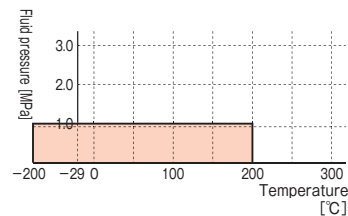
- Can be used with strong acidic fluids that do not permit TOMBO No.1133 to be used. (It cannot be used with hydrofluoric acid or strong alkalis.)
- Can be used where electrical insulating performance is necessary.

Main constituents: PTFE, silica

Water-type, oil-type or corrosive fluids



Gas-type fluid



These gaskets are based on fluororesin that has excellent heat resistance and chemical resistance. A gasket that is blended with a filler, such as alumina, has reduced deformation because of the filler, so compared to a gasket that consists of PTFE alone, these gaskets do not creep even at high temperature.

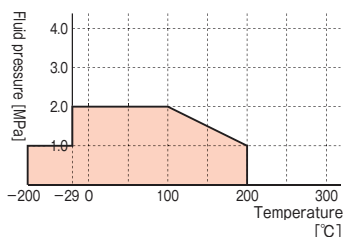
TOMBO No.
9007-GL
 NAFLON™ GL gasket



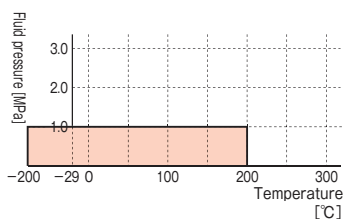
- This gasket is very flexible, so it is suitable for glass-lined pipes, plastic pipes, etc. where a large tightening torque cannot be applied.

Main constituents: PTFE, silica filler

Water-type, oil-type or corrosive fluids



Gas-type fluid



- When using TOMBO No.9007-GL or 9007-SGM in a gas-type fluid
- A ring-shaped (FR type) gasket is recommended (because the use of an FF type may fail to generate sufficient seating stress).
 - In order to improve the sealing performance, it is recommended that TOMBO No.9400 (NAFLON™ paste) be used as well.

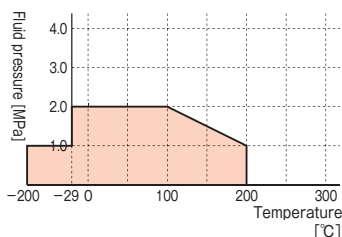
TOMBO No.
9007-FD
 NAFLON™ FD gasket



- This gasket is more flexible than TOMBO No.9007-GL.
- Because this gasket is porous, it is not suitable for a gas-type fluid.

Main constituents: PTFE, silica filler

Water-type, oil-type or corrosive fluids



Gas-type fluid

TOMBO No.9007-FD is of a porous construction, so it is not recommended for use with a gas-type fluid.

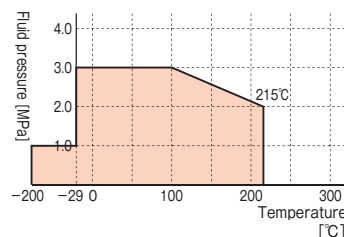
TOMBO No.
9096-SGM
 SGM™ gasket



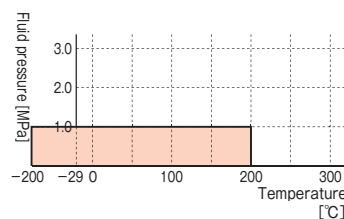
- This gasket is very flexible.
- Because it does not contain filler, it can be used in a line where contamination is not permitted.
- Can be used where electrical insulating performance is necessary.

Main constituents: Rolled PTFE

Water-type, oil-type or corrosive fluids



Gas-type fluid



Product name

Features

Construction

Service range

Fluororesin gaskets

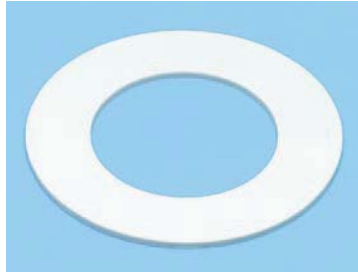
TOMBO No.

9007

NAFLON™ PTFE cut gasket



Conforms to the Standards and criteria for food and food additives, etc. (3-D-2 Public Notice No. 370 of the Ministry of Health & Welfare, 1959) stipulated by the Food Sanitation Act

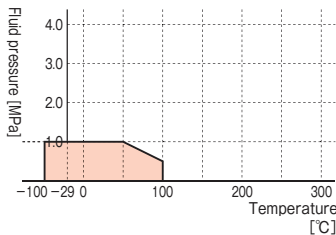


- This is a pure PTFE sheet, so it is suitable for use with fluids that are not permitted to become contaminated.
- This gasket is resistant to virtually all conceivable chemicals, but cannot be used at a temperature of 100°C or higher because deformation due to creep becomes large.

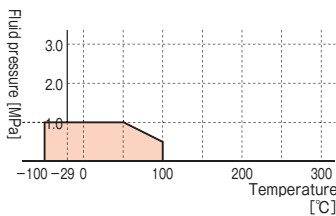
Main constituents: PTFE

* Compared to a gasket that contains a filler, this gasket is liable to creep. Use it with a grooved flange (T&G) as a general rule.

Water-type, oil-type or corrosive fluids



Gas-type fluid



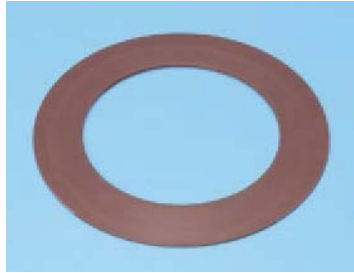
TOMBO No.9007-ST

Denatured PTFE gasket. Compared to TOMBO No.9007, this gasket has high creep resistance, so it can be used up to 150°C.

TOMBO No.

9007-LP

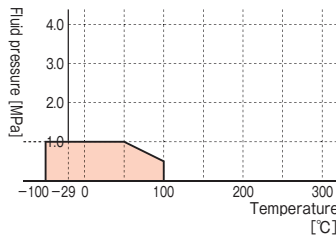
NAFLON™ LP gasket



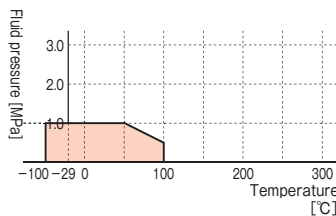
- This gasket is less permeable than PTFE when used with a chemical liquid or gas. It is thus suitable for use with highly permeable halogen-based fluid, for example.

Main constituents: PFA

Water-type, oil-type or corrosive fluids



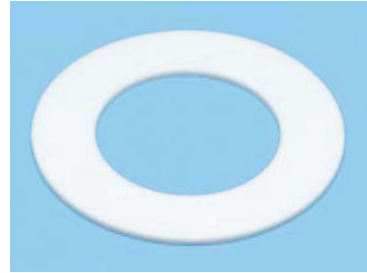
Gas-type fluid



TOMBO No.

9007-G20

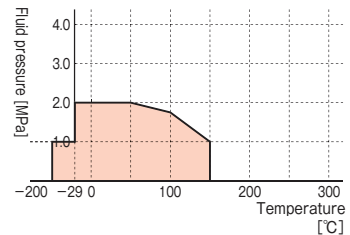
NAFLON™ glass fiber-filled PTFE cut gasket



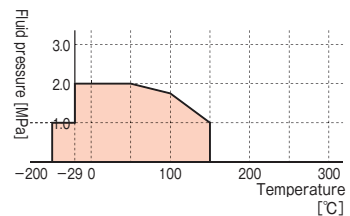
- Standard PTFE gasket containing a filler.
- Cannot be used with hydrofluoric acid or strong alkali.

Main constituents: PTFE, glass fiber

Water-type, oil-type or corrosive fluids



Gas-type fluid





Design criteria

TOMBO No.		1133	9007-SC	9007-LC	9007-GL	9007-FD	9096-SGM	9007	9007-LP	9007-G20
Gasket coefficient m [—]	1.0 t	3.50	—	3.50	—	—	2.50	3.50	—	3.50
	1.5 t	2.75	3.20	3.20	—	—	2.50	3.20	—	3.20
	2.0 t	2.75	3.00	3.00	—	—	2.50	3.00	3.00	3.00
	3.0 t	2.00	2.50	2.50	2.50	2.50	2.50	2.50	—	2.50
Minimum design seating stress y [N/mm ²]	1.0 t	44.8	—	24.5	—	—	19.6	24.5	—	24.5
	1.5 t	25.5	22.5	22.5	—	—	19.6	22.5	—	22.5
	2.0 t	25.5	19.6	19.6	—	—	19.6	19.6	19.6	19.6
	3.0 t	11.0	19.6	19.6	19.6	19.6	19.6	19.6	—	19.6
Minimum seating stress σ^3 [N/mm ²]	Water-type or oil-type fluid	14.7	14.7	14.7	14.7	14.7	19.6	10.8	14.7	12.7
	Gas-type fluid	34.3	29.4	24.5	14.7	—	39.2	19.6 ^{*1} 14.7 ^{*2}	14.7	24.5 ^{*1} 19.6 ^{*2}
Allowable seating stress [N/mm ²]		150.0	58.8	49.0	39.2	39.2	117.6 ^{*3}	39.2	29.4	49.0

*1 : Minimum seating stress for a thickness of 1.0t or 1.5t.

*2 : Minimum seating stress for a thickness of 2.0t or 3.0t.

*3 : The allowable seating stress for a thickness of 2.0t or 3.0t is 78.4N/mm².

Standard dimensions

TOMBO No.		1133	9007-SC	9007-LC	9007-GL	9007-FD	9096-SGM	9007	9007-LP	9007-G20
Maximum O.D. [mm]	1.0 t	φ610	—	φ1200	—	—	φ1380	φ1200	φ277	φ1200
	1.5 t	φ1250	φ1200							
	2.0 t	—	—							
	3.0 t	φ1430	φ1200	φ1430	φ600	φ1220				
Standard thickness	1.0 t	●	—	●	—	—	●	●	—	●
	1.5 t	●	●	●	—	—	●	●	—	●
	2.0 t	●	●	●	—	—	●	●	●	●
	3.0 t	●	●	●	●	●	●	●	—	●

* Gaskets indicated by the yellow areas in the drawing can be made larger than that indicated by employing welding.

Basic physical properties

TOMBO No.		1133	9007-SC	9007-LC	9007-GL	9007-FD	9007	9007-LP
Thickness	[mm]	1.5	1.5	1.5	3.0	3.0	1.5	2.0
Specific gravity	[g/cm ³]	2.74	2.06	2.30	1.94	1.62	2.18	2.18
Tensile strength	[N/mm ²]	18	24	18	22	17	34	28
Compression ratio [%]	34.3MPa	5	4	5	7	10	20	9
Recovery [%]		47	67	55	73	57	48	78
Stress relaxation ratio [%]	100°C × 22h	27	56	50	62	71	73	65
	200°C × 22h	59	79	74	87	90	—	—

* The above values are measured values. They are not standard values.

Precautions for fluororesin products

Precautions concerning design and selection

● Finish of the gasket seat

The recommended gasket seat when using a fluororesin gasket is as follows.

- For sealing liquid: 6.3 μm Ra
- For sealing gas: 3.2 μm Ra

Precautions for use

● Fluids for which a fluororesin gasket is not suitable.

- Do not use a PTFE gasket with molten alkali metal, high-temperature fluorine, chlorine trifluoride or other fluid that corrodes PTFE.
- When a fluororesin gasket is used with a monomer-based fluid, the fluid may permeate into the gasket, resulting in polymerization. In such a case, it is recommended that you either replace the gasket at shorter intervals, or use a vortex™ gasket.

● Gas-type fluid

- When using a fluororesin gasket to seal gas, use TOMBO No.9400 (NAFLON™ paste) together in order to improve the sealing performance.