PILLAR

Pillar Expanded Graphite (Pillar Foil®) Packing Series

NIPPON PILLAR PACKING CO., LTD

GPLC 0335-1

The expanded graphite (Trade name : Pillar Foil®) packing has been widely used in high-temperature and high-pressure applications thanks to its excellent properties. Though it has excellent properties, its few weak points such as **"1. The mechanical strength is low."**, **"2. The formed ring has no dimensional flexibility."** and **"The sliding resistance is high."** have prevented its scope of application from being expanded. We have been promoting research and development in order to improve these weak points and now completed **"Expanded Graphite Gland Packing Series"** that can be used in various applications.

We believe that braided packing Pillar Foil® Mark Ⅲ, Mark Ⅴ and Mark Ⅶ whose mechanical strength and dimensional flexibility have been improved and **Low Torque Packing Series** whose sliding resistance has been improved will meet your needs through **"Simplified maintenance, Longer service life and High reliability"**.

Pillar Foil® is our register trade mark for expanded graphite.

Pillar Foil® Mark Ⅲ, Mark Ⅴ, Mark Ⅶ and Low Torque Packing Series are our proprietary products we developed for the first time in the world.

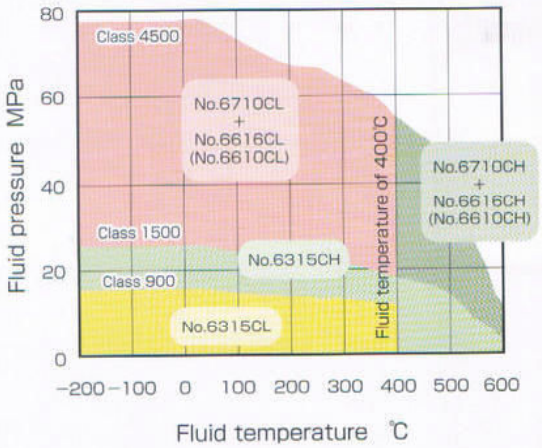
Performance and Applications of Pillar Foil Packing

	Pillar No.	Name	Characteristic: Temperature (℃) Fluid (※1)	Characteristic: Temperature (℃) Packing	Characteristic: Pressure (MPa)	Characteristic: Circumferential speed (m/s)	Major applications	Page
General application	6114	Pillar Foil Mark Ⅶ	−200 ~ +400	350 or less	5.2	—	Cast iron valve, Ductile valve	5
	6114(−M)	Pillar Foil Mark Ⅶ	+400	—	—	—	Manhole	5
	6118	Pillar Foil Mark Ⅴ	−200 ~ +350	—	10.3	—	Ductile valve, Stainless valve	—
	6315	Pillar Foil Mark Ⅴ	−200 ~ +450	—	15.5	—	Forged steel valve, Cast iron valve, Manhole	—
	6315CL	Pillar Foil Mark Ⅴ Low torque type	−200 ~ +400	350 or less	15.5	—	Medium-temperature and medium-pressure control valve	5
	6315CH	Pillar Foil Mark Ⅴ Low torque type	−200 ~ +600	—	25.9	—	High-temperature and medium-pressure valve	5
	6710 + 6616(6610)	Pillar Foil Mark Ⅲ Combination	−200 ~ +600	—	43.1	—	High-temperature and high-pressure valve, Cryogenic valve	—
	6710CL + 6616CL(6610CL)	Pillar Foil Mark Ⅲ Combination Low Torque Type	−200 ~ +400	350 or less	77.6	—	Medium-temperature and high-pressurecontrol valve, General valve	3
	6710CH + 6616CH(6610CH)	Pillar Foil Mark Ⅲ Combination Low Torque Type	−200 ~ +600	—	77.6	—	High-temperature and high-pressure control valve, General valve	3
	6720 + 6616CL(6610CL)	Pillar Foil Mark Ⅲ Combination Non-Metal Low Torque Type	−200 ~ +400	350 or less	15.5	—	Medium-temperature and high-pressure valve, Control valve, General valve	4
	6710 + 6617	Pillar Emission Defense Packing	−200 ~ +600	—	43.1	—	CAAA-compliant valve	4
	6711	Pillar Foil Mark Ⅲ Super	−200 ~ +600	—	25.9	—	High temperature and high pressure valve,High-pressure gas valve	6
	6722	Pillar Foil Mark Ⅲ Original	−200 ~ +350	—	10.3	—	Medium-temperature and medium-pressure valve, Suit blower slow rotation device	6
	6733	Pillar Foil Mark Ⅲ Pump	+350	—	2.0	20	High-temperature and high-pressure pump, High-viscosity oil pump	6
	6766	Pillar Foil Mark Ⅲ Manhole	+400	—	—	—	Manhole	5
For nuclear power	6315CN	Pillar Foil Mark Ⅴ Low Torque Type for Nuclear Power	−200 ~ +400	350 or less	15.5	—	Middle temperature and middle pressure valve	5
	6710N + 6616N(6610N)	Pillar Foil Mark Ⅲ Combination For Nuclear Power	−200 ~ +600	—	43.1	—	High temperature and high pressure valve	—
	6710CN + 6616CN(6610CN)	Pillar Foil Mark Ⅲ combination Low Torque Type for Nuclear Power	−200 ~ +400	350 or less	77.6	—	Middle temperature and high pressure control valve, General valve	3
	6720N + 6616CN(6610CN)	Pillar Foil Mark Ⅲ combination Non-Metal Low Torque Type for Nuclear Power	−200 ~ +400	350 or less	15.5	—	Middle temperature and middle pressure valve, Control valve	4
	6711N	Pillar Foil Mark Ⅲ Super for Nuclear Power	−200 ~ +600	—	25.9	—	High temperature and high pressure valve	6

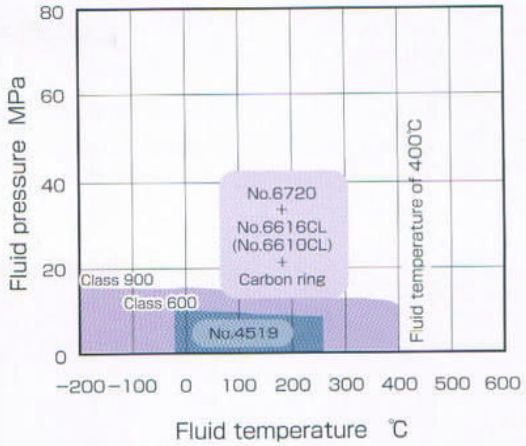
(※1) A fluid temperature of 600℃ applies when used in non-oxidizing atmosphere or vapor. 450℃ applies when used in oxidizing atmosphere.

Expanded Graphite Packing Selection Standard

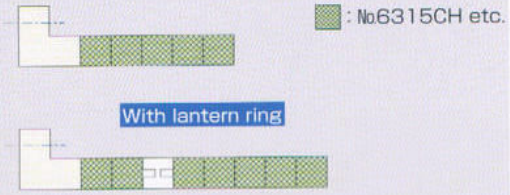
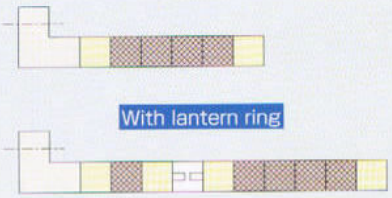
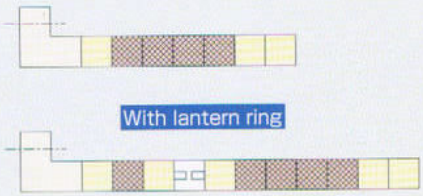
Manual valve, Motor valve



Control valve



Example of Combination of Expanded Graphite Packing

Pressure class	Combination arrangement No.6710CH + No.6616CH etc. No.6710CL + No.6616CL etc.	Single arrangement No.6315CH etc.
150 300		
600 900 1500		
2500 or more		

Minimum tightening Pressure of Expanded Graphite Packing

Minimum tightening pressure N/mm²						
Class150	Class300	Class600	Class900	Class1500	Class2500	Class4500
19.6	19.6	24.5	29.4	34.3	39.2	49.0

PILLAR MARK Ⅲ COMBINATION
No.6710CL+No.6616CL (6610CL)

Low Torque Type Packing Set for Medium-Temperature and High-Pressure Valve

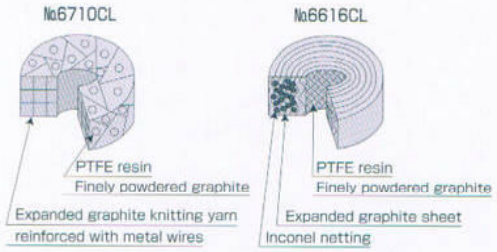
It is a packing set for medium-temperature and high-pressure valves, which is composed of main seal packing Pillar No.6616CL or No.6610CL and adapter packing Pillar No.6710CL on both ends of seal packing.

Pillar No.6616CL is main seal packing, which is fabricated by forming expanded graphite sheets and inconel netting in the shape of a ring. In order to provide a low sliding property, the inner periphery of the packing has been subjected to special modification treatment using PTFE resin and finely powdered graphite.

Pillar No.6610CL is identical with No.6616CL except that it contains no inconel netting.

Pillar No.6710CL is adapter packing, which is fabricated by braiding expanded graphite knitting yarn reinforced with inconel fine wires. The surface of the packing has been subjected to lubrication treatment using PTFE resin and finely powdered graphite to provide a low sliding property.

Structural drawing



■ Property
PH range : 0 to 14
Fluid temperature : − 200 to 400℃
(The temperature of the packing is 350℃ or less.)
Pressure : 77.6MPa (Class 4500)

■ Major applications
Water, Vapor, Oil, Heat transfer oil, Solvent, Gas, LNG

■ Manufacturable dimension
No.6616CL requires a packing height of 6.5mm or more. In the case of a packing height of less than 6.5mm, use No. 6610CL.

PILLAR MARK Ⅲ COMBINATION
No.6710CN + No.6616CN (6610CN)

Low Torque Type Packing Set for Valve for Nuclear Power

Pillar No.6710CN + No.6616CN(6610CN), which is identical with No.6710CL + No.6616CL(6610CL) in material, structure and performance, is a packing set fabricated with the chloride ion concentration controlled to 100ppm or less particularly for nuclear power.

PILLAR MARK Ⅲ COMBINATION
No.6710CH+No.6616CH (6610CH)

Low Torque Type Packing Set for High-Temperature and High-Pressure Valve

It is a packing set for high-temperature and high-pressure valves, which is composed of main seal packing Pillar No.6616CH or No.6610Ch and adapter packing Pillar No.6710CH on both ends of seal packing.

Pillar No.6616CH is main seal packing, which is fabricated by forming expanded graphite sheets and inconel netting in the shape of a ring.

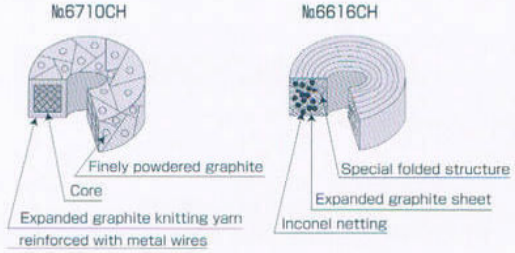
The cross section structure of this low torque packing is a special folded structure.

Pillar No.6610CH is identical with No.6616CH except that it contains no inconel netting.

Pillar No.6710CH is adapter packing, which is fabricated by braiding expanded graphite knitting yarn reinforced with inconel fine wires on the surface of core material made by braiding SUS316 fine wires.

The surface of the packing has been subjected to lubrication treatment using finely powdered graphite to provide a low sliding property.

Structural drawing



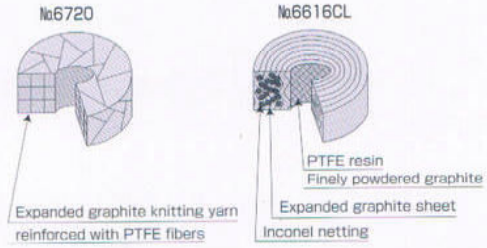
■ Property
PH range : 0 to 14
Fluid temperature : − 200 to 600℃
(The packing temperature is 450℃ or less when used in oxidizing atmosphere.)
Pressure : 77.6MPa (Class 4500)

■ Major applications
Water, Vapor, Oil, Heat transfer oil, Solvent, Gas, LNG

■ Manufacturable dimension
No.6616CH requires a packing height of 6.5mm or more. In the case of a packing height of less than 6.5mm, use No.6610CH

PILLAR MARK Ⅲ COMBINATION
No.6720+No.6616CL (6610CL)

Structural drawing



Low Torque Type Packing Set for Control Valve

It is a packing set for medium-temperature and medium-pressure valves, which is composed of main seal packing Pillar No.6616CL or No.6610CL and adapter packing Pillar No.6720 on both ends of seal packing.

Pillar No.6616CL is main seal packing, which is fabricated by forming expanded graphite sheets and inconel netting in the shape of a ring. In order to provide a low sliding property, the inner periphery of the packing has been subjected to special modification treatment using PTFE resin and finely powdered graphite.

Pillar No.6610CL is identical with No.6616CL except that it contains no inconel netting.

Pillar No.6720 is adapter packing, which is fabricated by braiding expanded graphite knitting yarn reinforced with PTFE fibers and has a low sliding property. Because this packing of non-metallic specification contains no materials that damage metals or valve bodies, it can be used with assurance for high frequency actuated valves .

※ It is recommended to use end rings (carbon rings) on both ends of the packing arrangement.

■ Property
PH range : 0 to 14
Fluid temperature : −200 to 400℃
(The packing temperature is 350℃ or less)
Pressure : 15.5MPa (Class 900)

■ Major applications
Water, Vapor, Oil, Heat transfer oil, Solvent, Gas, LNG

■ Manufacturable dimension
No.6616CL requires a packing height of 6.5mm or more. In the case of a packing height of less than 6.5mm, use No.6610CL

PILLAR MARK Ⅲ COMBINATION
No.6720N+No.6616CN (6610CN)

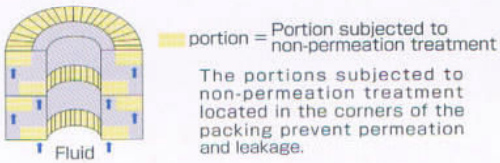
Low Torque Type Packing Set for Control Valve for Nuclear Power

Pillar No.6720N + No.6616CN(6610CN), which is identical with No.6720 + No.6616CL(6610CL) in material, structure and performance, is a packing set fabricated with the chloride ion concentration controlled to 100ppm or less particularly for nuclear power

※ It is recommended to use end rings (carbon rings) on both ends of the packing arrangement.

PILLAR EDP PACKING SET
No.6617+No.6710

Structural drawing



Gland Packing for US-CAAA-compliant Valve Emission Defence Packing

Pillar No.6617 is a gland packing made of expanded graphite alone subjected to non-permeation treatment, which is used in combination with Pillar No.6710. It delivers an excellent hermetic sealing property unattainable by the conventional expanded graphite packing.

Pillar No.6710 is an adapter packing which is fabricated by braiding expanded graphite knitting yarn reinforced with inconel fine wires in a profile angle.

■ Property
Fluid temperature : −200 to 600℃
(The packing temperature is 450℃ or less when used in oxidizing atmosphere.)
Pressure : 43.1MPa (Class 2500)

■ Major applications
Water, Vapor, Oil, Heat transfer oil, Solvent, Gas, LNG Strong acid, Strong alkali, High-temperature and high-pressure valve, cryogenic valve, High-pressure gas valve

■ Manufacturable dimension
No.6617 requires a packing width of 4mm or more

PILLAR MARK VII
No.6114

General Type Expanded Graphite Braided Packing

Pillar No.6114 is expanded graphite packing using no metal wires, which is fabricated by braiding expanded graphite knitting yarn reinforced with organic fibers in a profile angle.

The surface layer of the expanded graphite knitting yarn has been strongly treated with a special lubricant in order to fully deliver its performance such as a sealing property and sliding property.

■ Property
Fluid temperature : − 200 to 400℃
(The packing temperature is 350℃ or less)
Pressure : 5.3MPa (Class 300)

■ Major applications
Steel valve, Ductile valve

PILLAR MARK VII
No.6114-M

Expanded Graphite Braided Packing for Manhole

Pillar No.6114-M is expanded graphite packing which is fabricated by braiding expanded graphite yarn reinforced with organic fibers in a profile angle.

With a low clamping pressure, it delivers an excellent sealing property with good conformability.

■ Property
Temperature : 400℃
Fluid : Hot air, Exhaust gas, Dust, etc.

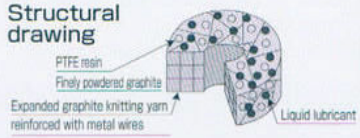
■ Major applications
Flange portion of manhole, Door portion of various furnaces, heating furnaces, drying machines, etc.

PILLAR MARK V
No.6315CL

Low Torque Type Emission Defence Packing

Pillar No.6315CL is expanded graphite packing having a low sliding property, which is fabricated by braiding expanded graphite knitting yarn reinforced with stainless steel wires and has been subjected to non-permeation treatment using a liquid lubricant and lubrication treatment using PTFE resin and finely powdered graphite. It can be used singly on pressure classes up to class 900 and applied under a wide range of use conditions, helping to reduce the maintenance of and increase the life of the stem seal of the valve.

Structural drawing



■ Property
Fluid temperature : − 200 to 400℃
(The packing temperature is 350℃ or less)
Pressure : 15.5MPa (Class 900)

■ Major applications
Water, Vapor, Oil, Heat transfer oil, Solvent, Gas, Acid, Alkali, Cast steel valve, Forged steel valve

PILLAR MARK V
No.6315CN

Low Torque Type Packing for Valve for Nuclear Power

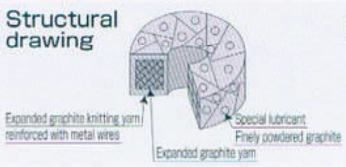
Pillar No.6315CN, which is identical with No.6315CL in material, structure and performance, is a packing set fabricated with the chloride ion concentration controlled to 100ppm or less particularly for nuclear power.

PILLAR MARK V
No.6315CH

Low Torque Type Packing for High-Temperature and Medium-Pressure Valve

Pillar No.6315CH is expanded graphite packing which is fabricated by coating the surface of expanded graphite yarn used as the core with braided expanded graphite knitting yarn reinforced with stainless steel wires (SUS304) and then surface-treating it with a special lubricant and finely powdered graphite.

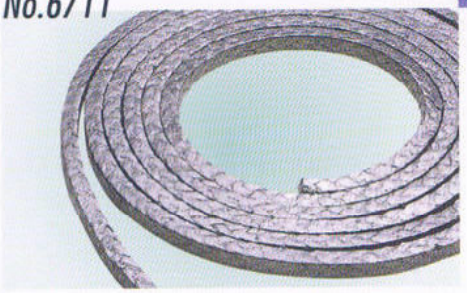
Structural drawing



■ Property
Fluid temperature : − 200 to 600℃
(The packing temperature is 450℃ or less when used in oxidizing atmosphere.)
Pressure : 25.9MPa (Class 1500)

■ Major applications
Water, Vapor, Oil, Heat transfer oil, Solvent, Gas, Acid, Alkali, Cast steel valve, Forged steel valve

PILLAR MARK III
No.6711



Packing for High-Temperature and High-Pressure Valve

Pillar No.6711 is expanded graphite packing that can be used singly for high-temperature and high-pressure valves, which is fabricated by braiding expanded graphite knitting yarn reinforced with inconel wires in a profile angle and baking graphite on the surface.

■ Property
Fluid temperature : − 200 to 600℃
(The packing temperature is 450℃ or less when used in oxidizing atmosphere.)
Pressure : 25.9MPa (Class 1500)

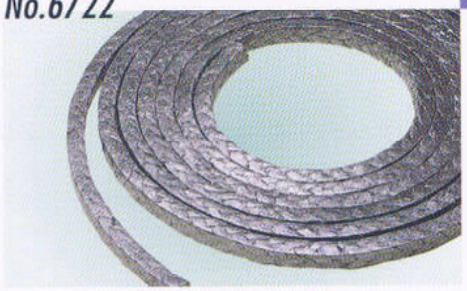
■ Major applications
Water, Vapor, Oil, Heat transfer oil, Solvent, Gas, Acid, Alkali, High-temperature and high-pressure valve, High-pressure gas valve, Heat transfer oil valve, Gasket for cover

PILLAR MARK III
No.6711N

Packing for High-Temperature and High-Pressure Valve for Nuclear Power

Pillar No.6711N, which is identical with No.6711 in material, structure and performance, is a packing set fabricated with the chloride ion concentration controlled to 100ppm or less particularly for nuclear power

PILLAR MARK III
No.6722



Packing for Low-Speed Rotating Machine

Pillar No.6722 is expanded graphite packing which is fabricated by braiding expanded graphite knitting yarn reinforced with aramid fibers and treating it with a heat-resistant lubricant.

■ Property
Temperature : − 200 to 350℃
Pressure : 10.3 MPa
(Class 600)

■ Major applications
Water, Vapor, Oil, Acid, Alkali, Medium-temperature and medium-pressure valve, Low-speed rotating machine

PILLAR MARK III
No.6733

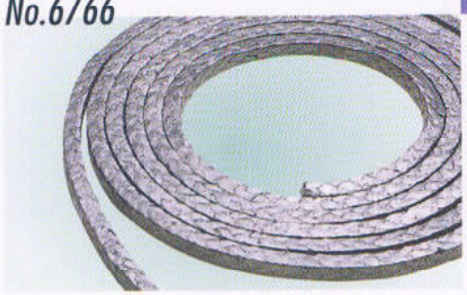
Packing for Pump

Pillar No.6733 is expanded graphite packing which is fabricated by braiding expanded graphite knitting yarn reinforced with aramid fibers and treating it with a heat-resistant lubricant.

■ Property
Temperature : 350℃
Pressure : 2.0 MPa
Circumferential speed : 20m/s
PV :19.6MPa・m/s

■ Major applications
Water, Hot water, Oil, Acid, Alkali, High-pressure feed water pump, Boiler feed water pump, Boiler circulating water pump, High-viscosity index oil pump

PILLAR MARK III
No.6766



Packing for Manhole

Pillar No.6766 is expanded graphite packing which is fabricated by using braided expanded graphite knitting yarn reinforced with stainless steel wires as the envelope and using elastic inorganic fibers as the core.

■ Property
Temperature : 400℃
Fluid : Hot air, Exhaust gas, Dust, etc.
(In the case of a temperature of 400℃ or more, use No.6711.)

■ Major applications
Door portion of various furnaces, heating equipment, drying furnaces, etc., Damper, Manhole flange

*Specifications and dimensions are subject to change without prior notice.

*The data on this catalogue are solely for your reference and are not to be construed as constituting a warranty.

⚠ CAUTION	• Follow the instructions, before installation and operation, for your safety.

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