OILES™

NEW Composite Bearing

OILES FIBERFLON GH

Ideal Durability for Hydro Application

— Predictable friction in small oscillation applications (±0.5°)

Stable predictable vane control
Avoids servo cylinder overload

— Low wear amount under wide range of conditions

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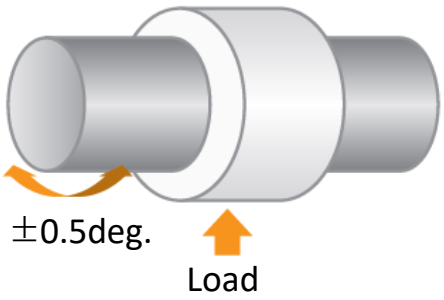
Highlight

Performance

■ Test Conditions

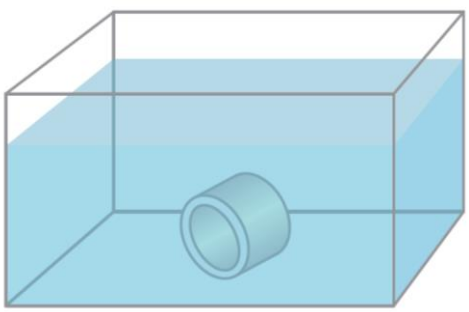


Motion mode	Journal shaft oscillation
Oscillating angle	1.0deg. (±0.5deg.)
Environment	in water(20℃) in air
Mating shaft	Stainless steel (SUS403 in JIS)
Bearing dimension	Φ60×ϕ75×L50 mm
Contact pressure	24.5 N/mm^2
Sliding velocity	2.1mm/s
Test time	100hr
Sliding distance	750m
Lubrication	Without grease

Friction	Wear amount
in air **under 0.15**	in air **Reduced 70%** (as compared to competitor's)
in water **under 0.1**	in water **Reduced 70%** (as compared to competitor's)

※See page 8 for details.

Design



Saturated swelling rate

under 0.1%

Typical competitive materials approx. 0.4%

※See page 4 for details.

OILES FIBERFLON GH

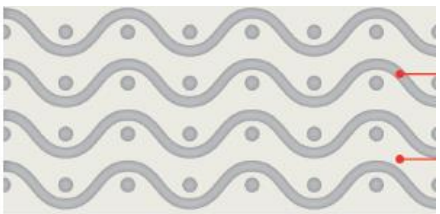
OILES FIBERFLON GH is a self-lubricated composite bearing consisting of unsaturated polyester, special woven fabric and solid lubricants.

Material Composition

■ Material

Base resin	Unsaturated polyester
Reinforcement	Special woven fabric
Additive	PTFE and other dry lubricants

■ Section View



Features

- Superior low coefficient of friction and wear resistance.
- Quickly develops lubricating layer allowing for superior friction and wear performance in small oscillation applications.
- Durable in both air and water.
- Superior friction and wear performance in low temperature water and muddy water applications.
- Low swell rate and better dimensional stability compared to competitor materials.
- Greaseless function eliminates environmental risk related to grease.
- Available as bushings, wear plates, and washers.

Service range

Allowable max. pressure	N/mm^2	60 (100)
Allowable max. velocity	m/s	0.16
Allowable max. PV value	$N/mm^2 \cdot m/s$	1.2
Service temperature range	℃	-40 ~ +100

※ Static allowable pressure in ( ) is allowable pressure in the condition with no sliding or with sliding at quite low velocity, which is 0.0017m/s or less

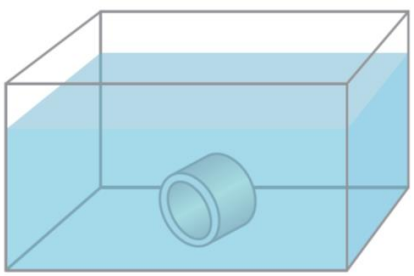
Mechanical Properties

Item	Test method	Unit	Representative value※1
Tensile strength	JIS K 6911	N/mm^2	110
Flexural strength （Normal to laminate）	JIS K 6911	N/mm^2	90
Compressive strength （Normal to laminate）	JIS K 6911	N/mm^2	300
Rockwell hardness	JIS K 6911	HRM	85
Izod impact strength （Normal to laminate）	JIS K 6911	J/m	1,300※3
Saturated swelling rate※2	—	%	0.1%
Density	JIS K 6911	—	1.3
Thermal Expansion	ASTM D 696	$\times 10^{-5}$/℃	normal to laminate 9 parallel to laminate 5

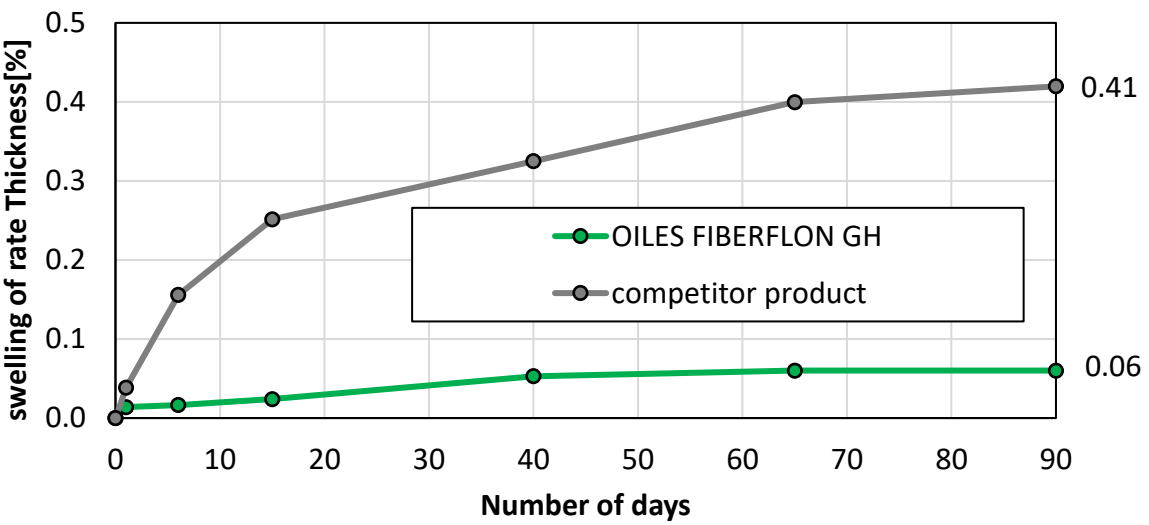
※1 Values are reference, not standard.
※2 Saturated swelling rate is increasing ratio of thickness, when in the water immersion test.
※3 Without destruction

Swelling characteristics

■ Conditions of water immersion test

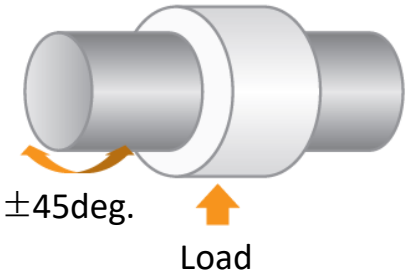


Dimension of test pieces	ϕ65×ϕ75×L50 mm (Thickness 5 mm)
Test method	Test pieces are immersed in tap water.
Water temperature	23℃

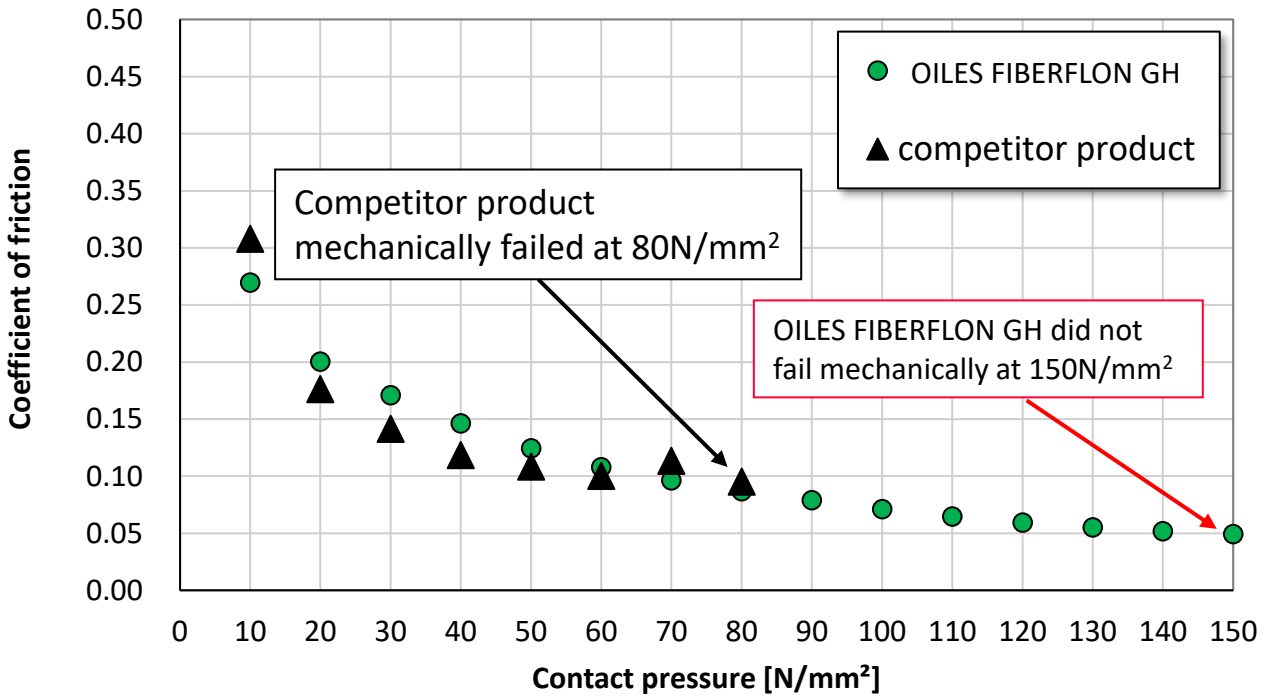


Load Capacity

■ Test Conditions

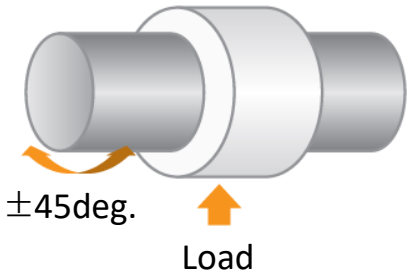


Motion mode	Journal shaft oscillation
Oscillating angle	90deg. (±45deg.)
Environment	in air
Mating shaft	Chrome molybdenum steel(Hardening) + Hard chrome plating
Bearing dimension	ϕ60 × ϕ75 × L25 mm
Contact pressure	5→150 N/mm^2 (150 N/mm^2 is maximum pressure of test machine)
Sliding velocity	16.8 mm/s
Test time	After each 15 minutes operation, increasing contact pressure 5→10→20→・・・→150 N/mm^2
Lubrication	Without grease

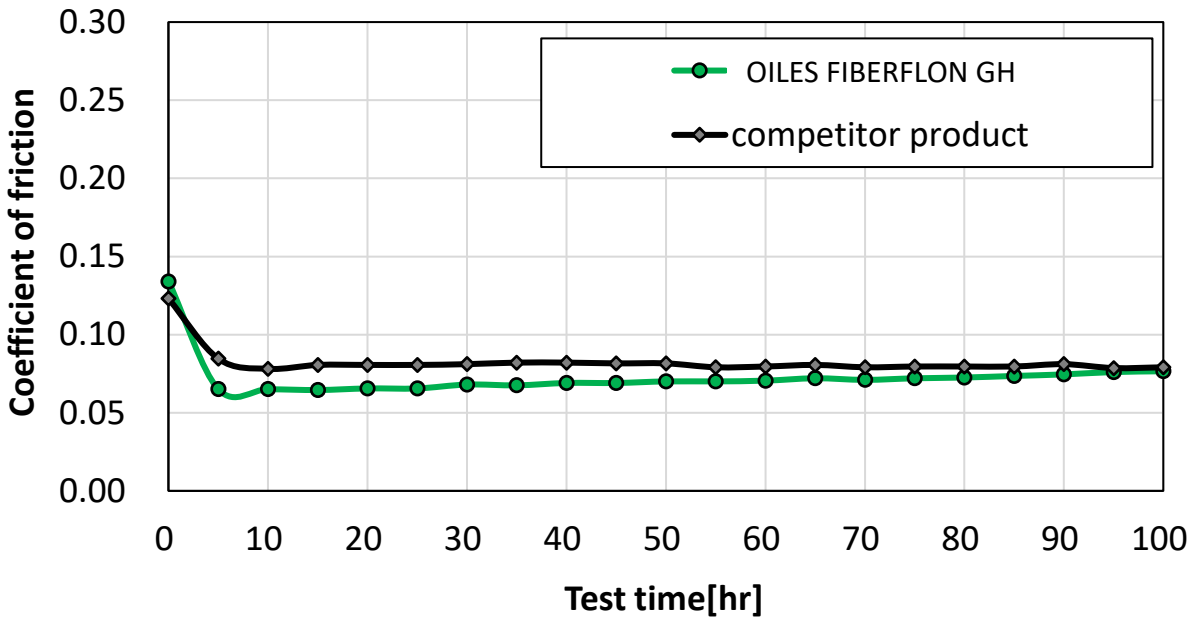


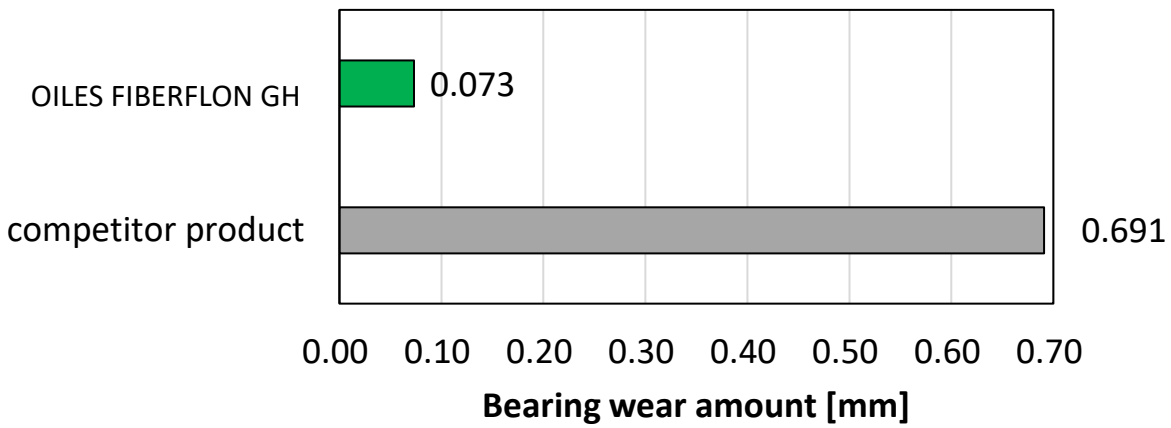
Sliding Performance

■ Test Conditions



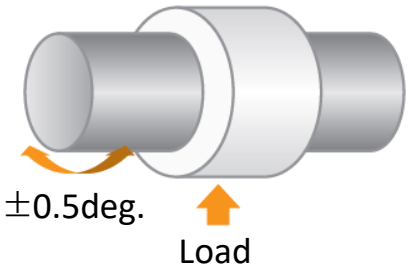
Motion mode	Journal shaft oscillation
Oscillating angle	90 deg. (±45 deg.)
Environment	in air
Mating shaft	Carbon steel (S45C in JIS)
Bearing dimension	ϕ60 × ϕ75 × L50 mm
Contact pressure	29 N/mm^2
Sliding velocity	28.3 mm/s
Test time	100hr
Sliding distance	10,200 m
Lubrication	Without grease





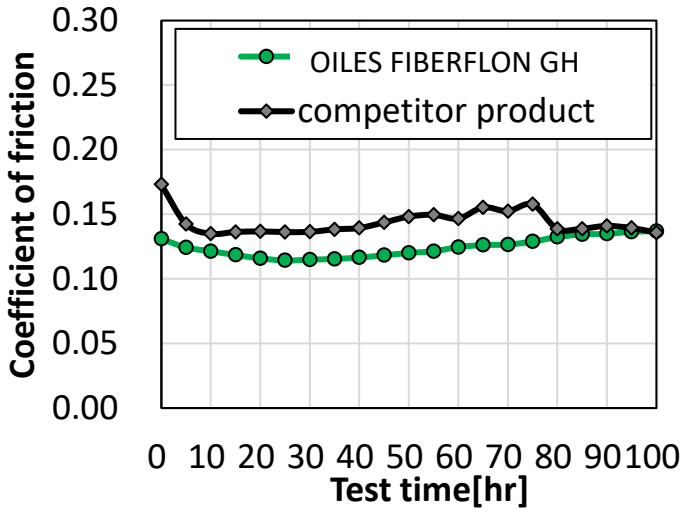
Sliding Performance (under minute movement)

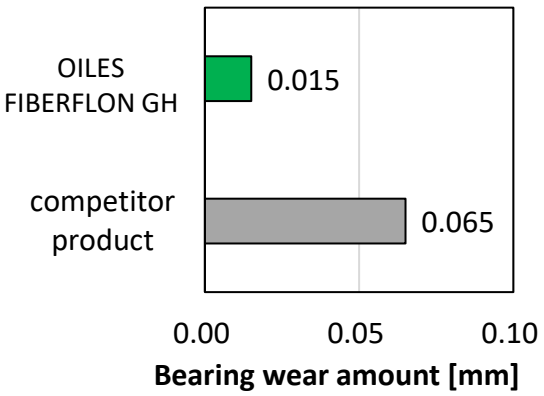
■ Test Conditions



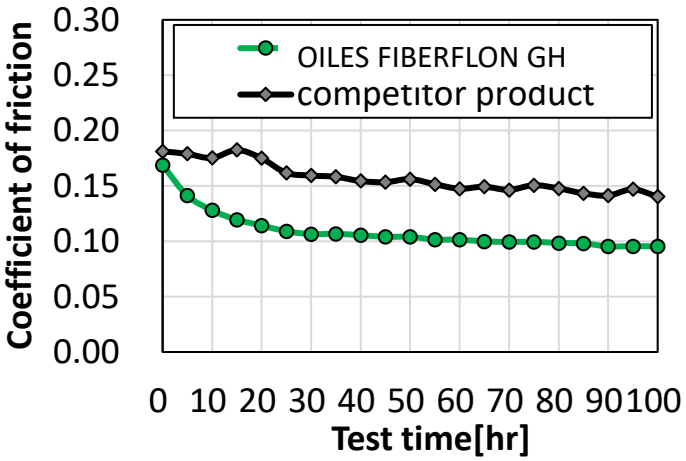
Motion mode	Journal shaft oscillation
Oscillating angle	1.0 deg. (±0.5 deg.)
Environment	in air in water (20℃)
Mating shaft	Stainless steel (SUS403 in JIS)
Bearing dimension	ϕ60×ϕ75×L50 mm
Contact pressure	24.5 N/mm²
Sliding velocity	2.1 mm/s
Test time	100hr
Sliding distance	750 m
Lubrication	Without grease

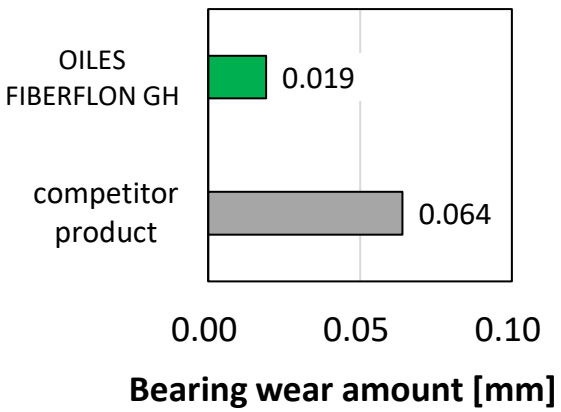
In air





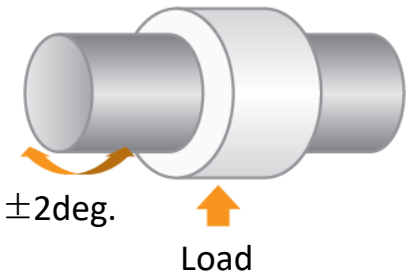
In water



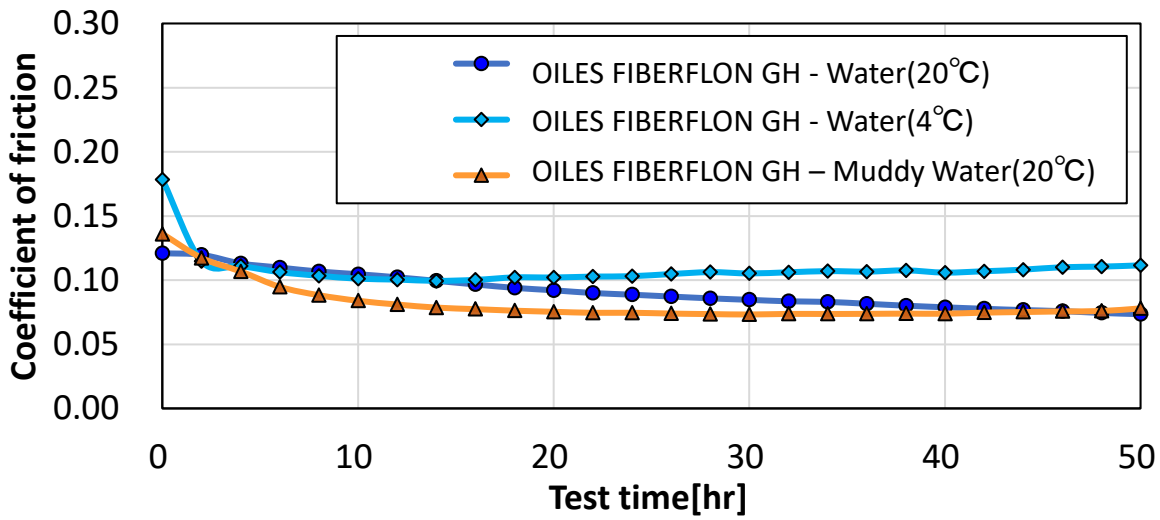


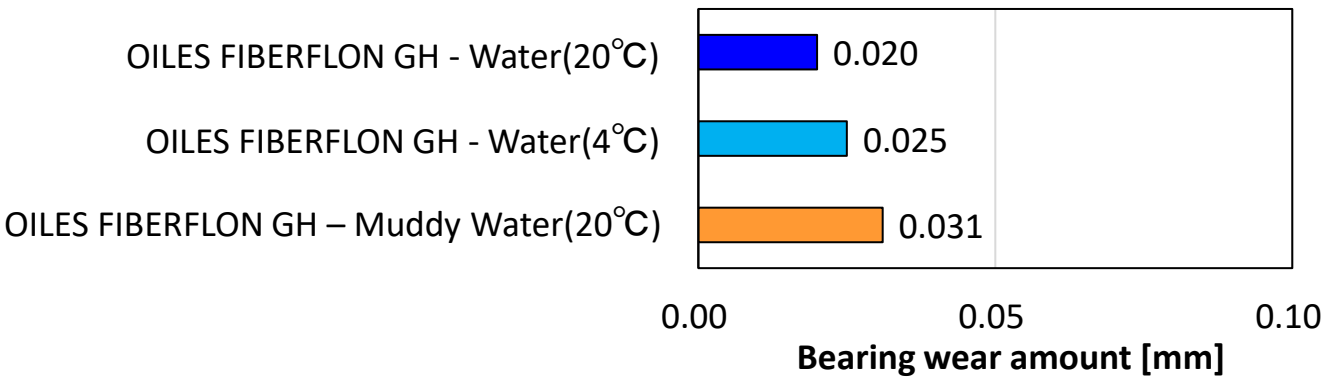
Sliding Performance (under low temperature water and muddy water)

Test Conditions



Bearing	OILES FIBERFLON GH
Motion mode	Journal shaft oscillation
Oscillating angle	4deg. (±2deg.)
Environment	in water (20℃) in water (4℃) in muddy water (20℃, Test powder No.8 in JIS, 0.1wt%)
Mating shaft	Stainless steel (SUS403 in JIS)
Bearing dimension	ϕ60 × ϕ75 × L50 mm
Contact pressure	24.5 N/mm^2
Sliding velocity	8.4 mm/s
Test time	50hr
Sliding distance	1,500m
Lubrication	Without grease

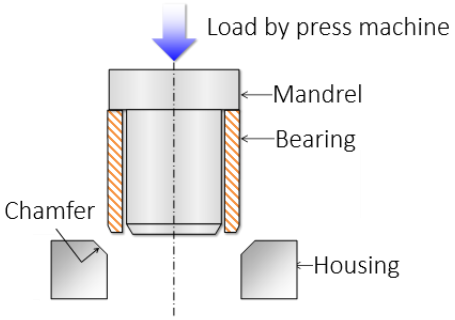




Housing Fixing Methods

Interference fit

OILES FIBERFLON GH bearings can be installed similar to other bearings designed for interference fit . A classic mandrel and housing are recommended as described to the right.



Shrink fit

Dry ice and liquid nitrogen are suggested methods for shrink fitting. The table below is a guide for using the different solutions.

Refrigerant type	Dry ice	Liquid nitrogen
Described	Dry ice Plastic bag Insulated container	Liquid nitrogen Stage Insulated container

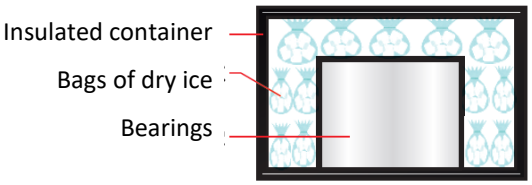
a. Shrink fit using dry ice

・Fill a sufficiently insulated container with bagged dry ice.
・Be careful not to damage the bearing surface with dry ice.

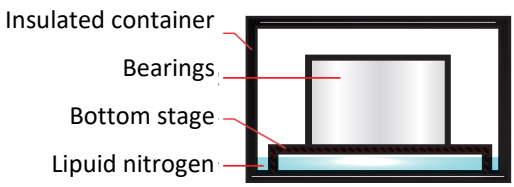
b. Shrink fit using liquid nitrogen

・Place the bearings on the bottom stage and place liquid nitrogen in the insulated container.
・The insulated container should be capable of withstanding temperatures as low as -200 degree C.
・Ensure the bearing does not contact the raw liquid nitrogen.

a.



b.



Bonding

The following adhesives are recommended when fixing with an adhesive.
・CEMEDINE EP007*1
・LOCTITE EA E60-HP*2
Any two-part room temperature curing epoxy adhesive other than the above will also work fine.

*1 CEMEDINE is a registered trademark of CEMEDINE COMPANY, LIMITED CORPORATION in the United States or in other countries.
*2 LOCTITE is a registered trademark of Henkel IP & Holding GmbH LIMITED LIABILITY COMPANY or in other countries.
*3 We do not guarantee the quality and adhesion effect of the adhesive.

Chemical Resistance

Acid	40%-80% Sulfuric Acid	A
	80%-95% Sulfuric Acid	D
	Hydrochloric Acid	B
	Phosphoric Acid	A
	Nitric Acid	D
	Chromic Acid	C
	Lactic Acid	B
	Hydrogen Peroxide	B
	Chlorine (moist)	C
Alkaline	Ammonia (moist)	D
	Ammonia (dry)	D
	Calcium Chloride	A
	Sulfur (dry)	A
	Calcium Hydroxide	A
Solvent	Methanol	A
	Acetone	C
	Toluene	C
	Ethylene Glycol	A
Oil, Water, Others	Lubricating oil	A
	Water	A
	Sea Water	A

A : Excellent B : Good C : Fair D : No Resistance

Machining Instruction

OILES FIBERFLON GH can be machined dry using conventional machining methods. Recommended machining conditions are shown in Table below. Some considerations may be required depending on equipment and environmental conditions to accommodate for thermal expansion, chucking, and material deflection.

Cutting tool	Tip type	Carbide tool, Diamond	
	Relief angle [deg.]	5 - 10	
	Rake angle [deg.]	5 - 20	
	Nose radius [mm]	0.4 - 0.8	
Condition	Speed [m/min]	300 – 500	
	Cut depth [mm]	Rough	1.0 - 3.0
		Finish	0.2 - 1.0
	Feed [mm/rev]	Rough	0.1 - 0.2
		Finish	0.04 - 0.08

Standard Dimensions of Cylindrical Material

Unit : mm

I.D.	Maximum O.D.	Length
15～under40	Negotiable	300
40～under50	104	
50～under60	114	
60～under70	124	
70～under80	134	
80～under90	144	
90～under100	154	
100～under110	164	
110～under120	174	
120～under130	184	
130～under150	194	
150～under175	214	1,000
175～under200	239	
200～under230	264	
230～under250	284	
250～under270	304	
270～under300	324	
300～under350	354	
350～under400	404	
400～under450	454	
450～under500	504	
500	554	

※Production lead time: 2week～4week （Excluding shipping period）
※Exposed white woven fabric on surface is allowed.

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