

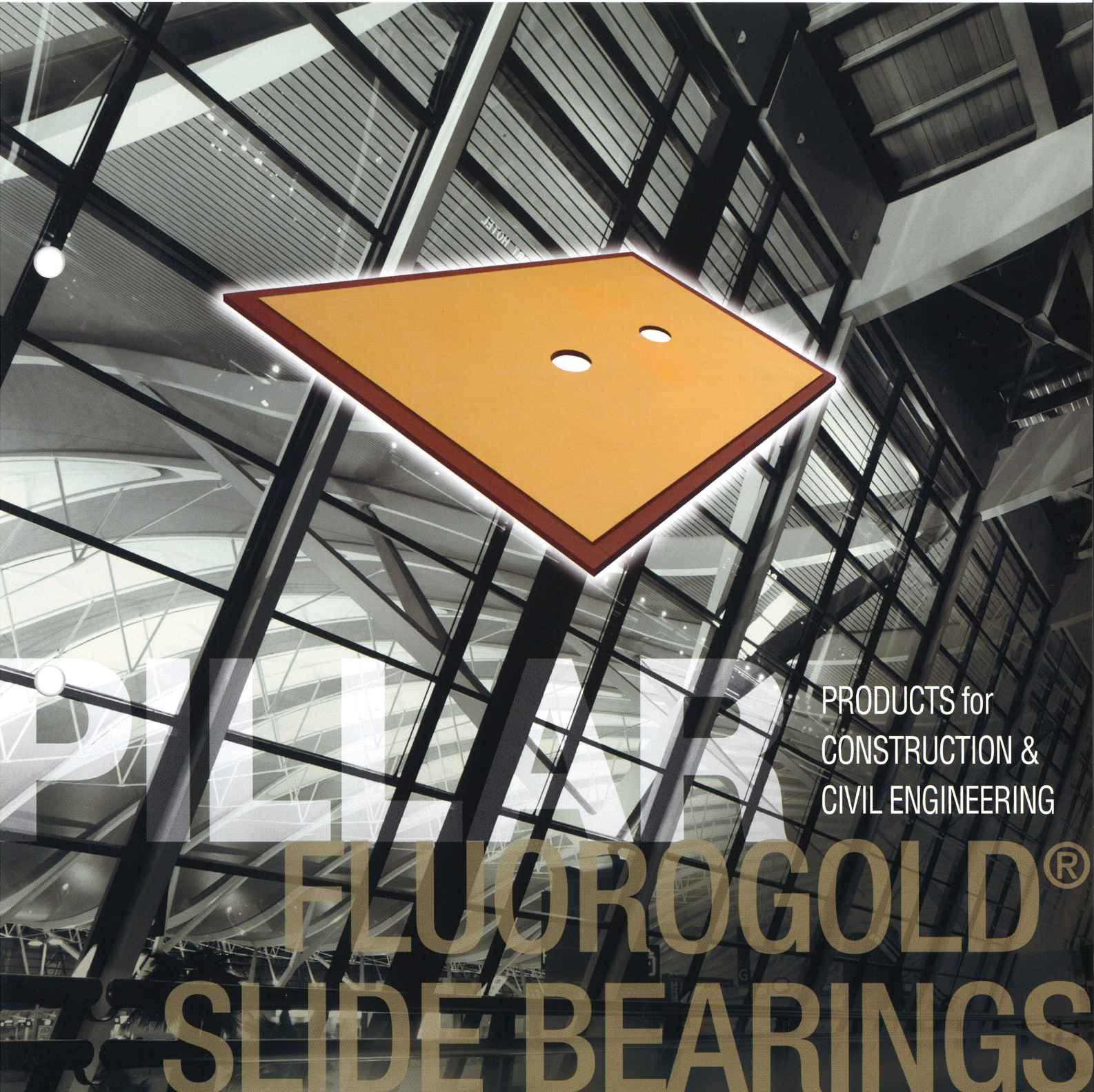


**PILLAR**

Products for Construction and Civil Engineering

# **PILLAR FLUOROGOLD<sup>®</sup> SLIDE BEARINGS**

Small-sized slide bearing plates to support heavy loads



PRODUCTS for  
CONSTRUCTION &  
CIVIL ENGINEERING

**FLUOROGOLD<sup>®</sup>  
SLIDE BEARINGS**

**NIPPON PILLAR PACKING CO., LTD.**

PPLC0333-1



# PILLAR FLUOROGOLD® SLIDE BEARINGS

The PILLAR FLUOROGOLD® slide bearing is a sliding material made of PILAFLO® bonded to metal, and used for various applications, centered in earthquake measures for buildings, thermal expansion countermeasures in industrial plants, and the transportation of equipment. In order to maximize the function of the slide bearing, the bearing material uses PILAFLO®, which incorporates special filler. PILAFLO® is firmly bonded to the metal blending to achieve high wear resistance and high load resistance. Furthermore, this slide bearing ensures ease of mounting, thus gaining high popularity.

PILAFLO® is NIPPON PILLAR PACKING's registered trademark for a filler-containing polytetrafluoroethylene (PTFE) resin molding.

## Features of PILLAR FLUOROGOLD®

### Low coefficient of friction

Extremely low coefficients of friction( $\mu$ ) can be achieved by using PILAFLO® on PILAFLO®, or polished stainless steel plates on PILAFLO®.

### Self-lubricating

PILLAR FLUOROGOLD is self-lubricating and requires no oil. PILLAR FLUOROGOLD are generally maintenance-free and can be used over extended periods of time.

### Weather resistance

PILAFLO® offers exceptional weather resistance and can be used in a broad range of temperatures. The material is stable even below the freezing point and only has a coefficient of water absorption of 0.01% or less.

### Chemical resistance

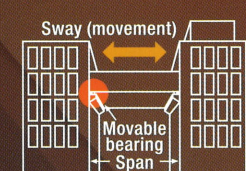
PILAFLO® is chemically inert, and reacts with few chemical solutions. Consequently, it can be used with peace of mind, even if close proximity to sea.

### Compact

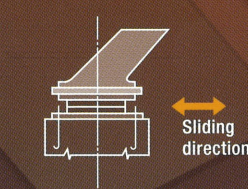
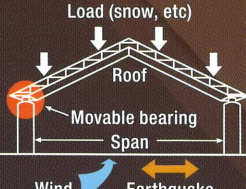
The standard thickness of a PILAFLO® plate is 2.4 mm and the standard thickness of the steel plate is 3.2 mm. The product is very compact with a total thickness of 5.6 mm, which ensures ease of designing.

## Applications example

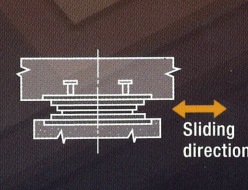
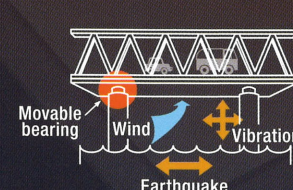
Connecting corridor



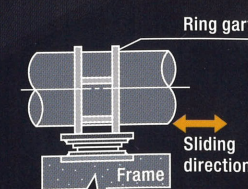
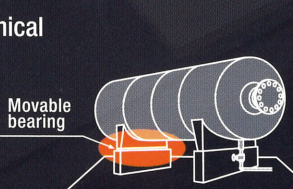
Roof beam



Bridge



Petrochemical plant



## Major accomplishments

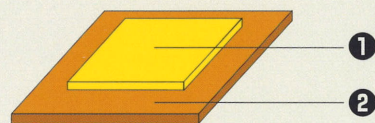
### Construction

- Modification of Osaka Ekimae Building No. 3 (curtain wall and drive way bearings)
- Construction of Ashiya Beach High-rise Apartments (structural walls and connecting corridors)
- Kobe Portopia Hotel (connecting corridors)
- Kasugai Indoor Pool (roof beams)
- Matsumoto City Gymnasium, Nagano Prefecture (roof beams)
- New Construction of Tokyo Health Plaza (expansion)
- Tokyo International Airport International Terminal (expansion)
- Hakata Bay Oriental Hotel & Resort (expansion)
- Kansai International Airport Passenger Terminal (connecting corridors)
- Hyogo Prefectural Museum of Art (expansion)
- Nagoya Inuyama Senjin Multistory Car Park (expansion)
- Okinawa Prefectural General Welfare Center (expansion)
- Tokyo Takarazuka Building (expansion)
- Miura Gymnasium (roof beams)
- AEON Mall Itami-nishi (connecting corridors)
- Glass Building of Tokyo International Forum (expansion)

### Plants and Civil Engineering

- No. 4 blower of Nippon Steel Kimitsu (Piping bearing)
- Kobe Power Plant, Kobe Steel (Electrostatic precipitator stand)
- Maizuru Power Station of Kansai Electric Power (Flue support)
- Akashi Kaikyo Bridge (Piping bearing)
- Glendale Freeway, Los Angeles (Road support)
- Barka Power & Desalination Project (Expansion)
- DA building of Japan Nuclear Fuel Limited's Rokkasho reprocessing facilities (Expansion)
- TEPCO's Kashima Power Station (Chimney support)
- China / Baoshan Iron & Steel (Device frame)
- Oji Paper's Yonago Plant (Boiler stand)
- Warak LNG Plant, Malaysia (Pipeline support)
- Chita LNG Base (Pipeline support)
- New Tokyo International Airport Authority (Aviation fuel pipeline support)
- Algeria Hassi R'Mel Gas Plant (Pipeline support)
- China / Mikawa Power Generation Facilities (Boiler stand)
- Mobil Oil Singapore Pte., Ltd. (Pipeline support)



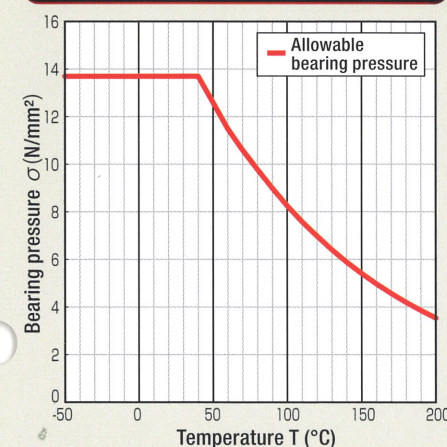
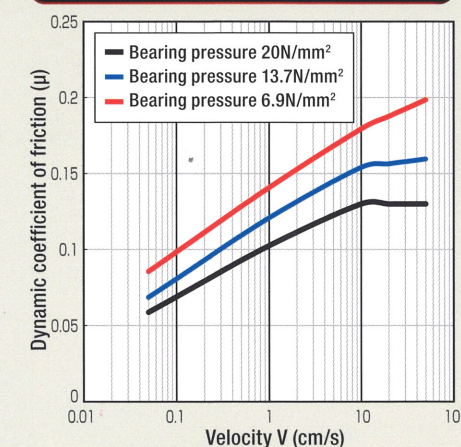
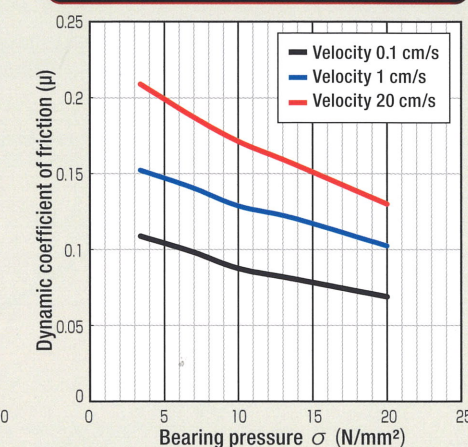
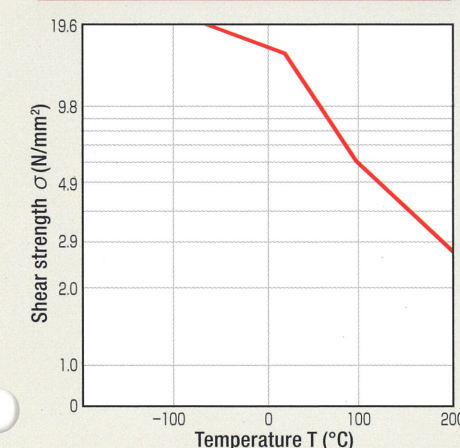
**Specifications****Standard specifications**

Parts name	Material / Specifications	Remarks
① Bearing	PILAFLON®	Thickness: 2.4 mm
② Metal plate	Carbon steel (JIS G 3101, SS400)	Thickness: 3.2 mm
Painting	Lead-free, Chromium-free anticorrosive paint	JIS K5674

\* Materials, thicknesses, and painting other than the above are available as well. For details, please contact us.

**Type and Use method**

Standard Type	How to use	Details
<b>Standard ①</b> FLUOROGOLD and SUS304 special polishing plate	A sliding combination consisting of FLUOROGOLD and special polishing SUS304 plate. FLUOROGOLD consists of 2.4mm of PILAFLON bonded to a SS400 metal plate on which 15mm lip has been left. This is the most common usage. Bearing pressure: 0.5N/mm <sup>2</sup> ~13.7N/mm <sup>2</sup> Temperature: -60°C~+200°C	<p>Mating material: Stainless steel (JIS, SUS304) special polishing plate FLUOROGOLD</p>
<b>Standard ②</b> FLUOROGOLD and FLUOROGOLD	A sliding combination with two FLUOROGOLD slide bearing each of it consists of 2.4mm of PILAFLON bonded to a SS400 metal plate on which 15mm lip has been left. This combination is ideal when there is little horizontal space in which to install the system. Bearing pressure: 0.5N/mm <sup>2</sup> ~13.7N/mm <sup>2</sup> Temperature: -60°C~+200°C	<p>Mating material FLUOROGOLD (upper side) FLUOROGOLD (lower side)</p>
Special Type	How to use	Details
<b>Dust seal Type</b>	A FLUOROGOLD plate is the same as that for the standard product ①, but a dustproof seal is on the FLUOROGOLD plate. This product used in dusty environments. Bearing pressure: 0.5N/mm <sup>2</sup> ~13.7N/mm <sup>2</sup> Temperature: -45°C~+100°C	<p>Mating material: Stainless steel (JIS, SUS304) special polishing plate FLUOROGOLD Dust seal</p>
<b>Back welding Type</b>	This is the same in combination as that for the standard product ②, but the metal plate thickness is 19 mm in the case of back welding. Bearing pressure: 0.5N/mm <sup>2</sup> ~13.7N/mm <sup>2</sup> Temperature: -60°C~+200°C	<p>Mating material FLUOROGOLD FLUOROGOLD Steel frame, etc</p>
<b>Screw-mounting Type</b>	A countersunk screw hole is provided for screw mounting, and the metal plate thickness is 4.5mm. The type with screw-mounting is used when welding is not possible on site, for example when the mounting portion is plated with a hot-dip galvanized. Bearing pressure: 0.5N/mm <sup>2</sup> ~13.7N/mm <sup>2</sup> Temperature: -60°C~+200°C	<p>Mating material FLUOROGOLD (upper side) FLUOROGOLD (lower side)</p>
<b>FLUOROGOLD with rubber Type</b>	Consists of 2.4mm of PILAFLON bonded to chloroprene rubber placed between stainless steel plates. The height is determined by individual design. Bearing pressure: 0.5N/mm <sup>2</sup> ~4.9N/mm <sup>2</sup> Temperature: -30°C~+100°C	<p>Mating material: Stainless steel (JIS, SUS304) special polishing plate FLUOROGOLD with rubber</p>
<b>LBP slide bearings</b>	Consists of 0.8mm of PILAFLON joined to 0.8mm punching stainless steel plate and welding to a 3mm stainless steel plate. Use this product as a slide bearing for high loads such as equipment. Bearing pressure: 0.5N/mm <sup>2</sup> ~34.3N/mm <sup>2</sup> Temperature: -60°C~+200°C	<p>Mating material: Stainless steel (JIS, SUS304) special polishing plate Pillar LBP</p>

**Performance****Relationship between temperature and allowable bearing pressure****Velocity dependence of friction coefficient****Bearing pressure dependence of friction coefficient****Bonding strength (shear)****Physical properties of PILAFLON®**

Mechanical properties	Units	Measurement method	Cross direction
Tensile strength	N/mm <sup>2</sup>	JIS K6897	11
Elongation	%	JIS K6897	190
Compressive strength (0.2% offset)	N/mm <sup>2</sup>	ASTM D695-68T	7.8
Compressive modulus	N/mm <sup>2</sup>	ASTM D695-68T	686
Flexural strength (0.2% offset)	N/mm <sup>2</sup>	ASTM D790-66	6.9
Flexural modulus	N/mm <sup>2</sup>	ASTM D790-66	680
Hardness (Shore D)	—	ASTM D2240	58~68
Physical properties			
Coefficient of linear thermal expansion	cm/cm/°C	ASTM D696-44	6.5×10 <sup>-5</sup>
Thermal conductivity	kJ/mh°C	JIS K6897	1.31
Specific gravity	—	JIS K6897	2.20
Wear coefficient	mm N/mm <sup>2</sup> · cm/sec · hr		11.2×10 <sup>-6</sup>

\* The numerical values in the above table and graph are reference values and not guaranteed values.  
\* Cross direction: The direction perpendicular to the molding direction of the material.

**How to order**

Specify the dimensions of the PTFE and steel plate of PILLAR FLUOROGOLD by the following explanation.

**P / #4801**  
**FC - 10 10 - CS - 15L 200×150**  
 ① ② ③ ④ ⑤ ⑥

- ① PILLAR FLUOROGOLD
- ② Thickness of filled PTFE (2.4 mm)
- ③ Steel plate thickness → See table at right
- ④ Steel plate material  
(CS = Carbon steel (SS400), SS = Stainless steel (SUS304))
- ⑤ Lip width (mm)
- ⑥ Steel plate plane dimensions

③ Code No.	Steel plate thickness (mm)	
	SS400	SUS304
10	3.2	3
15	—	4
20	4.5	5
25	6	6
30	9	9
50	12	12
70	16	15
75	19	20
100	25	25

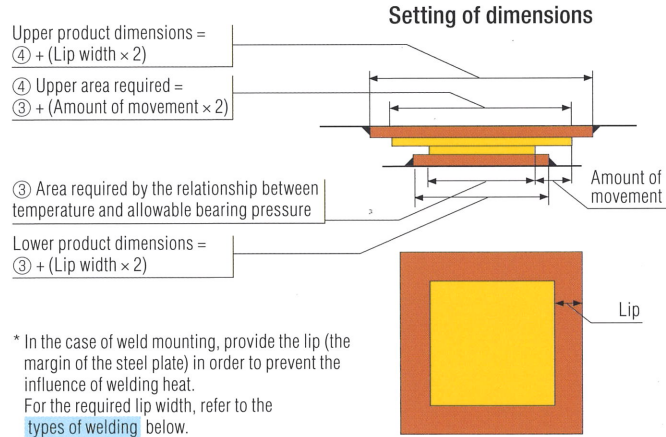
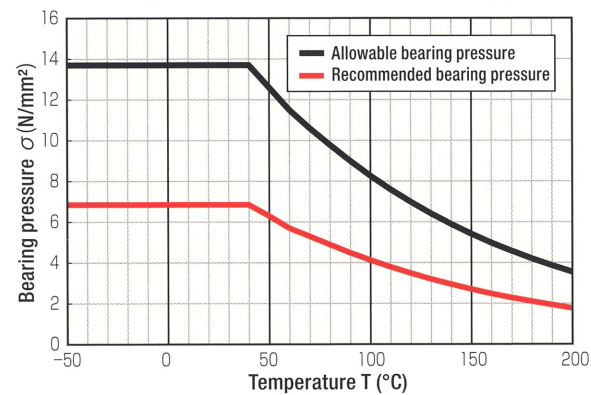
\* Special material and thickness orders are accepted.



## Design procedure

- ① Calculate the load temperature and movement applied to PILLAR FLUOROGOLD.
- ② Decide the method of mounting PILLAR FLUOROGOLD.
- ③ FLUOROGOLD cannot perform rotational absorption. On the assumption that the entire surface of FLUOROGOLD does not come in uniform contact, the bearing pressure of FLUOROGOLD recommends lower bearing pressure than the recommended bearing pressure (with a minimum safety factor of 2).
- ④ Decide on the area (dimensions) of the upper PILAFLO or upper stainless steel plate according to the amount of movement.

Relationship between PILLAR FLUOROGOLD temperature and allowable bearing pressure and recommended bearing pressure



## Notes of installation

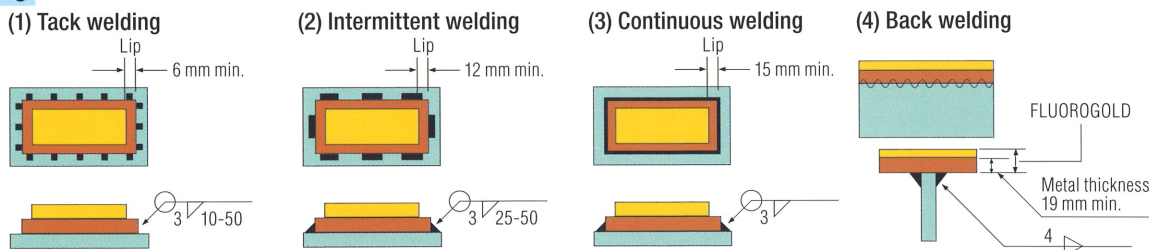
### Preparation before welding

- Clean the seat surface where PILLAR FLUOROGOLD is mounted.
- Remove the paint coating, moisture, dust, oil, and rust, etc. on the welding portion of PILLAR FLUOROGOLD immediately before welding, because they affect adversely to the welding.

### Welding

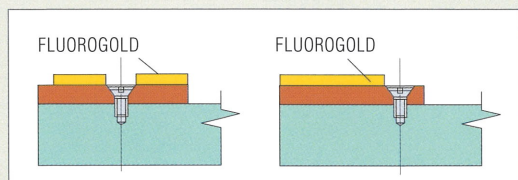
- Use a welding rod with size of less than 3.2 mm diameter. The welding rod of 2.6 mm diameter is the best.
- Lightly wet the soft package paper on PILLAR FLUOROGOLD and perform welding while protecting the surface of FLUOROGOLD in order to prevent the adhesion of welding spatter on the sliding surface at the time of welding. (A wet waste cloth may be used instead.)
- Do not use the gas welding procedure.
- In the case of tack welding or intermittent welding, apply sealant to the periphery of the welded part so that rainwater, will not penetrate between the mating member and FLUOROGOLD after welding.

### Types of welding



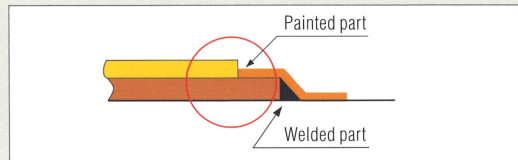
### Screw and tightening of bolt

- Make sure that the screw head will not protrude the sliding surface.
- Apply sealant to the periphery of the FLUOROGOLD and around the screw so that rainwater will not penetrate between the mating member and FLUOROGOLD after mating.

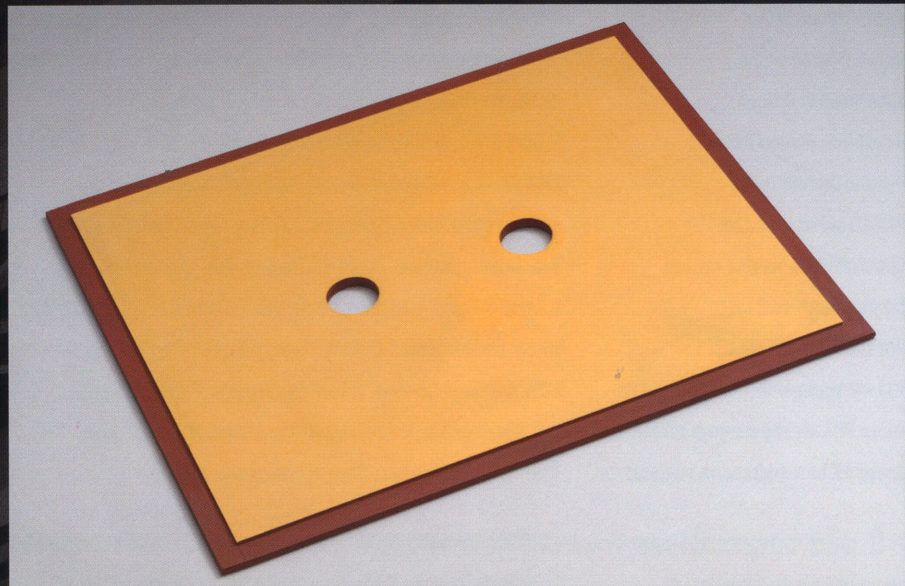


### Painting

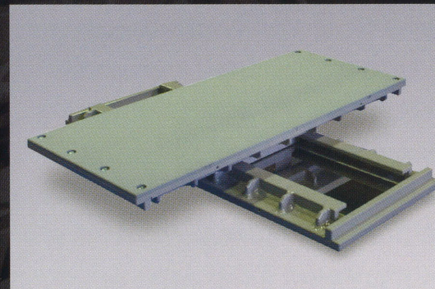
The steel surface is painted with JIS K5674 Lead-free, Chromium-free anticorrosive paint. At the time of welding, remove the painting of the welded portion of PILLAR FLUOROGOLD. Perform repair and finish painting after mounting. Perform painting carefully in particular within the circle as shown on the right.



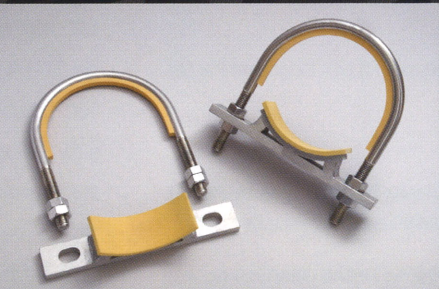
PILAFLO® products in a wide variety contribute to the fields of construction and civil engineering and general industries.



FLUOROGOLD®



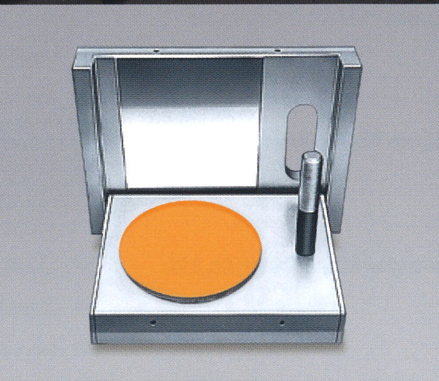
UNI-TON® bearing



U-bolt & pad



Insulating bolt



Insulation bearing

NIPPON PILLAR PACKING performs the strict quality control of products, ranging from PTFE material selection through molding and processing stages, thus realizing high-quality products.

Feel free to contact NIPPON PILLAR PACKING if you need help with sliding bearing materials.



## ■ Domestic sale network

Head Office	11-48, Nonakaminami 2-Chome, Yodogawa-ku, Osaka, 532-0022 Japan.	TEL: 81-(0)6-6305-2821 FAX: 81-(0)6-6302-3300
Sales Head Quarter	2-2, Uchisaiwaichou 2-Choume, Chiyoda-ku, Tokyo, 100-0011 Japan.	TEL: 81-(0)3-3508-1800 FAX: 81-(0)3-3508-1881
Tokyo Branch Office	2-2, Uchisaiwaichou 2-Choume, Chiyoda-ku, Tokyo, 100-0011 Japan.	
Yokohama Branch Office	113, Aioichou, 6-Choume, Naka-ku, Yokohama, 231-0012 Japan.	
Nagoya Branch Office	4-13, Higashisakura 1-Choume, Higashi-ku, Nagoya, 461-0005 Japan.	
Kyoto Branch Office	293-1, Ayahorikawa-Chou, district level under the Kyoto Horikawa Dori Ayakouji, Shimogyo-ku, Kyoto, 600-8482 Japan.	
Osaka Branch Office	11-48, Nonakaminami 2-Choume, Yodogawa-ku, Osaka, 532-0022 Japan.	
Kobe Branch Office	29, Taruya-Chou, 1-Choume, Akashi, 673-0898 Japan.	
Hiroshima Branch Office	1, Inari-Chou, 4-Choume, Minami-ku, Hiroshima, 732-0827 Japan.	
Kyushu Branch Office	25, Fukuhara, 1-Choume, Koushi, Kumamoto 861-1116 Japan.	
PILLAR service co.,Ltd.	4-4, Kai-Chou, Nishi, 3-Choume, Sakai-ku, Sakai, 590-0950 Japan.	
Chubu PILLAR service co.,Ltd.	3-4, Jingu 2-Choume, Atsuta-ku, Nagoya, 456-0031 Japan.	
Tokyo PILLAR co.,Ltd.	1, Minami-Chou, 16-Choume, Kawasaki-ku, Kawasaki, 210-0015 Japan.	
Hokuriku PILLAR co.,Ltd.	15-28, Chuou-Chou, 1-Choume, Tsuruga, Fukui, 914-0811 Japan.	
PILLAR engineering service co.,Ltd.	3-28, Matsue 3-Choume, Kurashiki, Okayama, 712-8052 Japan.	
Kanto PILLAR engineering service Ltd.	6-1, Aoyanagi-kita, 2-Choume, Ichihara, Chiba, 299-0101 Japan.	
Sanyo PILLAR engineering service Ltd.	3391-1, Oozatokuyama, Shunan, Yamaguchi, 745-0851 Japan.	

## ■ Group corporations

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Nippon PILLAR Singapore Pte Ltd.	No. 237 Pandan Loop #03-01 Westech Building, Singapore 128424 TEL: SINGAPORE(65) 6861-7138 FAX: SINGAPORE(65) 6862-9098 e-mail: <a href="mailto:npillars@singnet.com.sg">npillars@singnet.com.sg</a>
Nippon PILLAR Singapore Pte Ltd. Indonesia Representative Office	Jl.T.B.Simatupang, Kav.36 Sovereign Plaza 21st floor, Suite M23 Jakarta 12430 INDONESIA TEL: Indonesia(62) 21-2939-8831 FAX: Indonesia(62) 21-2939-8833
Nippon PILLAR (Thailand) Co., Ltd.	NO.23/33 Sorachai Bldg., 15th Floor, Soi Sukhumvit 63, Sukhumvit Rd., Klongtonnue, Wattana, Bangkok 10110 TEL: Thailand(66) 2-726-9700-1 FAX: Thailand(66) 2-726-9702
Taiwan PILLAR Industry Co.,Ltd.	8F., NO.45, SEC. 1, MINQUAN E. RD.,ZHONGSHAN DIST., TAIPEI CITY.,10452, TAIWAN. TEL: TAIPEI(886) 2-2587-1911 FAX: TAIPEI(886) 2-2585-3131 URL: <a href="http://www.taiwanpillar.com.tw/">http://www.taiwanpillar.com.tw/</a> e-mail: <a href="mailto:sales@taiwanpillar.com.tw">sales@taiwanpillar.com.tw</a>
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Shanghai PILLAR Trading Co., Ltd.	Far East International Plaza A-1111, No.319, Xianxia Road, Changning District, Shanghai China. (200051) TEL: CHINA(86) 21-6208-7711 FAX: CHINA(86) 21-6235-0501 URL: <a href="http://www.pillar-cn.com/">http://www.pillar-cn.com/</a> e-mail: <a href="mailto:sales@sh.pillar-cn.com">sales@sh.pillar-cn.com</a>
Nippon PILLAR Middle East FZE	Office NO.6EA-133 Dubai Airport Free Zone P.O.Box 371455, Dubai-U.A.E TEL: UAE(971) 4-2952907 FAX: UAE(971) 4-2952908

\*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.

**<http://www.pillar.co.jp/>**

**E-mail: [sales@pillar.co.jp](mailto:sales@pillar.co.jp)**