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SLIDING BEARING
Himon Valves Division

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Product Data Sheet
Advance Information

Mu 316
Self Lubricated Sliding Bearings

Description:

MU-316 Dry Sliding Bearings is a three layer composite product.

- PTFE Modified antifriction surface layer 0,01 mm minimum thickness (Without lead, complying with the European Parliament's "ELV" directive 2000/53/Ec).
- Porous bronze layer 0,05÷0,10 mm thickness
- AISI 316 L steel supporting strip 0,25 to 2,20 mm thickness (depending on the size of the bush).

Structure of the composite material:

Layer	*Average analyses of the material*	*Thickness of layer*
Sliding layer	PTFE Modified	10 ÷ 40 µm
Intermediate layer	Bronze Alloy Cu 90÷93% Al 7÷10%	50 ÷ 100 µm
Supporting shell	AISI 316 L Stainless Steel (1.4404) C = 0.030 % Max Mn = 2.00 % Max P = 0.045 % Max S = 0.030 % Max Si= 1 % Max Cr= 16.5 - 18.5 % Ni= 10.0-13.0 % Mo= 2.0 - 2.5 %	0,70 ÷ 2,20 mm (Depending on Dimension of the Bearing)

Characteristics:

MU-316 structure combines in the best way the mechanical strength of steel, bronze thermal conductivity and PTFE low coefficient of friction. The performance given without lubricants are the following:

- Working surface acceptable specific static pressure: Max 350 N/mm^2
- Working surface acceptable specific dynamic pressure: Max 140 N/mm^2 (Continuous)
- Working surface acceptable specific dynamic pressure: Max 300 N/mm^2 (Short Periods)
- Maximum sliding speed (dry): 2,5 m/s *(500 fpm)*
- Maximum Load Factor (PxV): 1,8 N/ mm^2 · m/s (Continuous)
- Working temperature from: -200 to +280° C *(-328°F to +536°F)*
- Friction factor from 0,02 to 0,20
- Clear fluids like oil or water permit higher values for speed and specific pressure
- Friction factor not affected by "stick - slip" effect
- High chemical resistance to industrial fluids and gases.
- High resistance to corrosion

Special Items:

Apart from plain bushings ISO 3547 (DIN 1494) and thrust washers the *MU-316* can be supplied as many other technical items, between them we indicate the followings:

- Bushings and washers with dimensions on request
- Counter - roller bushings with the sliding surface on the outside diameter
- Special items based on customer's drawing.

Friction:

MU-316 friction factor principally depends from the specific load, the sliding speed and from the working temperature; also very important is counter pieces material and superficial degree of finishing.

Sliding Speed V (m/s)	Specific Load P (N/mm^2)	Friction Factor
up to 0,001	140	0,02
from 0,001 to 0,005	from 140 to 62	from 0,04 to 0,07
from 0,005 to 0,05	from 62 to 11	from 0,07 to 0,1
from 0,05 to 0,5	from 11 to 1	from 0,1 to 0,15
from 0,5 to 2,5	1	from 0,15 to 0,20

Wear:

During operation the *MU-316* bushing shows a first running - in phase when some of PTFE compound transfers on counter piece which normally is of steel alloy. Other counter pieces of stainless steel, chrome plated steel and hard anodised aluminium can improve *MU-316* service life. As counter piece have to be avoided bronze, aluminium, phosphatized and nickel plated steel to optimise *MU-316* durability surface roughness must not exceed 0.4 um. Where possible *MU-316* bushing preliminary tests have to be carried out to make sure about the influencing factors of each application; our technical department is willing to supply additional information and data request.
For the bushes, the load surface corresponds to the projected surface of the internal cylinder (D1 x B).

Mounting:

Base procedure for bushings mounting is to force them into their seats; there are some suggestion to follow:

- Machine a 1 mm seat lead - in with an angle of 20° (±5°)
- Clean and burr the pieces to couple
- Lubricate external bushing surface before mounting
- Check alignment between seat and bushing centre lines
- When 2 bushing are needed their junctions must be aligned
- Use a proper sized mandrel when possible.
- Mounting can be done with hydraulic or mechanical tools.

The mounting force (**F**) in Newton is shown in the attached table.

Bushing Nominal Thickness 0,50 ÷ 1,00 mm	F = 300 x L (Length of bush)
Bushing Nominal Thickness 1,00 ÷ 1,50 mm	F = 500 x L (Length of bush)
Bushing Nominal Thickness 1,50 ÷ 2,00 mm	F = 700 x L (Length of bush)
Bushing Nominal Thickness 2,00 ÷ 2,50 mm	F = 900 x L (Length of bush)

When mounting larger bushes it is advisable to use a mounting tool to support the bush. The tool diameter should be 0,3 ÷ 0,4 mm more than the bush diameter.
If the bush is secured by using an adhesive, care must be taken to ensure that good quality adhesive are used and that it does not get onto the sliding surface.