TECHNYMON Technology Europe S.p.A.
SLIDING BEARING

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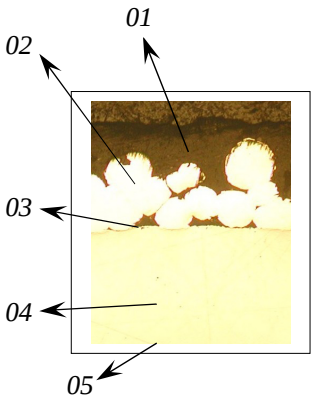
Product Data Sheet
Advance Information

Mu - 4
Self Lubricated Sliding Bearings

Description:

Multilayer bushing (dry/lubricated Sliding Bearings) *MU-4* bearings are self lubricated material, derivate by Mu bearings, and are a three layer composite product.

- PTFE Modified antifriction surface layer 0,01 mm minimum thickness (Lead-free Compliance with the European Parliament's ref: 2000/53/EC).
- Porous bronze layer 0,20 ÷ 0,35 mm thick
- Low carbon steel supporting strip 0,50 to 2,70 mm thick depending on the size of the bush. The steel is plated for corrosion protection (Tin or Zinc 2÷8 µm).



Structure of the composite material:

Layer		*Average analyses of the material*	*Thickness of layer*
Sliding layer	01	PTFE Modified /Aramidic Fibres	10 µm *(Minimum)*
Intermediate layer	02	CuSn11 Sintered	200 ÷ 350 µm *(Average Peak)*
Connecting layer	03	Cu	1 ÷ 3 µm
Supporting shell	04	Low Carbon Steel (EN 10139) C = 0,080 Max Mn = 0,40 Max P = 0,03 Max S = 0,03 Max	0,50 ÷ 2,70 mm (Depending on Dim. of the Bearing)
Protective Layer	05	Sn or Zn	2 ÷ 8 µm

Characteristics:

MU-4 structure combines in the best way the mechanical strength of the steel, the bronze thermal conductivity, the PTFE low friction and the resistance to abrasion due to the Aramidic Fiber.
In particular the *MU-4* bushings type are indicated in case of slow and alternate movement: in this condition they have an higher performance than *MU* bushing due to the higher resistance to abrasion. The sliding property is lower than *MU*, due to the absence of Mineral Lubricant mixed with PTFE. It is possible dry or lubricated use.

Typical application are

- Gear pump (alternate load and movement, lubricated use, idrodinamic or not)
- Shock-absorber strut (alternate load and movement, lubricated use. ex. Mc Pherson strut)
- Door Hinges (cars, oven….), Windscreen Systems (alternate movement in low load conditions)

The performance given without lubricants are the following:

- Working surface acceptable specific static pressure: Max 250 N/mm^2
- Working surface acceptable specific dynamic pressure: Max 150 N/mm^2
- Maximum sliding speed (dry): 2,0 m/s *(400 fpm)*
- Maximum sliding speed (oil): 6 m/s *(1200 fpm)*
- Working temperature from: -200 to +280° C *(-328°F to +536°F)*
- Friction factor from 0,08 to 0,25
- 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 (we recommended to make previous test for new application / project).

MU-4 is Lead-free [Compliance with the European Parliament's End of Life Vehicles directive (ref: 2000/53/EC) on the elimination of hazardous materials in the construction of passenger cars and light trucks]

Special Items:

Apart from bushings ISO 3547 (DIN 1494) and thrust washers the *MU-4* can be supplied as many other technical items, between them we indicate the followings:

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

Performance:

MU-4 bushing service life depend mainly from the load factor P x V (N/mm^2 x m/s). Practical cases have shown that a working load factor of 2.5 to 3.6 (N/mm^2 x m/s) is admissible for short periods. Long service life are suited with load factors ranging from 0.2 to 1.8 for continuous loads and 0.2 to 0.8 (N/mm^2 x m/s) for alternating loads in dry use. In case of lubricated use the life could have a big increase, and it depends by the type and quantity of the lubricant (up to 10 N/mm^2 x m/s)

Friction:

MU-4 friction factor principally depends from the specific load, the sliding speed and from the working temperature; very important it is also the material and the counter piece superficial degree of finishing.

Sliding Speed V (m/s)	Specific Load P (N/mm^2)	Friction Factor
up to 0,001	150	0,08
from 0,001 to 0,005	from 150 to 75	from 0,07 to 0,10
From 0,005 to 0,05	from 75 to 13	from 0,10 to 0,13
from 0,05 to 0,5	from 13 to 1	from 0,13 to 0,18
from 0,5 to 2.0	1	from 0,18 to 0,25

Wear:

During operation the *MU-4* 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-4* service life. As counter piece have to be avoided bronze, aluminium, phosphatised and nickel plated steel to optimise *MU-4* durability surface roughness must not exceed 0.4 um. Where possible *MU-4* 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.

Mounting:

Base procedure for bushings mounting is to force them into their seats; there are same 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.