

PEEK Lined Tilting Pads



**Michell
Bearings**

Background

Michell Bearings began to develop polymer bearings in the 1990's, starting with polytetrafluoroethylene (PTFE) lined thrust pads, following a demand for the material from large hydropower OEM's and operators looking for improved performance. This was a natural extension to the existing product range as Michell Bearings was already supplying bearings into the hydropower industry.

A manufacturing process was developed to deliver a superior quality product on a repeatable basis. Michell Bearings now has over 100 references for PTFE thrust pads in large industrial machines.

Michell Bearings' development of polyether ether ketone (PEEK) lined tilting pads also

started in the mid 1990s, but market demand from the hydro industry drew us to focus our resources to PTFE.

Michell Bearings research into PEEK restarted in 2015. A manufacturing process was developed based on the experience gained from PTFE and performance testing was undertaken on our standard vertical products and range of thrust bearing internals, across a vast range of speeds and loads.

The addition of PEEK into our portfolio reinforces our commitment to supplying high quality products that deliver significant performance improvements for the most demanding applications.



Development

Whitemetal, PTFE and PEEK are all complimentary to one another. Whilst whitemetal can be considered as the cost effective everyday material, PTFE and PEEK have distinct advantages for more challenging environments. The advantages of PTFE are well documented (visit our website for published technical papers) but PEEK has high strength and higher temperature resistant advantages and is well suited to high speed and/or high load applications.

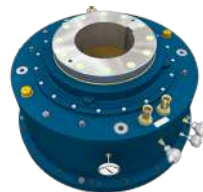
Vertical bearings for pump, motors and generators

PEEK thrust pads can be fitted into all of Michell Bearings' standard product ranges, such as the AV and LV ranges, to improve bearing performance. Any specialist applications can be considered.



AV (Advanced Vertical) Range

- Shaft diameters up to Ø400
- Thrust pad radial width up to 151mm
- Thrust capacity up to 970kN



LV (Large Vertical) Range

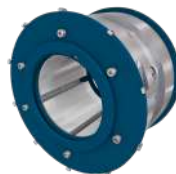
- Shaft diameters up to Ø600
- Thrust pad radial width up to 252mm
- Thrust capacity up to 2830kN

Tilting pad thrust and journal bearings for use in high speed turbo machinery such as steam and gas turbines, and compressors



Tilting Pad Thrust Bearings

- Shaft diameters up to Ø460
- Thrust pad radial width up to 140mm
- Thrust capacity up to 910kN



Journal Bearings

- Shaft diameters from 40mm to 300mm
- Standard length to diameter ratios of 0.4:1, 0.7:1 & 1:1
- Journal loads up to 252kN

Technology

Advantages of PEEK

- Low coefficient of friction
- Excellent wear resistance
- High temperature performance
- Mechanical strength and dimensional stability

Performance Improvements of PEEK

- Smaller bearings (i.e. reduced footprint and weight) operating at higher specific loads
- Continuous operation above the widely accepted 120°C temperature limit for whitemetal (Babbitt)
- Continuous operation at film thicknesses below the minimums considered acceptable for white metal
- Reduced power losses
- The elimination of high pressure oil injection for starting/stopping under high specific loads

Testing

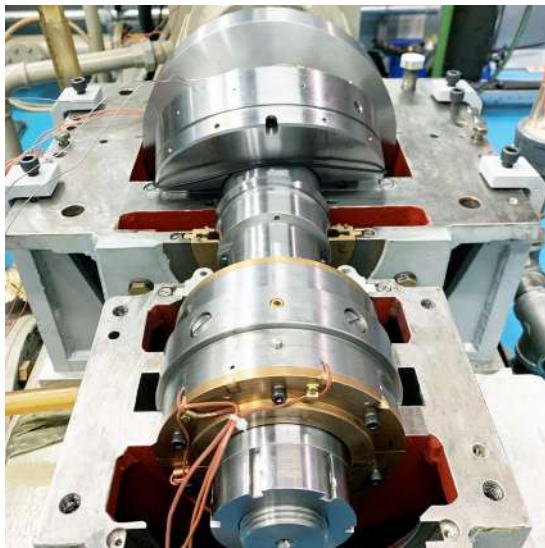
Our PEEK lined thrust pads have been comprehensively tested across a wide range of duties representing a broad base of real life applications.

High load, low to medium speed applications

- 24MPa between 1.5m/s to 21 m/s, oil film less than 4 microns.

High load, high speed applications

- 10 MPa at speeds up to 145m/s, temperatures in excess of 170 ° C



Manufacturing Process

The PEEK manufacturing process is an extension to our long established PTFE lining process.



PEEK is bonded to the steel backing using a specially developed layer for the PEEK material to adhere to. Under temperature and pressure, the PEEK is pressed firmly into this layer forming a strong mechanical bond after which it is machined into the finished component using traditional machining techniques.

Bearing Materials to Optimise Tilting Pad Solutions

Michell Bearings can offer PEEK, PTFE and competitively priced whitmetal products to meet all of your application needs.



Pumps



Gearboxes



Steam Turbines



Gas Turbines



Hydro Generators



Turbo Compressors



Journal Bearings

Our standard journal bearing has a steel housing seating five uniquely designed centre-pivoted journal pads.

The range of journal pad units (JPU) covers a shaft diameter range from 40 - 300mm.

Customised journal pad solutions with larger shaft diameters and various pivot types/ journal pad arrangements are available for specific applications.



Thrust Bearings

Our thrust bearings range from catalogue standards, with or without mechanical load equalisation features, to customised solutions for specific applications.

Our thrust bearings are suitable for a shaft diameter range of 20 - 460mm. Customised thrust bearings with larger shaft diameters are available for specific applications.

Enquire now...

Contact us on **+44 (0) 191 273 0291** or **sales@michellbearings.com** for a no obligation quote on your current white metal/Babbitt, PTFE or PEEK thrust or journal pad requirements.