

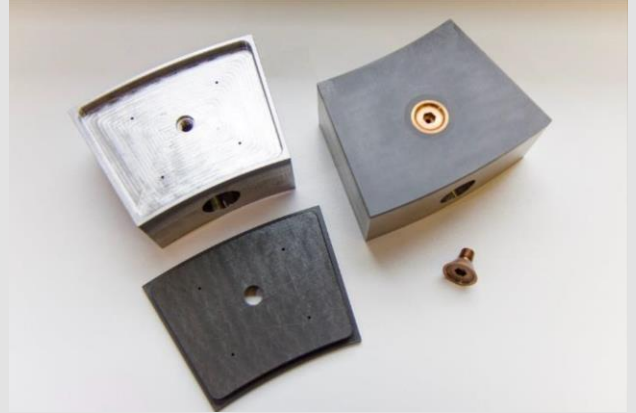


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HIGH PERFORMANCE THRUST & GUIDE BEARING PADS

Easier Maintenance, Higher Robustness & Reliability and Better Performance & Compactness thanks to a unique patented pads design and superior PEEK material properties.

FLEXIPAD



PEEK shell easily dismantable & replaceable

ADVANCED BEARING TECHNOLOGY

- GE Vernova’s Flexipad thrust & guide bearing pads have a sliding surface with a long lasting and high-performance thermoplastic coating.
- They advantageously replace conventional babbitt pads, thanks to higher resistance to temperature and pressure, higher dimensional integrity and a lower friction co-efficient.
- GE Vernova can upgrade existing babbitt pads to Flexipad by remachining the pads and installing a Flexipad PEEK shell instead of the babbitt coating.

Pad repair in less than 1 hour on site

5x less wear than PTFE coatings (*)

Safe operation without injection

Up to 30% reduction in bearing losses

Reduction of spare parts inventory: Only thin PEEK shells to be kept as spares

(*) wear measured on our test rig by operating PEEK and PTFE pads in similar conditions



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BENEFITS

Easily & quickly repairable on site:

in case of coating damage, one only has to dismount the pad from the bearing, dismount the Flexipad PEEK shell and install a spare one and remount the pad. The pad repair can be done on site in less than 1 hour. There is no need anymore to ship the pads to an external supplier for re-babbiting

More robust & reliable bearings: due to the low thermal conductivity of the Flexipad coating, the bearing pads have smaller thermal deformations compared to conventional materials, allowing a fast unit re-start after a stop. Low friction properties keep units with ageing hydraulic jacking systems operational, despite more starts and stops.

More compact, more efficient

bearings: with higher thermal and mechanical strengths, new bearings can be downsized and work with significantly higher loads.

Reduced upgrade cost: Flexipad's high load carrying properties allow to keep existing thrust bearing arrangements and civil works, thus reducing upgrade costs if unit power and weight are increased.

Improved peace of mind by solving hot or problem bearings : Flexipad is more resistant to temperature and pressure, meaning it is less likely to seize up or trip a machine.

FEATURES

Flexipad has a composite coating made from PEEK which improves pad characteristics. The coating is easily dismountable – see picture on the first page – with no need for any specific tooling.

GE Vernova recommends the use of Flexipad pads for all Guide & Thrust bearings in vertical and horizontal arrangements. In particular Flexipad is particularly suited

- To solve bearing issues such as overheating of the bearing: as it allows for higher specific pressure and reduced oil temperature increase
- In refurbishment in case of increase of rotation speed or thrust load
- For new bearings to reduce friction losses

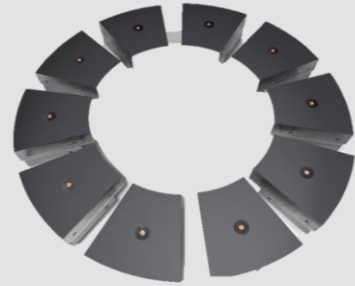


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PEEK COATING SUPERIOR CHARACTERISTICS

- High temperature resistance and maintenance of characteristics at higher temperatures
- Tough material with low deformation, low wear and creep for a longer life-time
- Very high load carrying capacity
- Low friction co-efficient improves sliding properties

FLEXIPAD



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Main Characteristics	PEEK*	Babbitt**	PTFE***
Melting point (°C)	341	240	327
Tensile strength room temp. (MPa)	240		22
Tensile strength at 100°C. (MPa)	150		15
Seizure, max. load (MPa)	≥25	3.5 Working pressure	14
Friction coefficient in oil	0.051	0.2	0.043
Wear (based on comparative wear test)	~2µm		~11µm
Elongation	2%		300%
Hardness (Rockwell)	126		20

* PolyEtherEtherKetone ** or 'White Metal' *** PolyTetraFluoroEthylene, or Teflon®

FEEDBACK FROM THE FIELD

20 years experience with PEEK coated pads. Flexipad itself was first installed on a hydro unit in 2018. 14 thrust bearings & 3 guide bearings have been equipped worldwide with Flexipad pads for units from 4 MW to 188 MW, 75 rpm to 600 RPM. Examples:

- Thrust bearing failure on Swiss unit in 2017. Due to low-speed rotation of the rotor for several hours after a guide vane failure. The mechanism got locked and was not able to close completely due to debris that entered between the blades. GE Vernova a solution based on PEEK material.
- Test simulated bearing seizure due to lack of lubricating oil. In this scenario during operation with 4 MPa and 800 rpm the oil was removed from the bearing housing. The bearing continued to operate for 15 minutes. The surface was only slightly worn without any catastrophic damage visible.