



How a Japanese Manufacturer Prolonged Their Pump Lifespan 4X

Greene Tweed's WR[®] 575 Thrust Pads Eased Installation and Extended the Replacement Cycle

Challenge

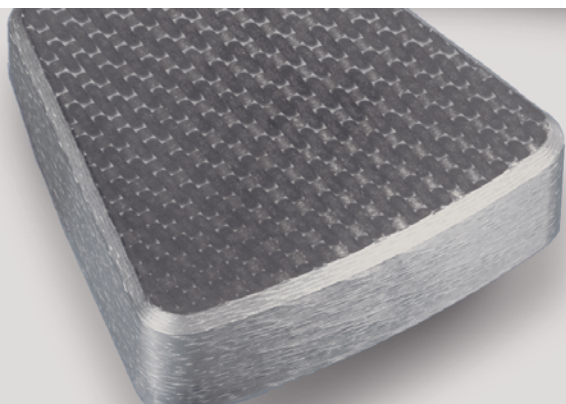
A prominent Japanese pump manufacturer noticed several problems in their boiler circulation pumps designed for power, water desalination, and oil and gas industries. The phenolic resin thrust pads in their pumps were carbonizing, leading to cracks on the hardened surface of the mating thrust collar. Installation was a lengthy process because the phenolic resin pads had to be immersed in water to stabilize their dimensions before mounting. Furthermore, the phenolic resin pads would swell in water used for bearing lubrication in these pumps.

In their quest for a better solution, they discovered Greene Tweed's carbon-fiber-reinforced PEEK composite resin, WR[®] 575, that proved to be a perfect fit.

Analysis

Due to bearing design constraints, only the thrust pad material could be changed. They began to explore thrust pad materials that are more durable than phenolic resin and have less aggression to the hard-faced mating collar surface. Upon further evaluation, they determined that the new thrust pad material would need to have good sliding wear characteristics against the existing thrust collar. In addition, it should be able to withstand the high-temperature and high-pressure environment common in boiler water pumps, preventing carbonization and cracks on the mating surface.

As they analyzed the properties of phenolic resin material, they learned its limitations. Its heat resistant temperature lies between 150°C and 180°C and their boiler circulation pumps typically operate at higher temperatures. In addition, phenolic resin has a high water absorption rate, and its dimensions change when it is immersed in water.



Why WR[®] 575

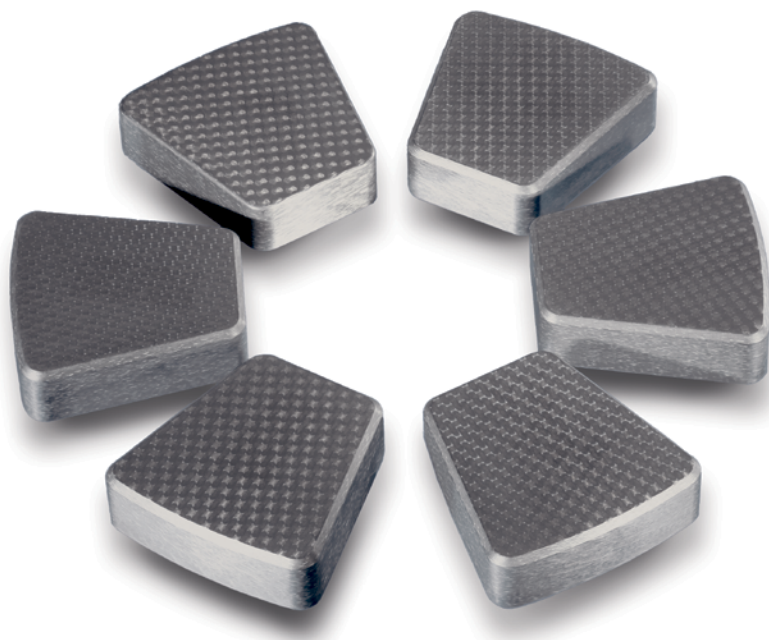
- High corrosion and chemical resistance
- High-temperature capability
- Excellent shock and impact resistance
- High load capability
- Superior wear resistance

Solution

In their quest for a better solution, they discovered Greene Tweed's carbon-fiber-reinforced PEEK composite resin, WR® 575, that proved to be a perfect fit. Firstly, it offers operating temperatures up to 250°C compared to a maximum of 180°C for a typical phenolic resin. Secondly, WR® 575 has a very low water absorption rate, resulting in a high dimensional stability and flexibility of designing without worrying about swelling due to water. Thirdly, it has a much higher compression strength than phenolic resin. They were impressed with the material properties and decided to upgrade to thrust pads made of WR® 575.

The Result

By upgrading to Greene Tweed's WR® 575 thrust pads, the Japanese pump manufacturer experienced multiple benefits. It was able to prevent carbonization and damage to the mating collar surface. In addition, the new pads were easier to install because they did not have to worry about swelling in water, due to the material's low water absorption rate. The new thrust pads displayed higher compressive strength and would not crack or chip easily. The WR® 575 thrust pads could withstand higher pressure velocity than phenolic resin, enabling the manufacturer to consider downsizing the bearing and widening the operating range of the pump. Since WR® 575 is a non-galling and non-seizing material, it helped them avoid serious failures even when the pump starts and stops frequently or witnesses excessive vibration.



Notably, the WR® 575 thrust pads remained in operation for over eight years extending the previous pad life over four times.