



Silicon Carbide -vs- Tungsten Carbide

Contributed by Zoeller Engineering Department

For many years tungsten carbide seal faces had been the workhorse of the industry whenever a high performance seal face has been required. In recent years, the industry has made a progressive switch from tungsten carbide to silicon carbide seal faces in these applications. Zoeller made this switch years ago. This article is an attempt to explain the basis of that decision and how it benefits the end user.

The primary job of a seal is to keep contaminants out of the motor assembly. On a sewage pump this is accomplished by using a face seal. A face seal consists of a rotating material and a stationary material. The standard seal faces in the Zoeller line are a stationary ceramic face and a rotating carbon face. Seal options include a stationary silicon carbide face and a rotating carbon face or a stationary carbide face and a rotation silicon carbide face. Silicon carbide faces should be used in any environment where a ceramic/carbon combination would not be suitable (i.e. any high abrasive, high abuse or continuous run environment).

There are four main areas where silicon carbide seals out perform a tungsten carbide seal from an engineering standpoint. First, the coefficient of friction is lower in a silicon carbide seal. This benefits the pump by wasting less energy turning the seal and can prevent the faces from 'seizing' or 'locking-up' during times of inactivity. Second, the silicon carbide seal has a hardness approaching or greater than tungsten carbide. This yields a seal face that is scratch resistant and provides minimal wear. Third, silicon carbide has excellent thermal conductivity to dissipate localized hot spots, and a low thermal expansion to reduce distortion. Last, the corrosion resistance of silicon carbide is better than tungsten carbide in most applications. This helps to benefit the wear characteristics and prevent seizing. From an end user standpoint there are two main benefits. Silicon Carbide is now manufactured at such a high volume that the price is considerably cheaper and the lead times are shorter than an equal tungsten carbide seal. Zoeller can provide any pump with a seal upgrade within our standard two week lead time.

Zoeller still realizes that some people will not want silicon carbide seals for whatever reason. So, in keeping with the continued commitment to customer service, Zoeller will still offer the tungsten carbide for those who do not wish to use silicon carbide. But beware, before offering a tungsten carbide seal, please consult the factory. Tungsten carbide seals will usually carry a higher price and longer lead time.