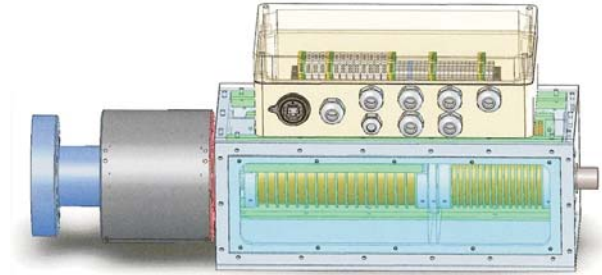


Metal Fiber Brushes (MFBs) can be used to replace carbon graphite and silver graphite contact brushes slip ring systems in wind turbine power, pitch control and grounding applications.

Phantom view of our wind turbine pitch control slip ring assembly



HiPerCon® can provide complete slip ring assemblies with metal fiber brushes capable of 200 million revolutions with a 5 year service interval.

Advantages of our Metal Fiber Brushes and Slip Ring Systems

MFB characteristics and benefits include significantly longer operating life than comparable carbon and silver graphite brushes, significantly reduced debris generation of approximately 20% of what carbon brushes create, light weight, lower audible noise generation, improved signal carrying capabilities as opposed to carbon and silver graphite, and availability with HiPerCon's® long-life slip ring assemblies.

MFBs, when used within a slip ring assembly for pitch control, require no lubrication, require cleaning every 5 years, and provide "life of the turbine" brush service life with significantly reduced maintenance requirements.



Who is HiPerCon, LLC.®?

HiPerCon, LLC® is a dynamic small research and manufacturing business dedicated to introducing and deploying new dual-use electrical technologies.

The HiPerCon® staff enjoys a reputation earned over many years for high quality and technical and managerial excellence. We support our customers in a wide range of industry sectors and operating environments with reliable, efficient, and low-maintenance solutions to the complex problems of transmitting electric power and data across moving interfaces.

Customer questions or concerns can be addressed to:

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HiPerCon, LLC.®

Presents

High Performance Slip Rings with Metal Fiber Brushes for Wind Turbine Applications

[WWW.HIPERCON-LLC.COM](http://www.hipercon-llc.com)



The problems of carbon brushes are well-known

- For nearly 100 years, virtually all sliding electrical contacts have used monolithic carbon or metal carbon brushes to transfer energy across a moving surface like a motor rotor or slip ring. Unfortunately, carbon based brushes can damage the sliding surface, causing them to wear out quickly.
- Carbon wear debris conducts electricity and can cause shorts, grounds or fires.
- Carbon dust also mixes with oil vapors, which can cause electrical insulation softening, a chief cause of grounds and shorts.
- Electric machines using carbon and metal carbon brush systems require frequent maintenance and cleaning, and do not work well in environments where the relative humidity is either too high or too low.



Metal Fiber Brushes provide many benefits



HiPerCon's® metal fiber brushes have unique performance characteristics and demonstrated advantages over carbon brushes now in use. Some key performance attributes of slip ring metal fiber brushes:

- Current densities of up to 250 Amps/sq inch are easily obtained.
- In all side by side testing, MFBs have achieved 2 to 10 times the service life of carbon brushes.
- Extremely high tolerance to atmosphere contaminants.
- Extremely low electrical noise across the brush slip ring interface.
- High data rate transfer across sliding surfaces above 50 Mbits/second.
- Less than 1/5 the wear debris volume of carbon brushes.

Slip ring MFBs developed by HiPerCon® are installed in the submarine force 500kW Ship Service Motor Generators under SHIPALT's 4415KP (SSN 21 class), 4429KP (SSN 688 class), and alteration SSBN TZ 0906KP (Trident). While the successful operation of MFBs in these applications proves their viability in a shipboard environment, these applications scarcely begin to utilize the full performance capabilities of metal fiber brushes.



MFB's offer a simple, low cost, longer life, alternative to other shaft grounding brush products on the market. Our grounding brush can be placed directly on the shaft without modification and is simple to install and maintain. Our grounding brush will last 10+ years

Grounding brush installed on a small motor shaft but can be easily installed on a larger shaft

