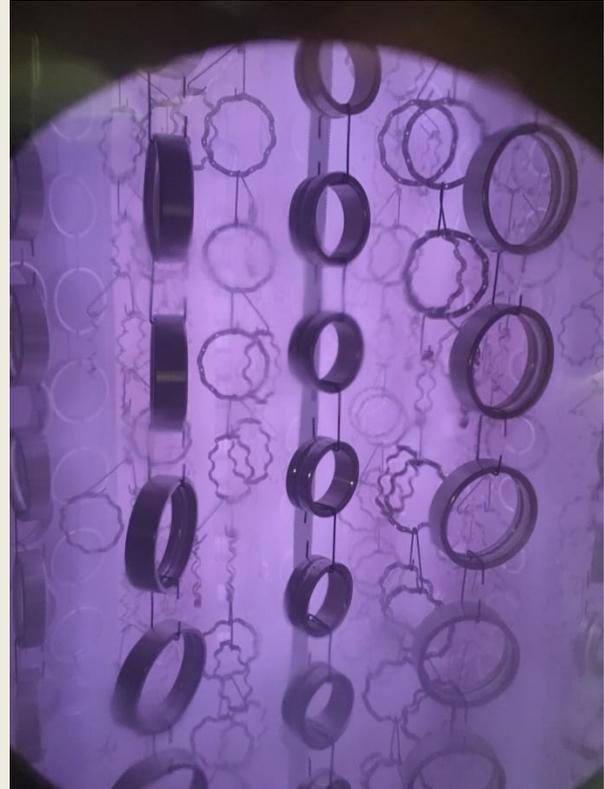




Molybdenum DiSulphide Sputtered Coating

Molybdenum DiSulphide (MoS_2) is an inorganic material with a unique crystal structure which allows it to have one of the lowest coefficients of friction of any solid. When used as a dry lubricant, MoS_2 has a very low cof. of friction ($\sim .01-.03$) even under the largest loads and a very high operating temperature (450°C). MoS_2 has strong bonds in the x-y plane and extremely weak bonds in the z-direction, allowing for plates of MoS_2 to slide on top of each other with minimal resistance. Naturally occurring MoS_2 has most of these plates in a randomized orientation which causes the plates to lock up while sliding. However, using advanced surface engineering techniques the structure of MoS_2 can be deposited with a single orientation obtaining a completely uniform surface on parts.



At Surface Engineering Technologies LLC, we have developed a unique coating consisting of a composite of MoS_2 and other elements that when applied using Magnetron Sputtered Vapor Deposition will produce a long lasting solid lubricant coating with a coefficient of friction as low as .01 while allowing operation in humid environments. Our process has been used on all sorts of critical applications, from satellites and the space station, to engine parts used in racing conditions. Our MoS_2 has also been used in combination with other surface treatments such as Titanium Nitride to increase hardness or Heavy Metal Ion Implantation to create some exceptional after market and specialty OEM parts.

Coating	Cof. of Friction	Operating Temp	Color
MoS_2	.01	450°C	Black

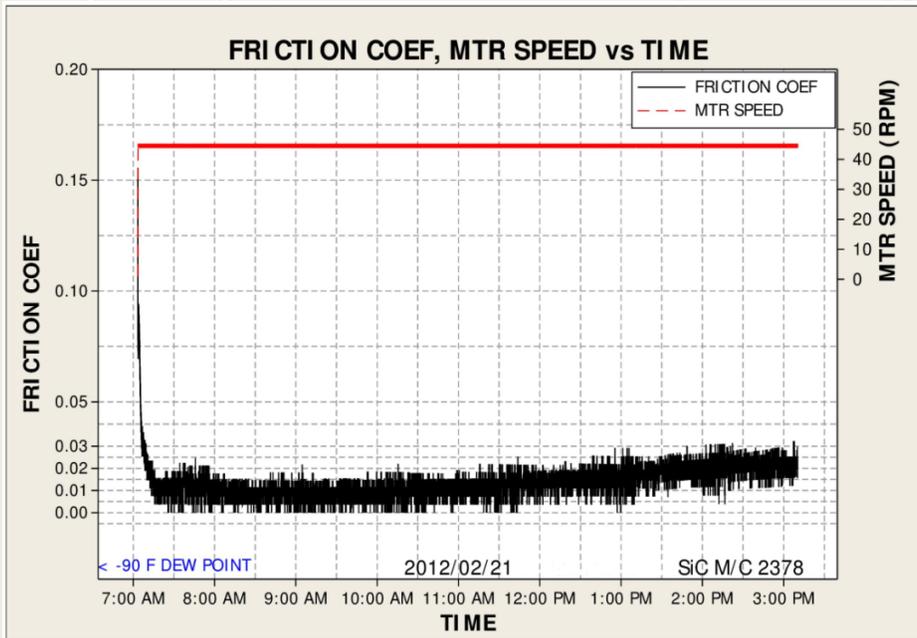


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Magnetron Sputtered MoS₂ is the preferred method of coating a surface with a completely uniform crystal structure with the optimal organization. Other processes that apply MoS₂ by burnishing, powder baking, or spray methods produce a completely randomized crystal structure which drastically reduces the cycle life and performance of the coating. These dry lubricants also have decreased lifetimes due to their lack of a strong bonding layer with the surface of the part. When applying MoS₂ by magnetron

sputtering in a vacuum chamber, the part surface and the coating as it forms can be bombarded with an Argon plasma to create a bonding interlayer which greatly increases the maximum adhesion of the coating.



Another major issue in the consideration of using MoS₂ as a solid lubricant is the deterioration of MoS₂ coating when exposed to humid conditions. When exposed to water, MoS₂

MoS₂ coated SiC seal tested at high temperature in a high humidity environment

can absorb the water which will result in the breakdown of the MoS₂ into other compounds. A further advantage of the Magnetron Sputtered process is that other proprietary elements can be added to the MoS₂ coating to prevent the absorption of water. By adding the other material to the MoS₂, composite MoS₂ coated end mills have successfully be used in cutting fluids containing 93% water.

Inquire with our sales reps and technical staff further for more information on how MoS₂ can work for your products.