



Materials Engineering Branch

TIP*



No. 017 Bonded MoS₂ Lubricant Films

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Solid film lubricants containing MoS₂ for use on bearings, gears, etc. can be bonded onto the surfaces by incorporation of the MoS₂ into a binder, such as sodium silicate, phenolic resin, polyimide resin or silicone resin. These are relatively thick coatings (200-500 micro-inches) as applied by spray, dip or brush and they require elevated temperature baking for various times and temperatures to cure the binder resin. There are literally dozens of formulations on the market. Many of which are proprietary. However, the following are not proprietary and have been shown by tests to be among the best:

AML 23A was developed by Naval Air Materials Laboratory and covered by MIL-PRF-81329. It is available from Electrofilm as Lube-Lok 2396, from Everlube as 811 and from Dow Corning as Molykote X-15.

As cured, the films have significant thickness and should be worn down by a burnishing operation with a rotating stiff bristle brush or by a run-in operation. The debris that is generated should be blown out before the component is installed. The resulting film thickness may still be of the order of 100 micro-inches. Therefore, this thickness should be considered in specifying the dimensional clearances.

The bonded films are not self-healing and therefore, have a shorter life than most oil and grease lubricants. However, wear cycles in the millions have been experienced before development of excessive friction. Axial pre-loads in bearings should be kept to a minimum to maintain a long life and smooth operation. The reader is referred to TIP 016 for a preferred method of applying MoS₂ films.