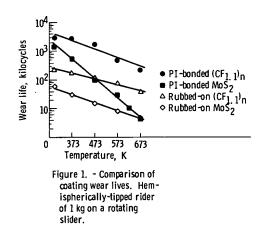
B72-10628

NASA TECH BRIEF Lewis Research Center



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POLYIMIDE BONDED GRAPHITE FLUORIDE -A NEW LONG LIFE SOLID LUBRICANT COATING



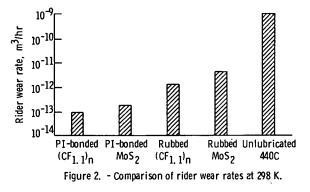
A solid lubricant film consisting of polyimide (PI) varnish as the binder and graphite fluoride $(CF_{1.1})_n$ as the lubricant has been formulated and tested at temperatures from 298 to 673 K (77°F to 752°F) with excellent results.

Compared to three other solid lubricant films, the PI-bonded (CF_{1.1})_n films had significantly longer wear life (Figure 1). For example, at 298 K (77°F) the wear life of PI-bonded (CF_{1.1})_n was about twice that of PI-bonded molybdenum disulfide (MoS₂). As the temperature was increased, the difference in wear life also increased; at 673 K (752°F), the life of PI-bonded (CF_{1.1})_n was greater by a factor of 60.

Figure 2 shows comparative wear rates for hemispherically-tipped riders sliding on disks coated with the four solid lubricant films tested. The lowest wear rates were obtained with the PI-bonded (CF_{1.1})_n films.

The friction coefficients of all four films were in the range of 0.04 to 0.12. The exact value depended more upon the duration of the tests and the experimental conditions than upon the particular lubricant coating.

The specimen configuration used to evaluate the solid lubricant films consisted of a flat, rotating disc in sliding contact with a stationary hemispherically-tipped rider loaded to 1 kilogram. The wear was determined by measuring the circular scar diameter on the hemispherically-tipped rider and calculating the volume of the material removed from the rider.



A summary of all tests made has shown that the polyimide bonded graphite fluoride will provide a solid lubricant coating with long life and low wear rate.

NOTES:

- 1. The following documentation may be obtained from: National Technical Information Service
 - Springfield, Virginia 22151
 - Single document price \$3.00
 - (or microfiche \$0.95)

Reference: NASA TN-D-6714 (N72-18496),

Graphite Fluoride As A Solid Lubricant in a Polyimide Binder

- 2. Technical questions may be directed to: Technology Utilization Officer Lewis Research Center
 - 21000 Brookpark Road Cleveland, Ohio 44135 Reference: B72-10628

PATENT STATUS:

NASA has decided not to apply for a patent.

Source: R.L. Fusaro and H.E. Sliney Lewis Research Center (LEW-11864)

Category 04

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