

Frictional Coefficient and Hydrodynamic
Lubrication of Synthetic Fibers

-Effect of Lubricants on Frictional Coefficient-

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It is a matter of common experience that the friction of lubricated surfaces is less than unlubricated surfaces.

Formulations of fiber lubricants are in general multi-component systems comprising at least one lubricant and one antistatic component. Usually, these two components differ widely in viscosity and in thermal stability. Therefore, the thermal stability and viscosity of a two-component model system consisting of a volatile lubricant (component A) and a non-volatile antistatic agent (component B) were studied over the entire concentration range and the pertinent results are given this Paper.

In order to investigate the frictional properties of synthetic fibers in the hydrodynamic region, the frictional coefficient of synthetic fibers were measured by Rothschild Friction Meter at the velocity range from 25 to 300 m/min.

The effect of oil component, oil pick up, temperature and pretension on friction are presented.

The conclusions obtained from this study are as follows:

1. Plots of frictional coefficient vs. logarithm of lubricant viscosity are linear.
2. The decrease in the frictional coefficient with the increasing temperature is attributed to a decrease of lubricant viscosity and the subsequent increase in friction to volatilization and/or thermal decomposition of the lubricant.
3. The frictional coefficient may slightly decrease by increasing amount of the lubricant added.
4. The increase in friction with increasing pretension is attributed to an increase in area of contact.