During a customer visit, we had an opportunity to compare a new sled for measuring COF on an existing TMI model 32-07 Friction tester. The customer was testing thin plastic film (0.7-2.0 mil) and measuring static and kinetic friction. Our engineering group had recently developed a new sled design which uses magnets to hold the film sample in place (no tape) and our customer was interested in evaluating the new device.

The material was a polyethylene 0.7 mil thick control film. We measured five samples using the customers’ existing sled and our new sled on the same instrument. During our initial test series, the kinetic friction data varied by 10% on the same material using the two different sleds. When we compared the new sled with the customers sled it was obvious the topography of the surface of the rubber on the customers sled was different. Rubber surface A was very smooth and rubber surface B, had a noticeable surface texture.
Several measurements were performed on both sleds using the same film. Kinetic friction results on both sets of tests confirmed that the sled covered with Rubber B, rubber having a texture, produced results that were higher than the sled covered with Rubber A, smooth surface. Static friction results were also higher using Rubber B.

It appeared that the topographical valleys and peaks on the surface of rubber B transformed through the thin film substrate and increased the frictional force between the film materials. This indicates that the interlocking of surface asperities is a factor in increasing friction of thin films when testing with a sled with a textured rubber surface.

Considering the nature of friction testing, it is recommended to regularly examine the surface of the rubber and consider implementing a procedure to change the rubber at least every 4 months. When testing friction on a regular basis, the sides and edges of the rubber can tend to wear thus reducing the total contact area of the rubber which in turn can decrease frictional force. Over an extended period of time, the surface of the rubber can change due to age and use which can also have an affect on static and kinetic test data.

We also conclude the general principles that apply to frictional properties of solid materials do not always comply with the frictional properties of thin plastic films. Sled contact pressure, surface interface and the duration the weight of the sled rests on the material before the test begins will affect static friction.

For more information on our new sled, model number 32-76-02, please contact:

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