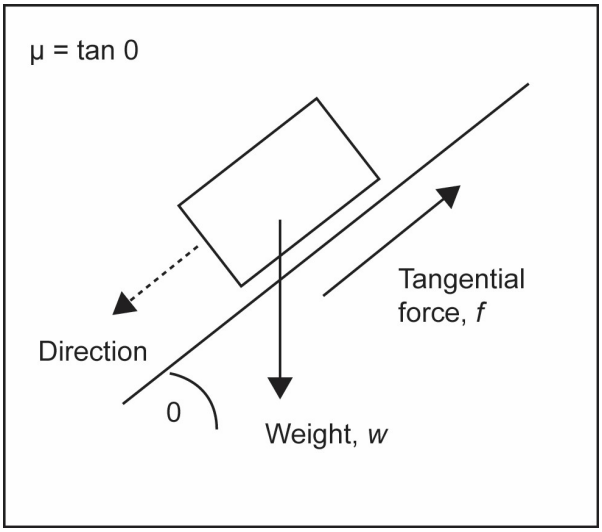
Is it possible to correlate slide angle static friction with static/kinetic horizontal plane COF?

Comparing slide angle static friction and static/kinetic COF Horizontal Plane

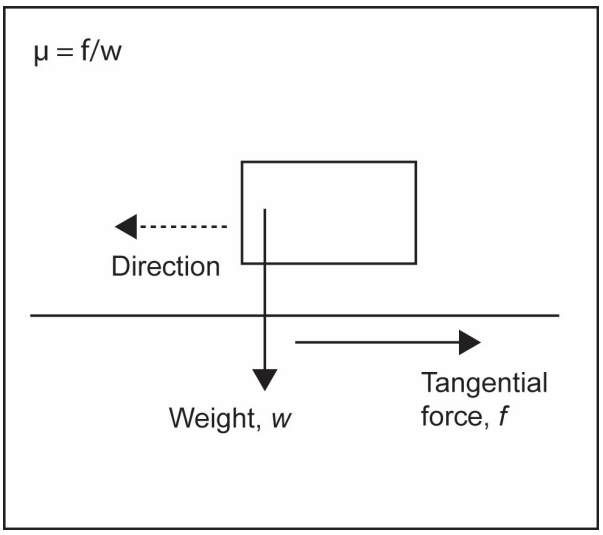
TMI offers two methods to measure static friction:
Horizontal plane method and slide angle static friction

Slide Angle or inclined plane method



This method measures the angle at which a sliding block or sled begins to move when one end of a base plate is tilted upward. The angle is recorded at the moment when the sled begins to slide due to the gravitational forces. The inclined plane method is convenient, durable, inexpensive and is suitable for many applications where controlling the surface friction is desirable. However, it lacks the precision of the horizontal plane COF method which uses a sensitive load cell to measure the static and kinetic friction required to move a test block.

Coefficient of Friction by Horizontal plane



This method measures both the static and kinetic friction of a sliding block in a horizontal plane. Typically, a 1000 gram load cell is used on most instruments for this test. There are a number of factors that influence static friction such as dwell time, operator positioning and condition of the sled. It should be noted that a higher degree of variability is generally reported for the static friction about 4-15% on paper material. Kinetic/dynamic friction is the preferred measurement and generally has a variability of 2-8% on paper materials.

Comparing Slide Angle to Horizontal Plane

Is it possible to compare slide angle COF to static COF- horizontal plane?

Many factors such as surface roughness and surface energy make it difficult to obtain a direct correlation. Although a chart exists to convert slide angle data to static friction by horizontal plane method of paper material, there are several other factors which influence the readings.

Factors which affect test data

Sample preparation of the test strip and mounting the sample to the sled can affect result data.
Variability in the test procedure can influence the result.
Ramp up speed of the slide angle instrument can affect results.
The amount of force the operator applies to the sled when placing the sled on the test bed will influence the result.

The amount of blocking or adhesion that occurs between the sample mounted to the sled and the sample mounted on the plate will affect the result. When the

sled is placed on the test strip; air gaps exist between the two sheets. Over time the air leaks away which increases the bond between the two surfaces. The longer the sled rests on the test sheet the higher the static friction result.

As mentioned, static COF data has a higher degree of variability than kinetic. For this reason, when measuring friction by the horizontal plane method, many labs rely completely on kinetic friction for material control.

Also, due to the variations in static COF as mentioned above, comparing the data between slide angle and horizontal plane measurements may not be meaningful.

Friction testers offered by TMI

TMI Model 32-91 LabMaster is a computer controlled Friction tester which automatically controls the sled placement and dwell time with an elevator system to reduce many of the above mentioned static COF variabilities.

Testing Machines also offers Model 32-25 Slide Angle, Model 32-71 computer controlled COF unit and Model 32-76 Horizontal plane method for static and kinetic COF. Model 32-76 can be interfaced to GraphMaster PC software to record static/kinetic curve analysis and data storage.
A new magnetic sled Model 32-76-02 was recently introduced to increase test precision and reduce operator sample preparation time.

www.testingmachines.com