

FRICTION

Friction is a force that resists motion. It involves objects that are in contact with each other.

THE FIVE PRINCIPLES OF FRICTION:

- 1). Friction acts parallel to the surfaces that are in contact and in the direction opposite to the motion of the object or to the net force tending to produce such motion.
- 2). Friction depends on the nature of the materials in contact and the smoothness of their surfaces.
- 3). Sliding friction (kinetic friction) is usually less than starting friction (static friction).
- 4). Friction is practically independent of the area of contact.
- 5). Starting or sliding friction is directly proportional to the force pressing the two surfaces together.

Thus $\mu = f / N$ or the coefficient of sliding friction is the ratio of the force of sliding friction to the normal (perpendicular) force pressing the surfaces together.

Examples:

Surfaces in contact	Starting friction	Sliding friction
steel on steel	.74	.57
glass on glass	.94	.40
wood on wood	.50	.30
rubber tire on dry road		.70
rubber tire on wet road		.50
Teflon on Teflon	.04	.04

WHAT CAUSES FRICTION?

Some scientists believe that friction is caused mainly by the uneven surfaces of the touching objects. As the surfaces are rubbed together, they tend to interlock and thus offer resistance to being moved over each other. It has been shown that tiny particles are actually torn from one surface and become imbedded in the other. There is a limit to which friction can be reduced by polishing however. When this limit is reached, further polishing increases the friction because the cohesive force that holds like molecules together starts coming into play.

Name ^{THREE} ~~two~~ ways we try to reduce friction between two surfaces.

- 1). wax (like on skis) or oil (like between the cylinder and the piston in a gasoline engine).
- 2). sanding or polishing.

3). ball bearings (marbles) (wheels)