

Friction Testing Services

Friction is the resistance to sliding between two surfaces in contact when pressed together. It is often described by a single coefficient, which is the sliding resistance force divided by the normal force pushing the surfaces together. Sometimes, there is an initial force spike that may be labeled as the static coefficient of friction, followed by a lower average force, which may be labeled as the dynamic coefficient of friction. The friction force is: (1) approximately independent of the area of contact and (2) is proportional to the normal force between the two materials. At Axel Products, we provide the following friction testing services.

1. Axial Torsion Friction Experiments

While Friction Sled Experiments are the preferred method for friction tests with a low normal force, it is not suitable to test materials with a coefficient of friction over 1.0, or for friction tests where the normal pressure is high. In this case, we perform an Axial Torsion Friction Experiment. In this test, the end surface of a cylinder is forced against a fixed surface of a second material, and then rotated so as to create friction between the surfaces. A load cell capable of measuring axial and torsional forces is used to measure (and control) the normal force, as well as the frictional force. The experiment can be performed either controlling the normal pressure (standard), or the normal position, and may be performed in a customer-supplied liquid.

2. Friction Sled Experiments

To measure the aforementioned proportionally factor or coefficient of friction a 50 mm by 100 mm sled with one material of interest is dragged along a larger second material of interest, typically 100 mm by 500 mm. Rubber and plastic materials tend to be sensitive to the normal pressure between the surfaces as well. The normal pressure is modified by resting weights on the sled. Testing can be performed at any temperature between -40°C and 150°C, and in any liquid (e.g. oil, grease, saline solution, or water). Customers can provide the base material themselves, or provide a full description of the material and surface finish.

3. Full Set of Friction Properties

We offer the possibility to get a comprehensive characterization of the material, by testing the friction between two materials in a set of one temperature, three loading rates (default rates are 0.1, 1, and 10 mm/s), and three normal pressures (default values are 0.1, 1, and 10 MPa). These may be adjusted within the limits specified below. All tests are performed per the Axial Torsion method.

General Pricing for Friction Testing Services

(Prices are shown in US Dollars)	Room Temp (23C)	-40C < Temp < 150C
1. Axial Torsion Friction Experiments <i>(normal pressure from 0.03 to 30 MPa, one rate from 0.1 to 100 mm/s)</i>		
3 Friction Tests in Air (dry) (3 separate samples)	315	450
3 Friction Tests in Liquid (3 separate samples)	390	525
2. Friction Sled Experiments <i>(normal pressure from 0.0003 to 0.006 MPa, one rate from 0.01 to 2.0 mm/s)</i>		
3 Friction Tests in Air (dry) (3 separate samples)	210	315
3 Friction Tests in Liquid (3 separate samples)	285	390
3. Friction Experiments – Full Set (1 Temperature, 3 Rates, 3 Pressures)		
27 Friction Tests in Air (dry) (9 separate samples, each tested 3 times) <i>(rates 0.1, 1.0, 10 mm/s, pressure 0.1, 1.0, 10 MPa)</i>	1800	2700
27 Friction Tests in Liquid (9 separate samples, each tested 3 times) <i>(rates 0.1, 1.0, 10 mm/s, pressure 0.1, 1.0, 10 MPa)</i>	2000	3000

December 2014. Pricing subject to change.

Notes:

- These are typical friction experiments. Feel free to request a proposal for other interests or specifications, or for custom part testing.
- The data is delivered via e-mail in an ASCII format.
- Customer data and materials will be retained for 1 year after initial data delivery.

Purchase Order, VISA, MasterCard, AMEX and Discover Card are accepted methods of payment.

Terms: NET 30 Days after Delivery of Data