

Basic Plastic Testing Services

The objective of the testing services is to define the basic material properties of solid plastic materials.

1. Tensile Test with Axial Strain and Transverse Measurement

The basic tensile properties of plastic in tension are determined. Testing methods ASTM D638 or ISO 527-1 may be used as a guide. Material may be provided as “dog bone” specimens or plaques. Strain measurement is typically performed with imaging-based extensometers based on the strain resolution and range required. Transverse strain may be measured for the determination of Poisson's Ratio. Full field strain measurement and associated videos may be provided with Digital Image Correlation (DIC).

2. Yield and Plasticity Measurement, Loading-Unloading Tensile Test

In general, yielding is the region where the contribution of plastic strain (or permanent strain) becomes a significant fraction of total strain. Plastic deformation may appear at very small strain values. A more accurate way to determine the yield point is by loading and unloading the specimen and directly observing the elastic strain recovery at each strain level.

3. Compression Experiments, In-plane and Simple

Compressive properties in the plane of the plane of a plastic sheet may be different than the properties perpendicular to the sheet. The in-plane data is typically paired with tensile data and it is a more complex experiment.

4. Shear Tests

The shear state of strain can be an important addition to the fitting of a material model. Shear tests for plastics typically use the rail or Iosipescu specimen. DIC strain measurement is used.

5. Bend Tests

The bend test is a classic plastics experiment. However, the value of the bend test for generating data for the calibration of material constitutive models is low because it is hard to determine the state of strain in the material.

6. Creep Testing

For short-time creep measurement, strain and time data is collected continuously at a set strain level for up to two hours in tension, but typically for 2000 seconds. Simple tension or compression may be used.

7. Rate Sensitivity

The rate or speed at which a stress is applied to plastic will alter the response of the material. At slow speeds, most plastics will stretch farther before failure and will yield at lower stress values than if the stress is applied quickly. This effect becomes measurable with order of magnitude rate changes.

8. Thermal Expansion

Plastics expand or contract with changes in temperature. Plastic may also expand far more than surrounding steel parts. Thermal expansion is measured using a Thermal Mechanical Analyzer (TMA).

9. Thermal Conductivity

Thermal conductivity, thermal diffusivity and specific heat are determined using the transient plane source method.

10. Friction Tests

To measure the proportionality factor or coefficient of friction, a 50 mm by 100 mm sled with one material is dragged against a larger second material. Rubber and plastic materials may be sensitive to the normal (perpendicular) pressure between the surfaces. The normal pressure is modified by resting weights on the sled.

11. Puncture (Multi-axial Impact) Experiment

Complex failure is measured by impacting a plaque with a semi-spherical probe at a fast impact speed (typical 6.6 m/s). This experiment is guided by ISO 6603 or ASTM D3763.

General Pricing for Plastic Testing Services

Prices are shown in US Dollars	Lab Temp. (23C)	-40C to 200C	37C in Saline
1. Tensile Properties in One Direction 5 Simple Tension tests, 1 rate between 0.001 s ⁻¹ and 0.01 s ⁻¹			
Axial Strain Only	440	660	
Axial and Transverse Strain	500	700	
Axial Strain Only (DIC strain measuring and associated video)	915	1135	
Axial and Transverse Strain (DIC strain measuring and associated video)	975	1225	
2. Yield and Plasticity, Loading-Unloading Tensile Test 3 tests, Load-unload experiments at 5 Strain Levels	440	660	1120
3. Compression 5 Compression tests, 1 rate less than 0.01 s ⁻¹			
In-plane Compression with Axial Strain	980	1210	
Simple Compression with Axial Strain	350	525	1120
4. Shear Tests [Iosipescu Shear (ASTM D5379) OR V-Notched Rail Shear (ASTM D7078)] 5 Shear tests, 1 rate less than 0.1 s ⁻¹	1290	1895	
5. Bend Tests 5 Bend tests			
One quasi-static rate	525	790	
5000 mm/min	1875	2450	
6. Short Term Creep Testing 5 tests at one stress level, less than 2000 seconds	490	730	1300
7. Rate Sensitivity Set in Tension 5 tests at 1 s ⁻¹ , 5 tests at 10 s ⁻¹ , 5 tests at 100 s ⁻¹			
Dot-Tracking Strain Measuring	2346	3525	n/a
DIC Strain Measuring (plus video)	3771	4950	n/a
8. Thermal Expansion 3 test repetitions from -40°C to 150°C	410	410	n/a
9. Thermal Conductivity 3 test repetitions at one temperature 3 test repetitions at five temperatures	440 1130	440 1130	n/a n/a
10. Friction Tests Sled Test			
3 tests, 1 pressure from 0.0003 to 0.006 MPa, one rate from 0.01 to 2.0 mm/s Limited to 100°C (max)	344	431	895
Axial Torsion Test			
3 tests, 1 pressure from 0.03 to 30 MPa, one rate from 0.1 to 100 mm/s	730	1095	1095
11. Puncture (Multi-axial Impact) Experiment 5 tests at one rate (6.6 m/s typical)	510	1420	n/a

February 2026. Pricing subject to change.

Notes:

- These are typical plastic testing experiments. Feel free to request a proposal for other interests or specifications, or for custom part testing.
- Data is provided in SI units of MPa for stress and non-dimensional strain. 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.