

## High Strain Rate Testing Services

The objective of the testing services is to define the basic material properties of solid materials at medium and high rates of strain.

### Tensile Properties

The basic tensile properties of materials in tension are determined at one rate of straining. Material may be provided as “dogbone” specimens, or plaques. Axial strain measurement may be performed with a variety of strain measurement devices, including (but not limited to) clip-on strain gauge extensometers, laser extensometers, video extensometers, or high-speed optical sensors, depending on the type of material, and the strain resolution and range required. Testing can be performed at any temperature between  $-40^{\circ}\text{C}$  and  $150^{\circ}\text{C}$ , and, depending on the dimensions of the test specimen, strain rates of several hundreds of  $\text{s}^{-1}$  can be reached.

### Compression Properties

The basic tensile properties of materials in compression are determined at one rate of straining. Material may be provided as cylinders, cubes or plaques. Axial strain measurement may be performed with a variety of strain measurement devices, including (but not limited to) laser extensometers, video extensometers, or high-speed optical sensors, depending on the type of material, and the strain resolution and range required. Testing can be performed at any temperature between  $-40^{\circ}\text{C}$  and  $150^{\circ}\text{C}$ , and, depending on the dimensions of the test specimen, strain rates up to  $100 \text{ s}^{-1}$  can be achieved.

### Full Sets of Tests

There is also the possibility of performing a full set of tests, in either tension or compression, or both. A full set contains 5 separate data sets, each being one rate of strain. The five strain rates are each an order of magnitude apart, namely 0.010, 0.10, 1.0, 10, and  $100 \text{ s}^{-1}$ . This gives you a very complete overview of the rate dependency of your material. If so desired, the full set can be supplemented by other tests, such as thermal expansion, or density.

### Other High-Speed Testing

In some cases, high strain rate tests can also be performed in other states of strain, such as shearing. Also, high-speed testing of components is possible. For these types of custom testing, please contact us.

### Materials and Specimens

High strain rate testing can be performed on a variety of materials, including (but not limited to) elastomers and plastics.

The prices are for specimens provided in tensile bar form or for material supplied in 3 mm thick plaques. If specimens need to be molded, the material will be sent out at additional cost. Specimens may also be extracted from components or parts.

For specific instructions or questions regarding sample geometry, pricing, or other testing needs, please contact Axel Products at [info@axelproducts.com](mailto:info@axelproducts.com).

## General Pricing for High Strain Rate Testing Services

Prices are shown in US Dollars	Room Temp (23C)	-40C < Temp < 150C
<b>1. Low Speed Tensile Properties</b> Elastomers 210 315 Plastics (axial strain only) 180 270 Plastics (axial and transverse strain for Poisson's Ratio) 390 585 Foam (axial and lateral strain) 420 630 <i>(3 Simple Tension tests, 1 rate less than 0.1 s<sup>-1</sup>)</i>		
<b>2. Medium Speed Tensile Properties</b> Elastomers, Plastics, Foam 950 1425 <i>(3 Simple Tension tests, 1 rate between .1 and 50 s<sup>-1</sup>)</i>		
<b>3. High Speed Tensile Properties</b> Elastomers, Plastics, Foam 2050 3125 <i>(3 Simple Tension tests, 1 rate over 50 s<sup>-1</sup>)</i>		
<b>Basic Tensile Properties – Full Set</b> Elastomers, Plastics, Foam 3100 4650 <i>(13 Simple Tension tests, rates 0.001, 1, 100 s<sup>-1</sup>)</i>		
<b>4. Low Speed Compression Properties</b> Elastomers 210 315 Plastics 180 270 (Crushable) Foam 210 315 <i>(3 Simple Compression tests, 1 rate less than 0.1 s<sup>-1</sup>)</i>		
<b>5. Medium Speed Compression Properties</b> Elastomers, Plastics, (Crushable) Foam 630 945 <i>(3 Simple Compression tests, 1 rate between .1 and 50 s<sup>-1</sup>)</i>		
<b>6. High Speed Compression Properties</b> Elastomers, Plastics, (Crushable) Foam 950 1425 <i>(3 Simple Compression tests, 1 rate over 50 s<sup>-1</sup>)</i>		
<b>Basic Compression Properties – Full Set</b> Elastomers, Plastics, (Crushable) Foam (axial strain only) 2500 3700 <i>(13 Simple Compression tests, rates 0.001, 1, 100 s<sup>-1</sup>)</i>		

November 29, 2010. Pricing subject to change.

Notes:

- These are typical high-speed 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