Elastomer Testing Services

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

1. Basic Hyperelastic Properties

3 simple tension specimens, 3 planar tension specimens and 3 equal biaxial specimens are cut from the provided slabs. Or for foam materials, 3 simple tension specimens, 3 simple shear specimens and 3 simple compression specimens are cut from provided slabs. The specimens are loaded slowly between zero force and a user defined stretch level for 5 loadings and unloadings at up to 4 maximum strain levels so as to examine the initial stress strain behavior and the "stabilized" stress strain behavior at each of the maximum strain conditions. (5 slabs, 150 mm by 150 mm by 1.0 to 2.0 mm thick are required for each temperature condition)

2. - 3. Short Term Stress Relaxation Properties

Stress and time data is collected continuously at a single set strain level for 2000 seconds. 3 specimens are tested. Simple tension, planar tension, compression or equal biaxial specimens may be used. This test can be expanded to include multiple strain levels, and multiple types of specimen. As such, it may replace the basic hyperelastic properties plus standard short term relaxation properties tests in some material models. (Two standard 150 mm by 150 mm by 1.0 to 2.0 mm thick test slabs of the material is required for each temperature or strain condition, in either a standard or an expanded short term stress relaxation test).

4. Volumetric Compression

A specimen is fully constrained and compressed for the purpose of determining the Bulk Modulus of the material. 6.35 mm diameter disks are cut from standard slabs and stacked. The initial slope of this curve is the Bulk Modulus.

5. Friction

To obtain the (static and/or dynamic) coefficient of an elastomer with a second material, we first need to establish at what normal pressure to perform the test (frictional force is proportional to that). At Axel Products we perform various friction experiments; for more information, check friction testing on our web site. The most common test is a basic sled with one subject material being dragged across the second subject material; at higher normal pressures, we can perform an axial torsion friction experiment.

6. Static Tearing

The static tearing experiment is a meaningful way to examine the failure of an elastomer in tearing. A sharp cut is introduced into a planar tension specimen and the specimen is stretched until failure. Failure stress, failure strain and total tearing energy are reported.

7. Thermal Properties

Thermal conductivity, thermal diffusivity and specific heat are determined using the transient plane source method (HotDisk™). One standard 150 mm by 150 mm test slab (more than 1 mm thick) of the material is required for each temperature condition.

Thermal expansion is determined by examining the dimensional change in a material specimen as temperature changes using a Perkin-Elmer Diamond TMA instrument.

8. Material Preparation Services

Preparing specimens from supplied material slabs, and other basic specimen preparation, is free of charge. To cut specimens from parts, we can skive material slabs out of most compounds that will fit our testing needs. A small fee for skiving services is involved.

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General Pricing for Elastomer Testing Services

(Prices are shown in US Dollars)	Room Temp (23C)	-40C < Temp < 150C	37C in Saline
1. Basic Hyperelastic Properties *(typically 5 loadings and unloadings at each of max. 4 strain levels, or single loading, a.k.a. pull to "failure")*			
Dense Elastomers	TOTAL 1155	TOTAL 1710	TOTAL 2310
3 Simple Tension Tests	210	315	420
3 Pure Shear Tests	315	450	630
3 Equal Biaxial Tests	630	945	1260
Foam Elastomers	TOTAL 945	TOTAL 1395	
3 Simple Tension Tests with lateral strain measurement	420	630	n/a
3 Simple Shear Tests	315	450	630
3 Simple Compression Tests	210	315	420
2. Standard Short Term Stress Relaxation			
3 Simple Tension Tests *(2000 seconds, 1 strain level)*	210	315	420
3 Pure Shear Tests *(2000 seconds, 1 strain level)*	315	450	630
3 Equal Biaxial Tests *(2000 seconds, 1 strain level)*	630	945	1260
3. Expanded Short Term Stress Relaxation			
Dense Elastomers *(Includes 1 Simple Tension test, 1 Planar Tension test, 1 Equal Biaxial Extension test, 5-10 strain levels each)*	1395	2090	2790
Foam Elastomers *(Includes 1 Simple Tension test, 1 Simple Shear test, 1 Simple Compression test, 5-10 strain levels each)*	1155	1710	2310
4. Volumetric Compression (Bulk Modulus) *(3 tests)*	250	375	
5. Basic Friction Sled Tests *(3 tests at a single normal pressure < 0.01 MPa)*	210	315	
6. Static Tearing Experiment *(3 tests)*	315	450	630

7. Thermal Properties	
Thermal Conductivity, Thermal Diffusivity, Specific Heat *at 1 temp between –40C and 150C, 3 repetitions*	250
Thermal Conductivity, Thermal Diffusivity, Specific Heat *at 5 temps between –40C and 150C, 3 repetitions*	600
Thermal Expansion *from –40C to 150C, 3 repetitions*	275
8. Material Preparation Services	
Skiving Parts into Materials *price per project*	400

August 2005. Pricing subject to change.

Notes:

a. 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.
b. 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

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