General Pricing for Elastomeric Foam Testing and Data Services

(Prices are shown in US Dollars)

	23C	-40C to 200C	37C in Saline
1 Basic Hyperfoam Properties (Total)	**1035**	**1555**	**2070**
3 Uniaxial Compression Tests with Lateral Strain	*345*	*520*	*690*
3 Simple Shear Tests	*450*	*675*	*900*
3 Uniaxial Tension Tests	*240*	*360*	*480*
2 Simple Shear with Lateral Force Measurement 3 tests	510	675	n/a
3 Short Term Stress Relaxation (quasi-static)	240	360	480
3 Uniaxial Compression Tests (2000 seconds, 1 strain level)			
4 Strain Rate Sensitivity	1800	2700	3600
3 Compression Tests at 0.1 s-1, 3 tests at 1 s-1, 3 tests at 10 s-1			
5 Dynamic Short Term Stress Relaxation (up to 50 s-1)	440	660	880
3 Simple Compression Tests (500 seconds, 1 strain level)			
6 Expanded Short Term Stress Relaxation (quasi-static)	460	690	920
3 Simple Compression Tests (2000 seconds, 5-10 strain levels)			
7 Dynamic Mechanical Analysis (DMA) by Forced Vibration	2250	3375	n/a
3 Tests, 8 Mean Strain Levels, 3 Amplitudes, 11 Frequencies			

8 Material Model Calibration, Determine Model Coefficients	
8.1 Hyperfoam Fit and Verification at One Condition (Blatz-Ko, Ogden)	**600**
8.2 Each Additional Condition for the Same Data Set	200
8.3 Hyperfoam Plus Mullins Softening Fit and Verification	750
8.4 Hyperfoam Plus Rate Effects Fit and Verification	850
9 Thermal Properties	
9.1 Thermal Conductivity, Diffusivity, Specific Heat at **1** temp between –40C and 150C, 3 reps	250
9.2 Thermal Conductivity, Diffusivity, Specific Heat at **5** temps between –40C and 150C, 3 reps	600
9.3 Thermal Expansion from –40C to 150C, 3 repetitions	275
10 Material Preparation Services, Cutting, Slicing, Sectioning of Parts	400

October 15, 2017. Pricing subject to change.

Purchase Order, VISA, MasterCard, AMEX, and Discover Card are accepted methods of payment.
Terms: NET 30 Days after Delivery of Data

a. Data is provided in SI units of MPa for stress and non-dimensional strain. The data is delivered via e-mail in ASCII format.
b. Customer data and materials will be retained for 1 year after initial data delivery.

Elastomeric Foam Testing and Data Services Descriptions

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

1. Basic Hyperfoam Properties

3 uniaxial compression specimens, 3 simple shear specimens and 3 uniaxial tension specimens are cut from the provided foam 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 to examine the initial stress strain behavior and the "stabilized" stress strain behavior at each of the maximum strain conditions.

2. Simple Shear with Lateral Force Measurement 3 tests

A specimen is deformed in a state of simple shear. Shear strain, shear stress and stress transverse to the shear direction is measured.

3. Short Term Stress Relaxation (quasi-static)

Stress and time data is collected continuously at a single set strain level for 2000 seconds.

4. Strain Rate Sensitivity

The rate or speed at which a stress is applied to a foam elastomer will alter the response of the material. This effect becomes measurable with order of magnitude rate changes.

5. Dynamic Short Term Stress Relaxation (up to 50 s-1)

The elastomeric foam is compressed or stretched at a high strain rate to a selected strain. Stress and time data is collected continuously for 500 seconds.

6. Expanded Short Term Stress Relaxation Properties (quasi-static)

Stress and time data is collected continuously at multiple set strain levels for 2000 seconds at each level.

7. Dynamic Mechanical Analysis (DMA) by Forced Vibration (0.1 Hz to 200 Hz. typical)

Test specimens are stepped to a mean strain and held. Sinusoidal vibrations are super-imposed on this mean strain and the stress reaction is measured. From this, the dynamic modulus, storage modulus and loss modulus of the material is determined.

8. Material Model Calibration, Determine Model Coefficients

The coefficients are determined for an appropriate elastomeric material model and the resulting fit is reported and compared with the experimental test data.

10.1 Hyperfoam Fit and Verification at One Condition (Blatz-Ko, Ogden)

The hyperfoam model is used to capture the complex strain field of elastomeric foam structural loadings. Since softening and viscoelastic effects are not captured, one or more conditions must be selected to fit.

Models are reviewed and the simplest math model with the best fit is selected. Models considered include Blatz-Ko, Ogden Hyperfoam and traditional hyperelastic models with compressibility.

10.3 Hyperfoam Plus Mullins Softening Fit and Verification

The hyperfoam model is used to capture the complex strain field of elastomeric foam structural loadings. The addition of Mullins to the Hyperfoam material model definition allows the material model to capture the softening resulting from the initial loading and unloading of the foam. Mullins in an analysis allows softening on an element-by-element basis so that highly strained regions soften more than lower strained regions. The overall strain range must be selected.

10.4 Hyperfoam Plus Rate Effects Fit and Verification

The hyperfoam model is used to capture the complex strain field of elastomeric foam structural loadings. The addition of Viscoelasticity to the Hyperelastic material model definition allows the material model to capture the change in stiffness resulting from stress decay over time or the change in stiffness from rate of straining changes.

9. Thermal Properties

Thermal conductivity, thermal diffusivity and specific heat are determined using the transient plane source method. This method does not work for all foams.

Thermal expansion is determined by examining the dimensional change in a material specimen by TMA.

10. Material Preparation Services, Cutting, Slicing, Sectioning of Parts

Preparing specimens from supplied material slabs is free of charge. To cut specimens from parts, a fee for machining services is involved.