

Model 833 Triaxial Test System for Dynamic Characterization and Fatigue Testing of Elastomers

The Model 833 Triaxial Elastomer Test System is a second generation of true triaxial test systems for fatigue and characterization testing of elastomeric materials and components.

This system was developed to meet the demanding test requirements of the automotive industry. It is designed to use an optional software package that will accurately reproduce road load data on three axes. Thus, with MTS Remote Parameter Control™ (RPC®) software or Component RPC, this system will provide true simulation for fatigue and durability testing.

While this technology will be used extensively for testing engine mounts, it is also appropriate for other triaxial simulation needs requiring excitation in a frequency range of 0.01 to a minimum of 80 Hz. The MTS Model 833 can be used for triaxial durability studies for detection of the onset and progression (degradation) of component failures and for dynamic characterization in each of three axes.

This new triaxial test system will accommodate most elastomer specimen sizes, up to 400 mm diameter. The moveable load frame crosshead provides easy loading and permits a variety of specimen heights, up to 550 mm.

Force capacity of the system is ± 25 kN on each axis. The displacement is ± 25 mm on each axis. Static and dynamic forces transmitted through the specimen can be measured during all phases of fatigue and characterization testing. Sequencing fatigue and characterization test steps allows the component or material to be closely monitored as it fails.

A unique MTS force transducer provides simultaneous multiaxial measurements (F_x , F_y , F_z , M_x , M_y , M_z). Cross coupling compensation minimizes possible errors caused by off axis loading. In addition, geometric compensation minimizes further errors caused by off axis loading.

The force transducer is mounted to the moveable crosshead assembly. Hydraulic lifts and locks control the



crosshead for easy specimen mounting and ready access to test space. Large diameter, hollow columns and a light but stiff crosshead load unit provide more accurate displacement measurement than other designs. Another attribute is the fact that the load frame resonance is outside of the operating frequency range, providing better phase, load, and displacement resolution within the system's wide operating range. Strut and flexure assemblies

are also lightweight and stiff. The unique software provided with this unit incorporates a sophisticated mass and load path stiffness compensation directly into the control loop.

Software and Test Control

Application and control software for the MTS Triaxial Elastomer Test System was developed to allow maximum utilization of the capabilities of the system. Thus, it provides a wide range of measurement and system control.

The system is unique in that it offers a software package that includes both TestStar™ and Remote Parameter Control (RPC) application and analysis software.

TestStar is the name for the control system used on most MTS elastomer test systems. It features software control of the test and test system working through an essentially transparent controller. All interaction with the test and test system is done with a PC.



MTS RPC simulation software is the industry standard for fatigue and durability testing of ground vehicles and components.

Together, these technologies provide unmatched power, capability and versatility for triaxial elastomer testing.

For example, the system provides measurement of static stiffness in three axes. Dynamic stiffness/damping properties can be either sequentially or simultaneously measured in the three axes. The operator specifies the desired sequence and test parameters during test set-up.

The system gives you the ability to separately control any combination of the following:

Mean Amplitude	Dynamic Amplitude
Force	Force
Displacement	Displacement
	Acceleration

It also will let you automatically control the phase between the three channels with a patented control algorithm specially designed to minimize phase and amplitude errors.

The MTS Triaxial Elastomer Test System is designed to provide exact excitation amplitudes in each axis at the specimen for repeatability.

For easier testing, all test setup parameters are readily recalled, as are specific test procedures. Furthermore, the system lets you analyze specific dynamic, static or fatigue data, on-the-fly, without interrupting the test.

System software allows the operator to sequence between fatigue-durability excitation and measurement of static or dynamic properties. It also lets you employ traditional, repetitive sinusoidal waveforms for fatigue durability excitation, as well as road-load data using MTS Remote Parameter Control Techniques.



The MTS Triaxial Elastomer Test System software employs standard spreadsheet formats for graphical and tabular display of measured and calculated parameters. In addition, you can call-up time-based (hysteresis-loop) or frequency-based (spectral analysis) presentation of dynamic data. Advanced macros are included to provide easy graphical presentation of test data that are potentially very complex.

Environmental Simulation

An optional environmental chamber allows accurate simulation of the component or material service environment. The range of the chamber is -50 to 150 degrees C. Control and monitor-

ing of the environmental chamber are completely integrated into the system's application software. The chamber dimensions will accommodate a range of specimen sizes. Interior dimensions are 436 mm wide by 468 mm deep. Height is 268 mm on the right side of the chamber and 199 mm on the left. Door and window allow visual inspection.

For More Information

If you would like more information on the MTS Triaxial Elastomer Test System, contact your local MTS Sales Engineer. You can also contact the company at the address below or visit our web site at www.mts.com.

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 100-015-996 833Triaxial-01 Printed in U.S.A. 899