

Model 793.31 and 793.32 Dynamic Characterization Software



Benefits

- ▶ Four channels of simultaneous control
- ▶ Can be used for dynamic characterization and durability tests
- ▶ Lets you evaluate effects of many variables on elastomer behavior
- ▶ Works with standard MTS elastomer systems

MTS Model 793.31 Dynamic Characterization software allows you to conduct dynamic characterization and durability tests with up to four channels of simultaneous control. It provides you with the capability to characterize the dynamic properties of a viscoelastic material or component under a wide range of variables.

Here's how it works. The figure below shows the format of a typical Dynamic Characterization process test condition.

- A Ramp to Hold Value
- B Hold During Temperature Dwell
- C Stabilize Temperature
- D Dwell at Temperature
- E Ramp to Zero
- F Relax at Zero
- G Ramp to Mean or Set Point
- H Dwell at Mean
- I Converge Dynamic Amplitude
- J Precycle
- K Acquire Data Cycles
- L Return to Base or Mean Level
- M Record Temperature
- N Process Data

You can measure the following parameters with Model 793.31 software in addition to a number of other calculated properties:

- ▶ Stiffness (K)
- ▶ Phase angle
- ▶ Damping (C)
- ▶ Modulus of materials (E or G)
- ▶ Tan delta

This software lets you sweep almost any variable including mean level, dynamic amplitude, frequency, temperature, or phase relationship between channels of control. Furthermore, you can combine multiple sweeps within one test. This capability lets you evaluate the effects of such things as changes in engine size or RPM and different road environments.

Excel™ macros allow easy sorting of data for graphical or tabular presentations.

There are many advantages available when you use Model 793.31 Dynamic Characterization software. One is that it allows you to run more types of tests.

For example, you can specify the following as fixed or sweep in a linear, logarithmic, or arbitrary manner:

- ▶ Frequency
- ▶ Mean
- ▶ Amplitude
- ▶ Temperature set point
- ▶ Phase (if multiple channels)

There's more. Depending on your need you can perform the following tests:

- ▶ Nested sweeps—Similar to "DO Loops" in software, the Model 793.31 Dynamic Characterization process allows you to define nested sweeps so that all of the variables can be changed together or separately.

▶ Mixed mode—Model 793.31 Dynamic Characterization software allows you to separately specify the mode of control for the dynamic amplitude and the mean level as follows:

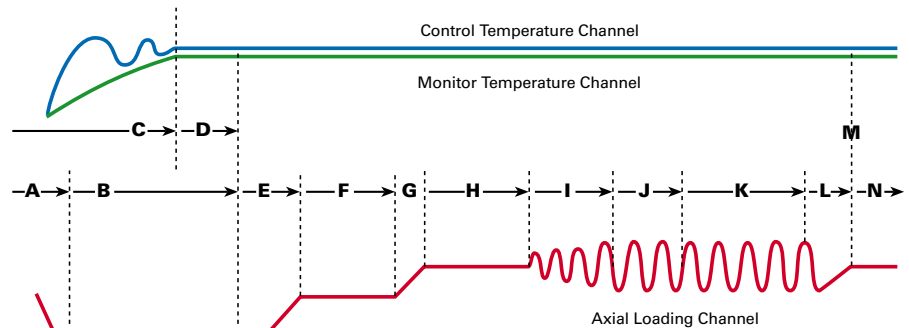
- Mean control parameter – Load, displacement, strain, or stress
- Amplitude control parameter – Load, displacement, strain, acceleration, or stress

▶ Automatic correction—If the feedback from the specimen does not agree with the desired waveform, MTS Model 793.31 Dynamic Characterization software compensates for errors automatically with a patented Amplitude/Phase Control (APC) algorithm.

▶ QC Limit Definition—This feature allows you to set limits of data acceptability for calculated values. This is very useful for quality control applications where the operator must know if a part is acceptable.

▶ Accurate Data—Model 793.31 Dynamic Characterization software allows the measurement and correction for a variety of potential errors, including errors due to unwanted accelerations, load path compliance, mechanical and electrical phase errors, and transducer rolloff.

▶ Familiarity—Since Model 793.31 Dynamic Characterization software is an enhancement to other MTS elas-



tomter software, you still have all of the testing flexibility and ease of use that you expect from MTS. Additional testing options are simply chosen from an extended list of processes.

From Material Properties to Final Parts

When it comes to material property analysis, Model 793.31 Dynamic Characterization software allows you to specify tests so that you can fully measure the dynamic behavior of a material. A wide variety of tensile, compressive, and shear samples can be tested with the appropriate shape factor used for each geometry to calculate modulus in axial or torsional modes.

Four decades of strain amplitudes can be accomplished with the same sample with frequencies that can range from 0.01 Hz to 1000 Hz. Over four decades of modulus can be measured to allow complete glass transition temperature measurements with one sample.

The software compensates for load path deflections so that modulus is measured accurately for even very stiff samples. Optionally, an extensometer can be used to measure strains directly on the sample.

The ASCII file format allows data transfer to a wide variety of finite element analysis packages for efficient modeling of the material's behavior.

For performing component performance analysis, MTS Model 793.31 Dynamic Characterization software measures a wide variety of performance parameters for components, including spring rate (storage stiffness), damping (C), transmissibility, and hysteretic energy.

Mixed mode testing can be specified where the mean level is held at a force that could represent the weight of an engine or vehicle, and the dynamic amplitude can be controlled to a displacement or acceleration amplitude that simulates the vibration input.

With MTS Model 793.31 Dynamic Characterization software, simultaneous, multiaxial tests are easily specified. You can use the process to measure the real world behavior of components over a wide range of test conditions.

Advanced Dynamic Characterization – Model 793.32

MTS also offers Model 793.32 software for Advanced Dynamic Characterization work. This software is designed to characterize properties of materials and components excited with either sine on sine or pulse waveforms.

Using sine on sine wave shapes, Model 793.32 Advanced Dynamic Characterization software performs characterizations as a function of fundamental mean level, fundamental and harmonic frequency, and fundamental and harmonic amplitude.

Using a pulse wave shape, it performs characterizations as functions of fundamental base level, fundamental and pulse frequency and pulse amplitude.

Advanced Dynamic Characterization software provides dynamic control of a single channel containing a force transducer (load cell) and a linear variable displacement transducer (LVDT). It also provides limited control of additional static channels, including temperature control and monitor channels.

For More Information

Contact your local MTS field sales engineer for more information. Or, write, fax or call MTS at the address below. Visit our web site at www.mts.com. Send e-mail inquiries to: info@mts.com