MTS High-Force Bushings Test System

Rubber bushings are a key component in a railway bogie assembly for damping axial, radial, torsional and conical loads. Furthermore, they assist in evaluating performance accurately, including dynamic characterization, static deflection, resonant search, tearing energy, and durability. With a history in elastomer testing market, MTS offers a range of systems from uniaxial to multiaxial, with numerous key benefits:

- Automatic compensation of load frame deflections
- Automatic correction of dynamic errors in all transducers and conditioning signals
- Model 505 HPUs with integrated noise isolation, meaning no air ventilation is required and they can be positioned directly beside the test system
- MTS FlexTest controller which sets the testing standard in automobile industry.
- Powerful Multi-Purpose Testware software for specialized test creation and automation
- Compensation algorithms
- Amplitude phase control
- Amplitude iterative control
- Other compensators available on controller include:
  - Null pacing
  - Peak valley compensation
  - Peak valley phase
  - Arbitrary end-level control
- Sophisticated MTS Elastomer Software designed specifically for elastomer testing and analysis
- RPC software can be added to the controller for enhanced durability testing
- Installation, introduction, and training by experienced MTS engineers
- First year warranty included in system price
- SSP contract (software support plan) included in price for 1st year
- Elastomer user groups held regionally every 1 to 2 years

SYSTEM SPECIFICATION

- Frequency range: 0.01-200 Hz:
  - Less than 5% change in stiffness
  - Less than 0.5º phase shift
- Static force: +/-100 kN
- Displacement: +/-50 mm
- T-slot table for easy mounting of fixture
  - 584 mm x 596 mm
- Test space
  - Width between column: 609 mm
  - Maximum vertical test space with actuator at mid stroke: 914.4 mm.
  - Minimum vertical test space with actuator at mid stroke: 0 mm.
  - Overall height: 2,286 mm
ELASTOMER DYNAMIC CHARACTERIZATION SOFTWARE

- Up to four channels of synchronized simultaneous control
- Mixed mode control – dynamic control and mean level control programmed independently
- On-line compensation tools include:
  - Amplitude phase control (APC)
  - Outer loop iterative control (OLIC)
- User programmable digital I/O
- Some of the features of the analysis package include:
  - Dynamic stiffness vs. frequency graphs
  - Phase vs. frequency graphs
  - Report generation tools

OPTIONAL ELASTOMER SOFTWARE PACKAGES

- **Advanced dynamic characterization software**: Provides additional pulse or sine-on-sine excitation, used to simulate input onto tire.
- **Static deflection software**: Used to measure and calculate the static stiffness of an elastomer material or component.
- **Trend Monitoring**: Used in fatigue testing to determine functional failure of a component.
- **Elastomer quality control software**: Used to simplify pass or fail decisions and to integrate a system into a production line.
- **Resonant search and dwell software**: Used to find the resonant point in a material or component and determine its fatigue life at that point.
- **RPC time history play-out and acquisition**: Used as a drive file to simulate driving conditions for fatigue life testing.

Six Degree of Freedom (DOF) Test System

<table>
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<tr>
<th></th>
<th>Force (kN)</th>
<th>Displacement (+/- mm)</th>
<th>Velocity (m/s)</th>
<th>Moment (kN*m)</th>
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<td>2</td>
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MTS Systems Corporation

14000 Technology Drive
Eden Prairie, MN 55344-2290 USA

Telephone: 1-952-937-4000
Toll Free: 1-800-328-2255
Fax: 1-952-937-4515
E-mail: info@mts.com
www.mts.com

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