



AKRON RUBBER DEVELOPMENT LABORATORY, INC.

Dynamic Testing

Dynamic testing is performed on a vast array of rubber articles including belts, biomedical components, bridge bearing pads, dynamic seals, engine mounts, exhaust hangers, shock mounts, tires, vibration isolators, etc., to determine their response to cyclic stress/dynamic load.

ARDL has five servohydraulic load frames along with two Metravib electrodynamic testing machines that are capable of dynamic characterization of elastomeric parts as well as stroke and load control fatigue testing. In addition, three electrodynamic shaker tables can test loads up to 7,000 lbf and frequencies up to 2,000 Hz. ARDL's engineers can also develop customized test setups to better suit your individual needs.

MTS 831.20 Elastomer Test System

Applications

- Biomedical Components
- Bridge Bearing Pads
- Dynamic Seals
- Engine Mounts
- Exhaust Hangers
- Shock & Vibration Isolators
- Suspension Bushings
- And Many More...

Specifications

- Frequency: 0.01 Hz to 400 Hz
- Displacement: $\pm 1 \frac{3}{8}$ in.
- Load: $\pm 5,500$ lbs
- MTS Video Extensometer
- MTS LX500 Laser Extensometer
- Temperature Cycling Chamber: -54°C to $+200^{\circ}\text{C}$

Resonant Search

- Determines the Resonant Frequency of Rubber Components

Static Deflection

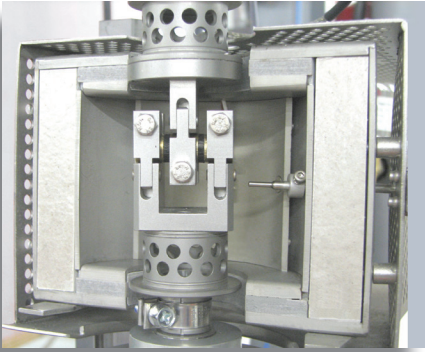
- Determines the Static Spring Rate of Rubber

Measurement Options

- Dynamic Characterization
- Determines the Material Properties of Rubber K^* , K' , K'' , $\tan \Delta$, E^* , E' , E'' , C
- Frequency and Strain Sweeps
- Sample Geometry
 - Dual-Lap Shear
 - Hollow Cylinder
 - Product/Parts
 - Quad-Lap Shear
 - Solid Box
 - Solid Cylinder
- Total Energy



Dynamic Testing (cont.)



Dual-Lap Shear Testing Using Metravib Electrodynamic Testing Machine

Metravib – DMA +150 – Electrodynamic Testing Machine

The Metravib Electrodynamic Testing Machine has the ability to generate quantitative dynamic property data for modelers and end-users and can duplicate the shear field experienced at the belt edge. ARDL can test to ASTM D 575, ASTM D5992, ASTM D5026, ISO 6721 and unique customer specifications.

Deformation (Excitation) Modes

- Tension
- Compression
- Shear
- Annular Pumping, Annular Shear, 3-Point Bending, Dual and Single Cantilever Bending

Major Capabilities

- Dynamic Property Measurements: E^* , E' , E'' , Loss Angle, $\tan \Delta$, G^* , G' , G'' , J^* , J' , J'' , Energy Recovered & Energy Dissipated
- Temperature Sweeps (-150°C to 450°C)
- Frequency Sweeps
- Strain Sweeps
- Creep
- Fatigue
- WLF Master Curves

Specifications

- Frequency Range = 0.001 Hz to 1,000 Hz
- Force Range = $\pm 150\text{N}$
- Displacement Range = $\pm 6\text{ mm}$

MTS 312.21 Dynamic Test Unit

The MTS 312.21 Dynamic Test Unit is a hydraulically actuated load frame with load tension and compression capabilities and has static/dynamic programmable cycles. This unit has the stroke capability for special and larger designs.

Capabilities

- Fatigue Testing
- Creep
- Durability Testing
- Specific/Custom Engineering Testing
- Temperature Cycling Chamber
- Tire Analysis (Static Spring Rate, Whole Tire Hysteresis and Tire Dynamic Mechanical Properties)

DMA

- Kinetic Tests
- Stabilized Temperature Tests
- Temperature Ramp Tests
- Specific Analysis
- Thermo-Mechanical Analysis (TMA)
- Transient Analysis

Applications

- Rubber, Plastic, Film and Fiber

Applications

- Engine Mounts
- Bridge Bearing Pads
- Shock and Vibration Isolators
- Rail Pads
- Special and Larger Design Applications