

ElectroForce® BioDynamic® Test Instruments

Characterization and Stimulation in a Physiological Environment

ElectroForce® BioDynamic® test instruments provide characterization, stimulation, and tissue growth solutions for biomaterials and biological specimens within a sterile cell culture media environment. The instruments can be used for the evaluation of a variety of specimens, including biomaterials, acellular and cell-seeded scaffolds, native tissue samples and tissue-engineered constructs. BioDynamic test instruments can simulate in vivo conditions and bridge the gap between basic in vitro exploratory studies in culture dishes and in vivo animal experiments. BioDynamic test instruments provide specimen loading and media circulation control under customizable, programmable conditions. Each test chamber is packaged with its own closed media flow loop system to minimize contamination.

Compact Design Fits in an Incubator

The system is available in a single-axis (tension/compression) or dual-axis (tension/compression and pulsatile flow) configuration, with torsional options also available. The test chamber can be easily removed from the motor assembly to accommodate experimental setup, or to conduct experiments with multiple test chambers on a revolving basis.

The BioDynamic instrument is provided as a complete system with a media perfusion flow loop, load cell, displacement transducers, pressure transducers (if applicable), and a chamber stand for use in a sterile flow hood. It is available as a 200 N maximum force system, and can be packaged for a variety of tissue applications.



ElectroForce® BioDynamic® test instrument for dynamic compression, tension, and perfusion flow



BioDynamic chamber for mechanical stimulation and characterization of samples in a physiologically-relevant environment

Multiple Applications

Orthopaedic Research

Dynamic tissue and biomaterial characterization and stimulation can be done under tension/compression and perfusion flow loading regimes. Tensile grips and porous and non-porous platens used for compression can be used within the same chamber. Tissues that have been tested include bone, cartilage, meniscus, spinal disc, ligament and tendon, as well as engineered biomaterials. A fully integrated digital video extensometer can be added to the system for primary, secondary and shear strain measurements.

Vascular Applications

Accurate pulsatile loading (with programmable stroke volume and frequency) and tension/compression to tubular specimens such as native arteries and veins, vascular grafts, and tissue-engineered blood vessels can be done. Pulsatile waveforms can be created, and creep and elasticity can be studied by using the laser micrometer to measure diametric changes in samples due to pulsatile flow and pressure. Chemical sensors to measure pH and oxygen are also available.

Designed to Fit Your Research Needs

ElectroForce® BioDynamic® test instruments are integrated systems that combine ElectroForce linear motors with environmental technologies and fully-automated computer control and software. Proprietary ElectroForce motors provide exceptional fidelity because of their simple and durable moving-magnet design.



ElectroForce® BioDynamic® instrument with an off-axis pulse can replicate a variety of waveforms

BioDynamic® Configurations

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Biomaterials and Tissue Testing Options

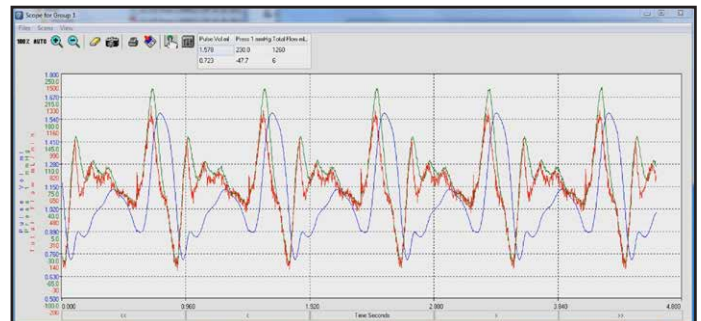
BioDynamic chambers are compatible with other ElectroForce instruments such as the TestBench and ElectroForce 3200 for experiments with less critical temperature requirements. Planar biaxial configurations are available for dynamic testing of tissues and strain measurement in a saline bath.

Control and Measurement

The BioDynamic test instrument is controlled by a PC using PCI digital controls and WinTest® software. WinTest software is an intuitive control system for performing complex test routines with minimal training.

When the instrument is integrated with optional Dynamic Mechanical Analysis (DMA) software from TA ElectroForce, tissue viscoelastic properties can be determined for comparison and correlation under a variety of dynamic conditions.

Measurement transducers are provided for each active control channel, including pressure sensors, axial load and displacement measurement.



WinTest® software running a custom heart wave form