Multi-specimen BioDynamic® Test Instruments

Characterization and Stimulation of Multiple Specimens

ElectroForce® multi-specimen BioDynamic® test instruments provide a new standard of performance for characterization and stimulation of multiple biological specimens within a cell culture media environment. Multi-specimen BioDynamic test configurations can be used for a variety of tissues and biomaterials, and allow independent programmability or the same stimulation program for statistical characterization of multiple specimens.

The ability to perform multi-specimen characterization and stimulation in the same environment is a significant advancement over traditional systems. With multi-mover capabilities for tension/compression loading and dynamic (pulsatile) flow stimulation, BioDynamic instruments from TA ElectroForce open up new research possibilities for advanced tissue engineering and biomaterials research.

200 N Multi-chamber ElectroForce® BioDynamic® Test Instrument for Orthopaedic Specimens

Multi-Chamber Pulsatile Loading for Vascular Specimens

Advanced Capabilities in a Compact Package

- Versatile chambers adaptable to blood vessels, cardiac muscle, bone, cartilage, meniscus, spinal discs, ligaments, tendons, and skin.
- Multi-chamber system for statistical analysis:
  - 4 chamber frame with independent media loops
  - Controlled loading of all samples to measure statistical variability.
- Displacement, load and pressure measurements for characterization of mechanical properties.
- Mechanical stimulation capabilities:
  - Dynamic (pulsatile) perfusion flow control
  - Tension/compression loading.
- Chambers and flow loops compatible for use in cell culture incubators.
- Real-time monitoring and imaging capabilities.

TA ElectroForce®

Multi-specimen BioDynamic® Test Instrument Specifications

Applications:			
	Cardiovascular and Endovascular	Blood vessels	Tubular specimens are mounted with hose barb-style fittings and secured with cable ties/sutures.
	Orthopaedic	Cartilage and bone	Disc-shaped samples are placed between porous (40 µm and 100 µm pore size) or nonporous platens.
		Ligament and tendon	Sheet or rod-like specimens are secured with clamp-style grips.
Chambers:			
	Chamber Features	Each chamber includes easy-to-assemble components and transparent viewports. Sterilizable by autoclaving (steam sterilization) or ethylene oxide (ETO) Chamber stand for mounting specimens in flow hood when chamber is not attached to the test frame Complete flow loop with mean flow pump, media reservoir, tubing and fittings	
	Chamber Ports	12 ports available for flow paths and sensing/monitoring: - 2 ports for lumen perfusion - 2 ports for external loop perfusion - 2 ports for media sampling - 2 ports for chamber filling/draining - 4 ports for monitoring	
Multi-chamber Configurations for Shared Loading:			
	Four (4) Chambers per Frame	200 N (45 lb) for 4 specimens	± 6.35 mm displacement
	Cardiovascular and Endovascular	Pulsatile	4 chambers: 1 motor
		Axial/Pulsatile	4 chambers: 2 motors
	Orthopaedic	Axial (tension/compression)	4 chambers: 1 motor
		Axial/Dynamic Flow (perfusion)	4 chambers: 2 motors
	Specimen Setup	Four (4) specimens can be simultaneously characterized and stimulated in one test frame. Load rating is shared among specimens, and displacement is the same for all 4 specimens. The nutrient environment around the samples and through the porous platens (for bone/cartilage samples) or lumens of vascular grafts can be either shared or independent.	
	Dynamic Volume/Pressure (pulsatile loading)	200 N (45 lb) motor: 6.0 mL/pulse and 0 to 500 mmHg differential per sample	
	Mean Flow Loop	17 mL/min to 1700 mL/min high flow drive .36 mL/min to 36 mL/min low flow drive; extra low flow available Four (4) pump heads and four (4) media reservoirs, tubing and fittings	
	Sensors	Each motor includes a displacement transducer. Each chamber includes a load cell, and each vascular chamber includes a pressure transducer.	
Additional Features:			
	Optional Sensors and Monitoring	Laser micrometer for vascular distension Video strain measurement for axial strain Cell culture media pH, temperature, dissolved oxygen, lactate and glucose Custom fittings for catheters and other endoscopic devices	
	Incubator	Customer-supplied incubator for chamber and flow loop placement Consult TA ElectroForce on incubator requirements	

Specifications are subject to change

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