



FLEXCELL INTERNATIONAL CORPORATION

Biotechnology Products for Cellular Biomechanics

Flexcell® FX-5000™ Compression System Specifications and Sole Source Statement

The purpose of the following information is to provide you with data describing our Flexcell® FX-5000™ Compression System. This system is composed of scientific instrumentation designed to provide a mechanically active environment for the purpose of cell culture and tissue engineering research. This specialized equipment incorporates proprietary technology and is protected by both United States and International patents. Flexcell® International Corporation is the sole source for this equipment.

Flexcell® FX-5000™ Compression System Specifications

FX-5000™ COMPRESSION SYSTEM FEATURES

- Uses air pressure to deform a flexible-bottom culture plate yielding up to 14 pounds of applied force to a tissue or 3D cell culture sample
- Minimum force resolution capability is 0.1 lb force
- Applies a defined, controlled, static, or cyclic deformation to growing cells *in vitro*
- Housed valving mechanism automatically regulates and maintains pressure to provide the specified compression regimen
- Capable of driving up to 4 independent FlexLink® remote compression and/or strain controllers
- Capable of delivering frequency ranges from 0.01 → 5 Hz
- Works with BioPress™ series culture plates
- Able to program multiple frequency, amplitude, and wave changes in one regimen
- Waveforms available: Static wave, sinusoidal wave, heart wave (electronic and pressure), triangular wave, square wave, and custom waveforms
- Optional: StagePresser™ device allows compression application to cells while viewing in real time under an upright microscope

FX-5000™ COMPRESSION COMPONENTS AND SPECIFICATIONS

- Dell OptiPlex Desktop Computer
- USB Keyboard
- USB Mouse
- 19" Flat panel Monitor
- FlexSoft® FX-5000™ V1.0 (Flexcell® FX-5000™ Software), Microsoft Windows 7
- FX5K™ Compression FlexLink® controller
- Accessory Pack - nuts, ferrules
- Flexcell® positive pressure baseplate, gaskets, clamping system and Plexiglas® baseplate bottom support
- Inlet and outlet tubing
- Flexcell® FX-5000™ Compression System User's manual, Culture Plate & Loading Stations™ manual and other ancillary manuals for computer and monitor
- Surge protected power outlet strip
- Pop-off valve/Pressure gauge assembly

FX-5000™ COMPRESSION COMPUTER SPECIFICATIONS

- Dell OptiPlex Small Form Factor
- Intel Core i5 processor (3.2 GHz)
- 500 GB SATA 6.0 Gb/s hard drive
- DVD +/- RW Drive
- 4 GB of DDR3 RAM
- Integrated video, Intel® HD4600

Operating System:

- Microsoft Windows 7 Professional

FX5K™ COMPRESSION FLEXLINK® COMPONENT SPECIFICATIONS

- Custom design positive pressure controller board
 - Microprocessor sampling rate for display data transducer: 200 Hz
 - Microprocessor sampling rate for feedback/error (valve adjustment) transducer: 1 KHz
- 2 proportional-solenoid valves
- Ethernet port (RJ45)

FX5K™ COMPRESSION FLEXLINK® CALIBRATION SPECIFICATIONS

Static Performance:

Maximum allowable waveform variance from static line: +/- 0.15 lbs

Maximum force error (actual vs. programmed): +/-0.35 lbs

Maximum allowable transducer inaccuracy: +/-2.0 kPa

Dynamic Performance:

Maximum force error (actual vs. programmed): +/-0.35 lbs, at the following

Frequencies: ≤ 10 lbs, 0.5 and 1.0 Hz; $10 < x \leq 14$ lbs, 0.5 Hz

Maximum allowable transducer inaccuracy: +/-2.0 kPa

FX-5000™ COMPRESSION PHYSICAL SPECIFICATIONS

<i>FX-5000™ Computer:</i>	Size, W x H x D:	3.65" x 12.45" x 13.40" (9.3 x 31.6 x 34.0 cm)
	Power Requirements:	115/230V – 8.8/4.3A or 4.3/2.2A – 60/50 Hz
	Weight (unit only):	15.0 lbs (6.8 kg)
<i>FX5K™ Compression FlexLink®:</i>	Size, W x H x D:	10.5" x 7.0" x 18.5" (26.7 x 17.8 x 46.9 cm)
	Power Requirements:	115/230V – 6/3A – 60/50 Hz
	Weight (unit only):	22.15 lbs (10.06 kg)
<i>Monitor 19"LCD Flat Panel:</i>	Size, W x H x D:	19.67" x 16.20" x 7.09" (49.97 x 41.14 x 18 cm)
	Power Requirements:	100 to 240 VAC / 50 or 60 Hz \pm 3Hz / 1.2 A (Max)
	Weight (unit only):	9.4 lbs (4.3 kg)

FX-5000™ COMPRESSION - COMPRESSED AIR REQUIREMENTS

To achieve the maximum system capability, the recommended compressed air requirements are:

- The pressure source must be able to produce 12 PSI (83 kPa) of pressure at 0.9 cfm (25.5L/min).
- If a house pressure system is being used and there are no means to test the flow rate capabilities, run the house pressure system with the FX-5000™ to determine if it is able to maintain 12-15 PSI (83-104kPa) consistently while the FlexLink® is running a regimen. If it is able to maintain 12-15 PSI (83-104kPa) while the FX-5000™ is running then your house pressure source is sufficient.
- The following is an example of specifications for a floor compressor pump that can supply enough pressure to run the FX-5000™. The pressure versus flow curve for this pump shows that it can achieve the necessary 12 PSI (83 kPa) of pressure at 0.9 cfm (25.5L/min). Contact the manufacturer for the specifications of the floor compressor pump to determine if it will meet the necessary requirements.
 - Maximum Pressure: 60 PSI (414 kPa)
 - Maximum Free Airflow Rate: 1.1 cfm (31 L/min)