THE NEW ENDOLAB SPINE SIMULATOR

8 Station Spinal Disc Test System

Total Disc Wear Testing

The replacement of lumbar and cervical spinal discs with artificial devices has become a successful surgical procedure over recent years. During the development and regulatory approval processes of such replacements, the implants need to be characterized regarding their mechanical characteristics and long-term durability. Wear testing is one fundamental aspect to evaluate the implants performance. Such tests have to incorporate realistic load and motion profiles, and they should generate clinically relevant wear appearance, including particles morphology.
Driving for standardized testing, international normative institutions are developing standards that define the fundamental aspects of total disc wear testing.

Basic features include:

- Six wear stations plus two load-soak stations
- Four-degrees-of-freedom load/motion application
- Angular movements and load applied with high accuracy
- Specimen mounting in the configuration intended for clinical use
- Controlled environment simulating physiological conditions
- Separate profiles for lumbar and cervical disc replacements
- Adaptable input profiles

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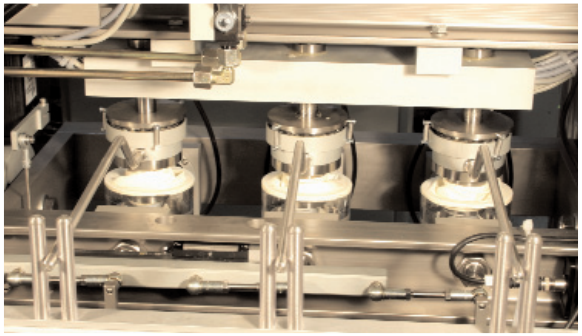
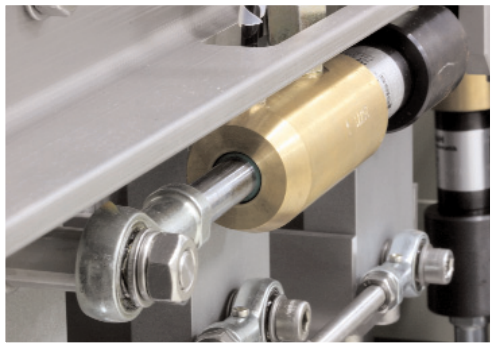
Technical Excellence Improving Your Orthopedic Devices





EndoLab Spine Simulator

EndoLab has used modified hip wear simulators since 2001 to test spinal disc implants. The new EndoLab Spine Simulator reflects this experience and is specifically designed for total discs, while maintaining the hip simulator configuration option. It also takes the specific requirements into account that are being established by standard bodies.

The simulator bases upon a rigid frame that is mounted on lockable casters. Hydraulic and mechanical components are laid out ergonomically, easy accessible, and require minimal maintenance. Two plexiglas covers protect the interior as well as the operator. An attached manual control panel houses all basic features and allows quick and safe set-up of the system. Connected to a PC, more detailed control and data acquisition functions are available.

Simulator Layout

The EndoLab Spine Simulator allows for simultaneous testing of up to six specimens plus two load-soak reference samples. All testing chambers are comfortably accessible and easily maintained. They are corrosion resistant, so that the specimens can be submersed in physiological testing fluid and kept at 37°C. Four degrees-of-freedom (three rotations and axial force) are applied on each station. Each channel is independently controlled to accurately follow the input signals. The wear stations are mechanically coupled in their angular motions to follow the input profiles exactly. The axial load is actively controlled for one station; the others are hydraulically combined and thus experience the same loading profiles. Not all stations have to be occupied at the same time, any number from one to six (plus two load soak) stations can be active.

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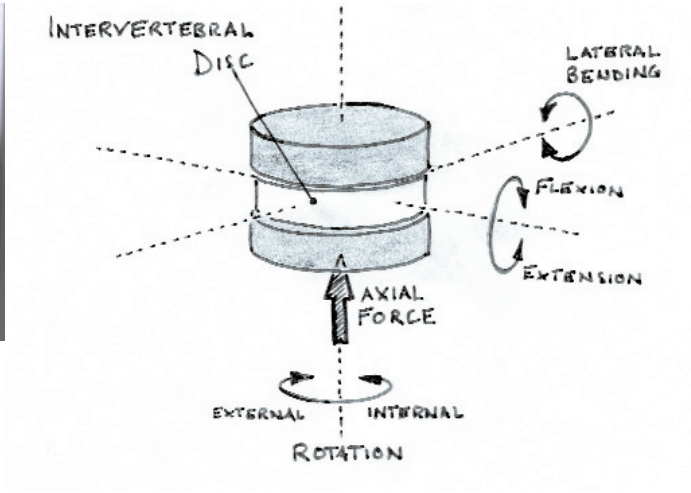
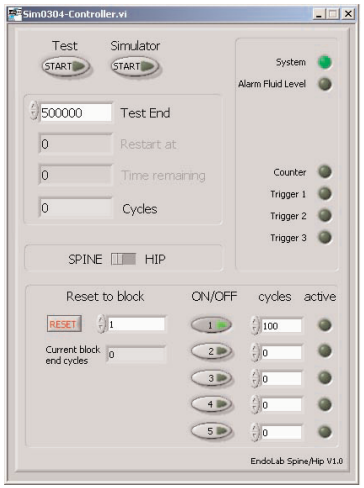
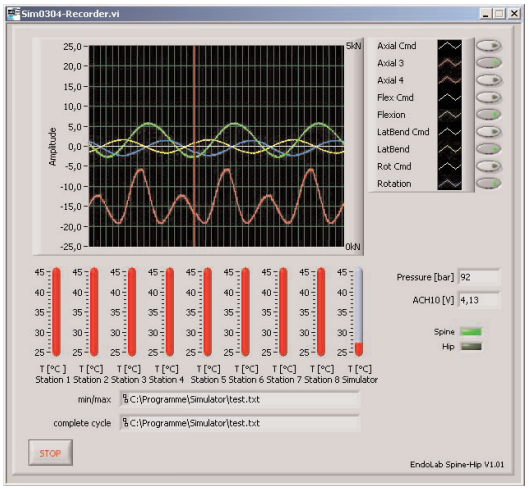
Functionality Without Compromise







Machine parameters at a glance:

Number of stations ..... 6 wear / 2 load-soak
Flexion / Extension ..... 30°/25°
Lateral Bending..... 20°/15°
Rotation..... 9°/9°
Axial Load..... 5kN
Actuation..... Hydraulic cylinders
Weight..... 400kg
Pressure Requirements..... 150bar (2176psi), 3L/min
Overall dimensions..... 130x65x170cm (width*depth*height)
Test Chamber..... 150ml, corrosion resistant, fluid level sensor
Temperature Control..... Independent chamber heating control

Set-Up

The EndoLab Spine Simulator is set-up using the machine mounted manual control panel. Running in set-up control mode, the system pressure is low, so that the actuators can be positioned safely. Other basic functions, like temperature control, are also accessible through the manual control board, enabling the quick and safe set-up of the test stations.
Detailed test programming and control can be performed through a connected PC. The Spine Simulator test software has a concise user interface with easy access to all functions. Custom test profiles can be generated using conventional programs such as Microsoft Excel. They can then be uploaded directly into the controller hardware of the simulator. The software also provides test supervision and data acquisition features.

Safety

Various features ensure the safety of the operating technician. Interrupt switches on the cover doors stop the tests if doors are opened. While doors are open, the system can only be run in low pressure mode. Fluid sensors pause the test if a critical level is reached.

The EndoLab Spine Simulator is an easy to use, safe, and reliable wear test system. It permits the assessment of long-term performance of lumbar and cervical disc replacements. Thanks to its flexibility, it can incorporate the testing of many different implant designs, materials, and input scenarios. The machine robustness, paired with EndoLab's reliable service and support, guarantees optimal equipment utilization and result outcome for many years.

ENDOLAB MECHANICAL ENGINEERING GMBH

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