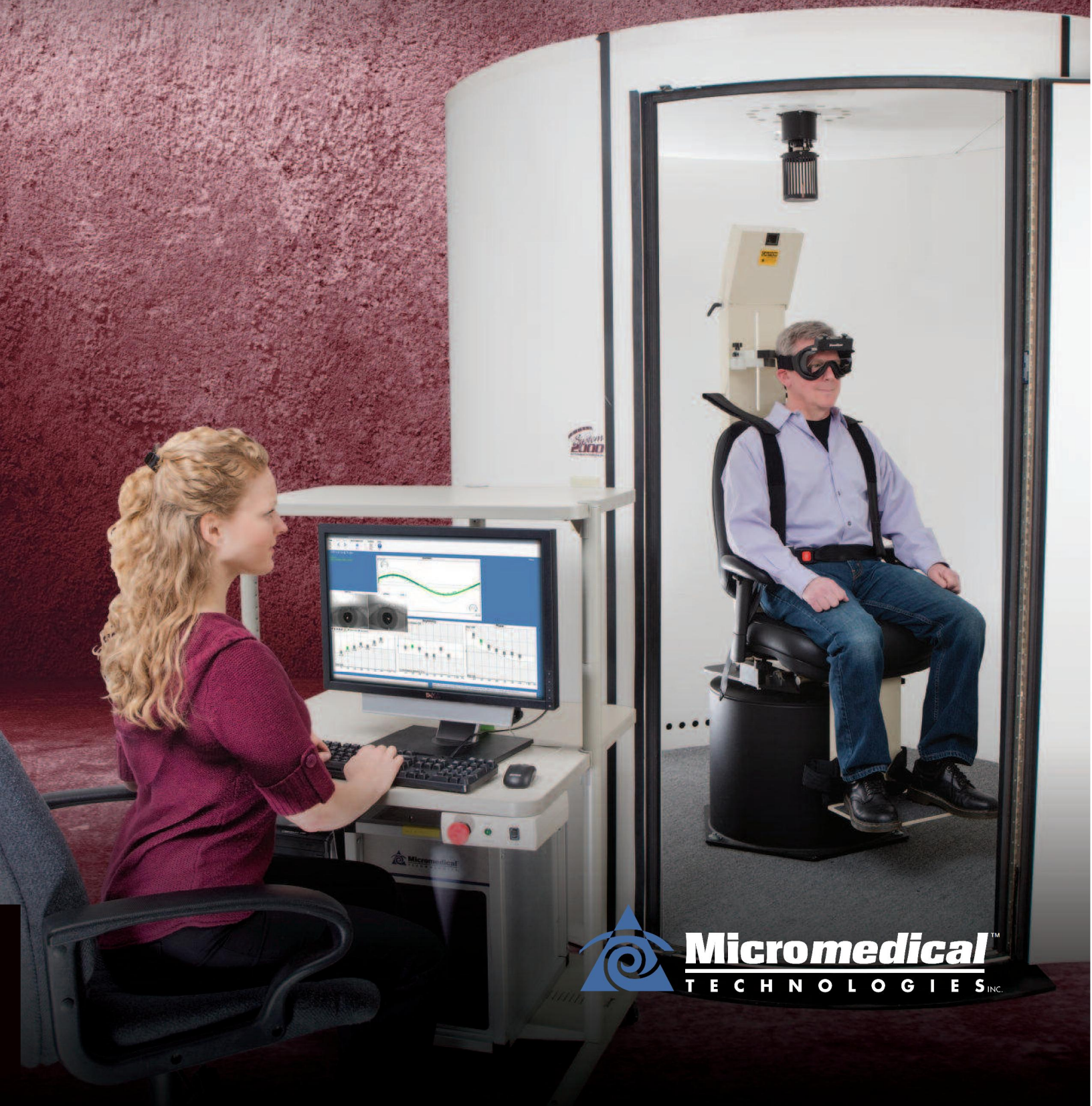


# System 2000™

Auto Traverse Rotational Vestibular Chair



**Micromedical**™  
TECHNOLOGIES INC.

# Providing Insight

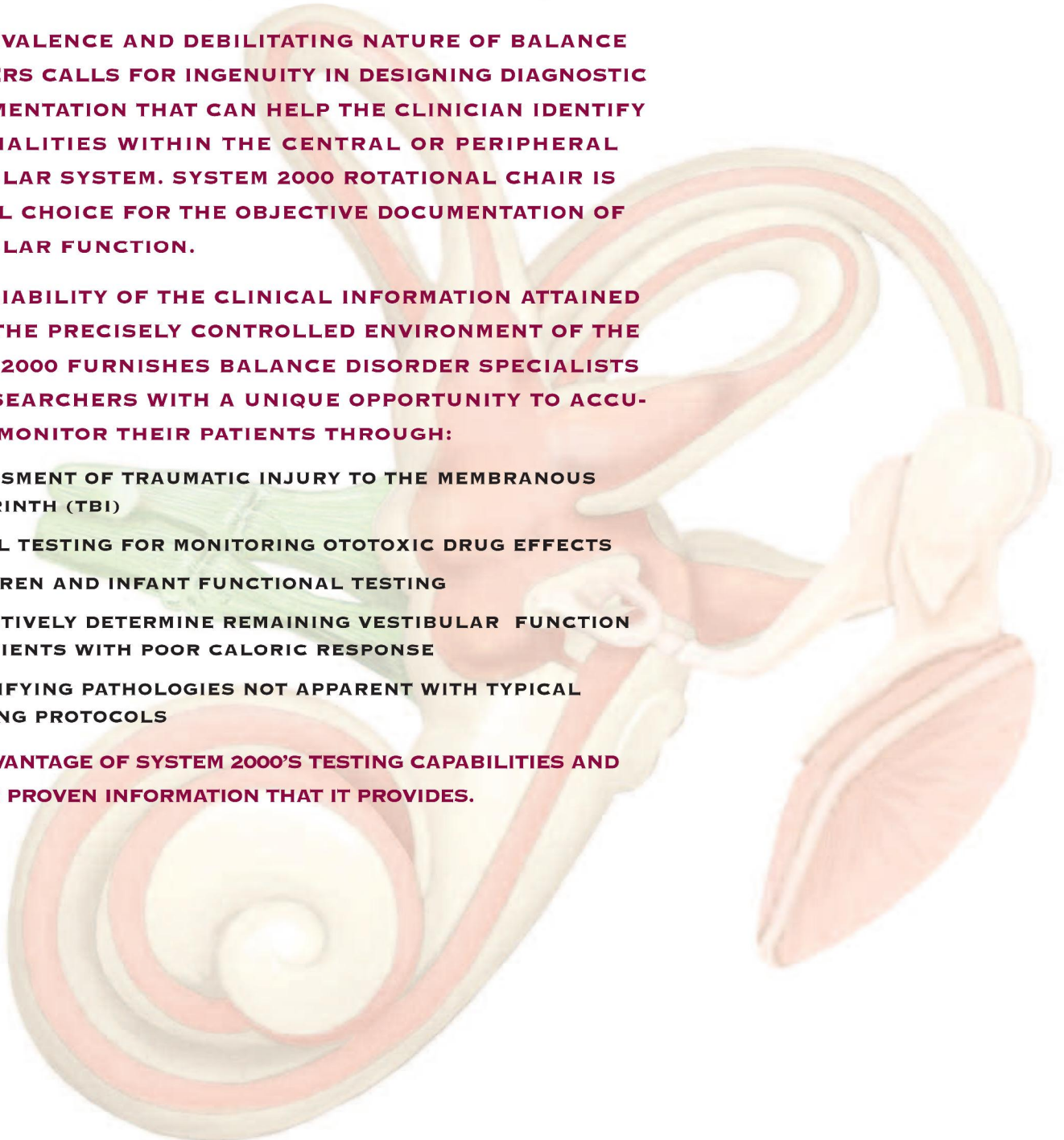
into the Complexity of the Balance System.

THE PREVALENCE AND DEBILITATING NATURE OF BALANCE DISORDERS CALLS FOR INGENUITY IN DESIGNING DIAGNOSTIC INSTRUMENTATION THAT CAN HELP THE CLINICIAN IDENTIFY ABNORMALITIES WITHIN THE CENTRAL OR PERIPHERAL VESTIBULAR SYSTEM. SYSTEM 2000 ROTATIONAL CHAIR IS AN IDEAL CHOICE FOR THE OBJECTIVE DOCUMENTATION OF VESTIBULAR FUNCTION.

THE RELIABILITY OF THE CLINICAL INFORMATION ATTAINED UNDER THE PRECISELY CONTROLLED ENVIRONMENT OF THE SYSTEM 2000 FURNISHES BALANCE DISORDER SPECIALISTS AND RESEARCHERS WITH A UNIQUE OPPORTUNITY TO ACCURATELY MONITOR THEIR PATIENTS THROUGH:

- ASSESSMENT OF TRAUMATIC INJURY TO THE MEMBRANOUS LABYRINTH (TBI)
- SERIAL TESTING FOR MONITORING OTOTOXIC DRUG EFFECTS
- CHILDREN AND INFANT FUNCTIONAL TESTING
- OBJECTIVELY DETERMINE REMAINING VESTIBULAR FUNCTION IN PATIENTS WITH POOR CALORIC RESPONSE
- IDENTIFYING PATHOLOGIES NOT APPARENT WITH TYPICAL VNG/ENG PROTOCOLS

TAKE ADVANTAGE OF SYSTEM 2000'S TESTING CAPABILITIES AND THE TIME PROVEN INFORMATION THAT IT PROVIDES.



# System 2000<sup>TM</sup>

## Auto Traverse Rotational Vestibular Chair

*Rotational Chair testing provides versatility in measuring the Vestibular-ocular Reflex (VOR). The System 2000 Rotational Chair is engineered to deliver precisely controlled stimuli and superior waveform detail while utilizing either Firewire infrared video recording or electrodes to discriminate the extent and progress of peripheral and central vestibular disorders.*



The innovative design of the binocular goggles incorporates a comfortable light tight fit when the cover is on while allowing a full field of view when the cover is removed. The goggles utilize high speed Firewire cameras to better capture minute eye movement details.

The turnkey system includes – the chair, controller, enclosure, ceiling mounted Optokinetic drum and XY axis laser projector. A child seat is optional for pediatric testing. System 2000 is capable of testing patients weighing up to 400 pounds while testing ocular motor and VOR function from 0.01Hz to 0.64 Hz and step velocities up to 350 deg/sec.





*Programming and analysis presentation are the nucleus of the System 2000. Rotational chair testing utilizing Spectrum Software aids in the identification of vestibular problems not apparent with typical VNG/ENG testing protocols.*

## STANDARD TESTING MODALITIES

After an initial test for spontaneous nystagmus, the following tests are available measuring gain, phase and symmetry:

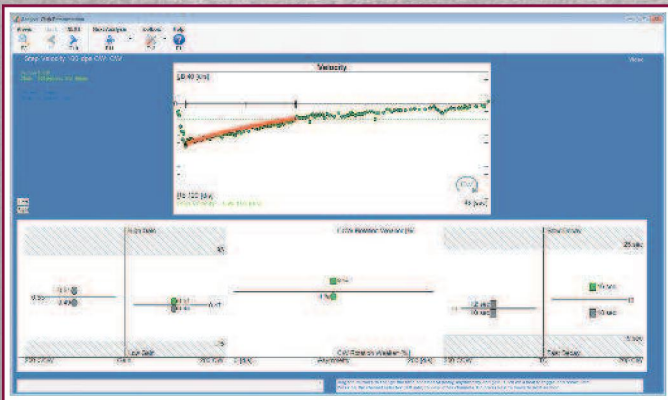
### SINUSOIDAL HARMONIC ACCELERATION (SHA) TESTS

**VESTIBULAR-OCULAR REFLEX (VOR)** 0.01 Hz to 0.64 Hz

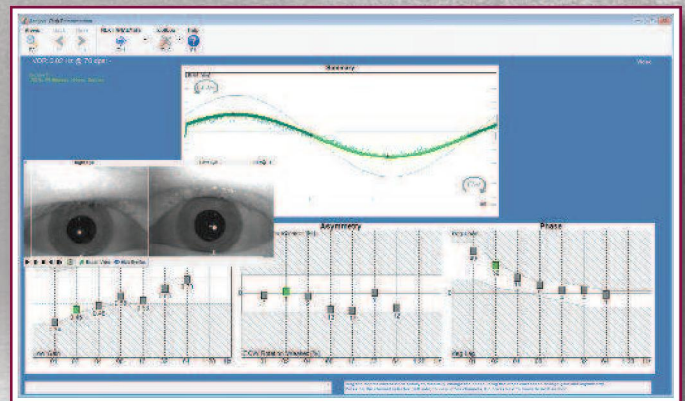
**VISUAL ENHANCED VOR (VVOR)** – utilizes stationary Optokinetic stripes to enhance the VOR

**VISUAL FIXATION OF VOR (VFX)** – the laser projects a dot on the wall of the enclosure that rotates with the patient

**VELOCITY STEP TEST** – measures the VOR time constant, gain and symmetry



*Velocity Step Test showing normal gain, time constant and symmetry at clockwise 100 degrees per second.*



### VOR ANALYSIS

Slow phase eye velocities of sinusoidal tests are automatically overlaid with a "best fit curve". For reference, test results are also shown on the VOR gain, symmetry and phase graphs. High and low threshold boundaries are indicated by the shaded regions. Eye Max eye movement videos can be reviewed as well.

### OCULAR-MOTOR TESTS

**OPTOKINETIC AFTER NYSTAGMUS (OKAN)** – measures Optokinetic velocity storage

**OPTOKINETIC (OKN)** – full field stripes or planetarium style dots

**PURSUIT TRACKING** – laser projector produces target at 0.05 to 0.5 Hz up to 50 deg/sec

**SACCADE** – fixed or random timing and amplitude in X and Y

# TRACKING EYE MOVEMENT FOR MEDICINE

*Human postural control relies on the motion and gravity sensing ability of the vestibular system, and the spinal reflexes to balance the body over the relatively small base of support provided by the feet. When the integrity of the sensory information to the central nervous system is compromised or the CNS itself is compromised, the ability to stay balanced is reduced. System 2000 Auto-Traverse Rotational Chair provides assessment of the otolith function through measuring the perception of tilt in the Subjective Visual Vertical Test (SVV)*

## AUTO-TRAVERSE MICRO-CENTRIFUGE

A computer controlled stepper motor drives programmable lateral movement of the chair up to +/- 7 centimeters during an eccentric otolith test. In a typical test, the chair is directed to spin up on center to a velocity of 300 deg/sec until any nystagmus response from the horizontal semicircular canal has diminished. The chair migrates off-axis at a rate of 1 cm/sec to its designated end point.

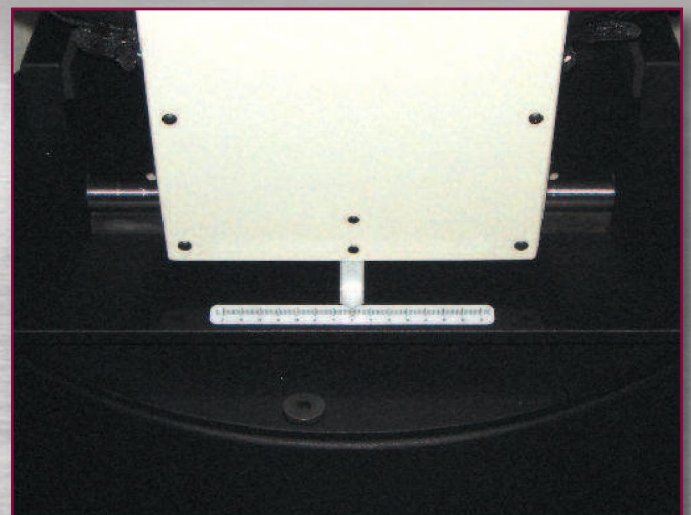


## AUTO-TRAVERSE INDICATOR

The indicator gauge at the base of the chair frame shows the lateral offset of the chair as the software moves the chair to the desired set point.

## DYNAMIC SUBJECTIVE VISUAL VERTICAL (DSVV)

When rotating a patient off-axis, outward centripetal acceleration continuously stimulates the patients lateral otolith organ (utricle) producing a tilt sensation (normally toward the center of rotation). To record this perception of tilt (SVV), the patient uses an RF remote to adjust a projected laser line in increments of 0.1 degrees to their perceived vertical. Impaired otolith function may result in an asymmetric static and/or dynamic perceived vertical.





## To Preserve and Improve Balance

### THE SYSTEM 2000 IS ALSO AVAILABLE IN THE FOLLOWING CONFIGURATIONS:

#### COMPREHENSIVE

With enclosure, ceiling mounted Optokinetic drum and XY axis laser projector.

#### RECLINING

A combination of our precisely controlled rotational chair, a seat that reclines and our VisualEyes VNG creates the ultimate in clinical efficiency.

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ISO 13485:2003  
FM 90233

### ALSO AVAILABLE FROM MICROMEDICAL

- VisualEyes VNG
- EOG – Electrode Capability
- Air Fx air caloric irrigator
- Aqua Stim water caloric irrigator
- Vorteq – Active Head Rotation Testing
- DVAT – Dynamic Visual Acuity Test
- Pupillometry
- Consensual Light Reflex (CLR)
- VHIT Video Head Impulse Test

### CUSTOMER CARE

MICROMEDICAL'S KNOWLEDGEABLE STAFF IS DEDICATED TO ASSISTING YOU AND MAXIMIZING YOUR INVESTMENT BY:

- Providing on-site installation and training using local representatives
- Providing technical, operational and interpretation assistance from Micromedical's experienced support staff
- Sponsoring continuing education courses
- Including a one year hardware warranty
- Including one year of free software updates

### QUALITY AND REGULATORY STANDARDS

All equipment is designed and manufactured under our ISO 13485 certified quality management system to meet U.S. FDA; Canadian; European and International Standards.

- CMDCAS
- ANSI S3.45-2009
- Medical Device Directive (MDD) to comply with EC Directive 93/42



**Micromedical**<sup>™</sup>  
TECHNOLOGIES INC.

10 KEMP DRIVE • CHATHAM, ILLINOIS 62629 • 800.334.4154 U.S. AND CANADA  
217.483.2122 OUTSIDE U.S. 217.483.4533 FAX • WWW.MICROMEDICAL.COM