



Innovative SSM Technology

A complete mechanical testing lab in one compact system.....

Stress-Strain Microprobe® (SSM) System

The SSM system, using the Automated Ball Indentation (ABI) technique, is the only system that performs localized and nondestructive tests to measure actual key mechanical properties of metallic structures or very small samples. No other system exists worldwide that can measure the gradient in the stress-strain curves of welds and their heat affected-zones, including pipeline welds and spotwelds in the automotive industry. It eliminates the need to cut components and specimens.

Award Winning Technology

In 1996 *R&D Magazine* selected the SSM technology for an R&D 100 Award as one of the most technologically significant products of the year.

Key Mechanical Properties from ABI

- Yield strength
- True-stress/true-plastic-strain curve
- Strain-hardening exponent (n)
- Strength coefficient (k)
- Uniform ductility
- Ultimate strength
- Haggag Toughness Method (HTM) fracture toughness values of ferritic steels
- Reference temperature and fracture toughness master curve of ferritic steels in the transition temperature region

SSM-B4000™ System Options

The turnkey benchtop SSM system has a 4000-lb (17.80 kN) load capacity.

It is also a computer-controlled universal test machine for destructive testing.

Options include:

- Motorized X-Y table including a video camera with support, and a black/white monitor or a video-capture card and software;
- Cool/heat chamber including a temperature controller and a low/high temperature accessory kit.

The SSM system ships with both the nondestructive ABI and destructive Tensile software programs. For even greater versatility, you can upgrade your SSM-Suite™ software package with optional modules including:

- Indentation-Creep™
- Indentation-Stress-Relaxation™,
- Destructive fracture toughness (ASTM E1820),
- Fiber push-out,

All of the modules are written with National Instruments' LabView® graphical language, so running programs or learning new applications is easy.



Model SSM-B4000 shown with optional equipment

During an ABI test, progressive indentation is made in a single polished test location. The indentation load and depth data are continuously measured and used to calculate the incremental strain and stress values based on elasticity and plasticity theories.

U.S. Patent No. 4,852,397



Innovative SSM Technology

A complete mechanical testing lab in one compact system.....

Stress-Strain Microprobe® (SSM) System SSM-M1000™

The miniature, lightweight model performs ambient temperature testing on metallic structures and components in the field. The system is powered using a small, lightweight, and easily transportable battery pack.

The Lightweight, Powerful, and Portable System delivers up to 4.5 kN (1000 lbs) indentation force. A 12V DC powered electric magnet is used to mount the testing head on the component and provides the magnetic pull force needed to counter the indentation force. The SSM-M1000 is fully computer-controlled using a notebook computer and our SSM-Suite™ software.

Complete on-site commissioning and training are included in the purchase price of the SSM-M1000 system. And every system is backed by a 1-year warranty against manufacturers' defects for parts and labor.

SSM-M1000™ Turnkey System Specifications

- DC-electric magnet base for in-situ testing on ferritic steel components and
- Bench-top base for performing ABI testing on samples and specimens and for performing conventional destructive miniature tensile and fracture toughness tests
- Test Head Dimensions (without magnet base):
 - Height 631 mm (25 inches)
 - Width 178 mm (7 in)
 - Weight 11.4 kg (25 lbs)
- SSM-Suite Software Modules: ABI and Tensile
- Electronics cabinet, notebook computer, and all cables
- Equipment cases - 2 portable cases
 - Weight 154 kg (70 lbs) each case

Nondestructive Applications

- § Compare key mechanical properties of Weld, Heat-Affected Zone (HAZ), and Base Metal;
- § Production Line - test components in minutes without destroying parts and delaying shipments waiting for destructive tensile or fracture toughness test results;
- § Pipelines - test pipelines and new welds or weld repairs in the field; verify pipeline transmission capacity;
- § Detect weaknesses before failure Pressure Vessels (petro-chemical, nuclear, high-pressure gas cylinders);
- § Automotivee - verify rolled steel characteristics before stamping process;
- § Test spot welds nondestructively;
- § Validation - Quickly and easily validate manufacturers' materials certificates;
- § Accurate and complete heat treatment verification



Get ahead of your competition:

**UPGRADE YOUR LAB TODAY
with a state-of-the-art
Stress-Strain Microprobe® System**

Call: 1.865.483.5756

E-mail: sales@atc-ssm.com