



**Industrial
Measurement
Systems Inc.**
www.imsysinc.com

ETEK 3000 Measurement System



E3000 Computer Module & Control Software

This module consists of a personal computer, keyboard, mouse, and monitor. Software includes Microsoft Operating system, Microsoft Office Suite, instrument drivers for ultrasonic system, analog to digital conversion and temperature control. The **ETEK 3000** graphical user interface is used to control all measurement, display, and analysis functions.

E3000 Test Station

This module is comprised of all the mechanical hardware needed to make the ultrasonic measurements at ambient, cold (requires dry ice) and elevated temperatures. This station has the superstructure for holding samples and for applying as well as monitoring the coupling pressure. Additional hardware includes the heater, coupling force monitor, eight ultrasonic transducers. For the **ETEK 3000**, the ultrasonic instrumentation, high speed A/D, transducer switching circuits and temperature controller are located in the enclosure immediately behind the superstructure.

Optional Components

Option 1: Saw and Cutting Fixtures

This option is used to aid in preparing samples for ETEK analysis. Fixtures have been designed primarily for friction materials but can be used for other materials with transversely isotropic symmetry. The fixtures can be used to produce rectangular pieces and the special 45-degree cuts



needed for analysis. The resultant samples are compatible with the ETEK 3000 sample heater used for elevated temperature measurements. The user must provide additional tools such as a band saw to remove the friction material from the steel backing and belt sander to make samples flat and parallel. Dust collection system must be supplied by the user. For those users that wish to formulate their own sample preparation procedures mechanical drawings of the cutting fixtures can be supplied at no charge.

Option 2: Enhanced Analysis Tools:

This option includes both a software modification which can be used to record velocity as a function of coupling pressure as well as an Excel analysis package. This combination allows the user to compute complete matrix of elastic data over the full range of load and temperature using a minimum number of load and temperature measurements. The numerical data is available in the form of an Excel spreadsheet and includes Young's Modulus, Shear Modulus and Poisson's ratio as well as a complete set of Elastic Constants as a function of temperature (20°C to 300°C) and pressure (<0.5 MPa to 5.0 MPa).

Option 3: High Frequency Operation:

This option includes hardware and software enhancement for higher frequency operation including A/D rate to 100 MHz and sensors up to 10 MHz. This Option is desirable for measuring plastics, ceramics or metals. Four additional ultrasonic sensors, 2 longitudinal wave and 2 shear wave sensors are supplied with this Option along with additional fixtures for elevated temperature measurements.

Other Options include:

Option 4: Low Temperature (-20 C) Capability

Additional test fixtures, control software, and analysis procedures to extend the operating temperature to -20 degrees Centigrade. This option requires dry ice for cooling (~ 300 grams/trial). The system will be configured to measure elastic properties continuously from -20°C to 320°C.

Additional Special Options available on request

- Special fixtures and transducers for production testing of as-manufactured friction materials
- Software & hardware for extended elevated temperature operation beyond 325°C Centigrade.