



## The James V-Meter Mark II

**The most advanced ultra-sonic test system for accurately identifying basic characteristics of coarse grained materials.**

### **Features and Benefits**

- Direct digital read-out of transit time.
- Flaw detection.
- Simple calibration; no special bar required.
- Built-in wave form display on LCD.
- Portable, light weight with battery and A-C power.
- Conforms to ASTM C-597, BS 1881-203 and other international standards.

### **Optional: Hand-Held Terminal**

- RS-232 output for uploading to computer.
- Direct reading of calculated P-wave velocity and S-wave velocity.
- Direct reading of calculated modulus of elasticity.
- Direct reading of Poissons ratio.

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## Applications

### Concrete

The V-Meter is widely used and accepted for quality control and inspection of concrete. It can measure and correlate concrete strength to standard strength measurement, permitting non-destructive testing of complete structures. It will identify honey-combs, voids, frozen concrete, cracks and other non-homo-genous conditions in concrete.

Ultrasonic testing can be applied to new and old structures, slabs, columns, walls, fire damaged areas, hydroelectric structures, pipe, prefab and prestressed beams, cylinders and other concrete forms. A wide range of transducers are available.

### Wood

V-Meter Mark II, ultrasonic testing of wood can, non-destructively, detect knots, shakes, delamination, checks, splits, grain orientation, windfall cracks and presence of decay and rot. Basic parameters such as modulus of elasticity and density can be calculated.

Practical applications include field testing of utility poles and structures, grading in the manufacturing process, fire ladder inspection, examination of laminates and paper roll density.

The velocity of ultrasonic energy pulses travelling in a solid material are related to the density and elastic properties of the material. The pulse velocity is thus a measure of density and elastic properties of the material.

In transmitting ultrasonic energy through a coarse grained material such as concrete, ceramics or wood, it is necessary for the wave length of energy to be greater than the diameter of the largest grain particle. If it is not, all of the energy will be reflected back by the particles and none will reach the receiver.

Typically, the 54 KHZ transducers are used for concrete testing – the signal wave length is about 3 inches (75mm). Finer materials require higher frequencies for optimum resolution.

The basic V-Meter Mark II contains a transmitter, a receiver and a very accurate high speed electronic clock. The transmitter generates an electrical pulse which when applied to a transmitting transducer, converts the electrical energy into a pulse of ultrasonic mechanical vibration. This vibration is coupled with the specimen under test by placing the transducer in contact with the specimen. At another selected point on the specimen another receiving transducer is coupled by mechanical contact. Each transmitted pulse of energy registers on the high speed clock. The first energy wave reaching the receiving transducer is converted back to an electrical signal and turns off the clock. The elapsed time is displayed on the LCD in 0.1 microsecond increments.

## Technical

The large LCD display has a graphic display of the waveform in the lower half of the LCD with the option for displaying the envelope of the received signal or expanded front end of the signal.

The optional hand-held terminal is an external input device; it facilitates input of:

- Distance between transducers.
- English or Metric Units.
- Density differences.
- Moisture correction.
- Selection of P or S wave transducers.

**Enabling the following to be done automatically:**

- Calculation of ultrasonic pulse velocity
- Calculation of Poissons Ratio
- Calculation of modulus of elasticity

Finally, the hand-held terminal with RS-232 adaptor enables stored data to be uploaded to a P.C.



**Indirect method: measuring the depth of crack in concrete.**



**Semi-direct method of checking concrete for flaws.**

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## Technical Specifications



**Direct method used in detecting decay and rot in wood ...**

## Model Numbers

- V-C-7902** V-METER MARK II, basic instrument, CRO attachment, 12 foot cables and application manual (*less transducers*).
- V-C-7901** V-METER MARK II, system for general use, including: C-7902 basic V-Meter Mark II, and two (2) C-4898 54 KHz transducers.
- V-C-4860** Hand Held Terminal
- V-C-4940** Re-amplifier.

## Specifications

- Frequency range:** 24-500 KHz, based on transducers selected.
- Receiver sensitivity:** 250 micro volts, between 30 KHz and 100 KHz.
- Receiver input impedance:** approximately 2 M OHMS.
- Transit time measurement:** 0.1 to 6400 microseconds, direct digital display.
- Measurement accuracy:** + 0.1 microseconds.
- Transmitter output:** pulse 1000/500V, 2 microseconds.
- Transmitter pulse rep rate:** selectable 1,3 or 10.
- Power supply:** Internal rechargeable NI-CAD batteries, 9 hours portable operation.
- Line input:** 115/230 volts 50/60 Hz.
- Weight:** 2.7 KG (6 lbs.) with battery.
- Dimensions:** 190 x 100 x 220MM (7.5" x 4" x 8").
- Ambient temperature range:** 0-40 degrees C.
- Cathode ray oscilloscope output:** permits external display of received signal for analysis.
- Display:** 240 x 64 LCD, graphic dot matrix.
- Storage capacity:** 1 K byte.
- Data transfer:** RS 232 C. Built in software uploads to IBM PC

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