The James M-Meters

Measures the developing strength of maturing concrete (ASTM C-1074 & C-918)

The JAMES M-METER, using modern micro-processor technology, applies the proven relationship of time and temperature to concrete strength for monitoring poured concrete at the site. This improves safety, ensures quality and reduces cost.

Features and Benefits

- **Premature form stripping in cold weather can be avoided. Excessive summer heat exposure is controlled. Loading, prestressing or post tensioning as well as lifting and/or form removal can be done safely.**
- **Large difference in concrete strength caused by variations in temperature during curing, can be eliminated and uniformity of concrete strength achieved. Maturing concrete strength can be monitored continuously, and documented.**
- **Optimum scheduling of form removal, prestressing, post tensioning and highway loading achieved. Artificial heating or cooling minimized. Rework due to concrete not being cured to specified strength reduced. Costly cylinder testing reduced.**

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M-3056 maturity system connected to a field printer

Theory

The maturity method is a technique for predicting strength based on the temperature history of the concrete. Strength increases as cement hydrates. The extent of the cement hydration depends on how long the concrete has cured and at what temperature. Maturity is a measure of how far the hydration has progressed.

There are two established maturity equations, and both equations conform to ASTM C-1074.

The equation, developed by Arrhenius is used in the James M-3056 meter. The Arrhenius equation is more suitable when the temperature is outside the range given above and the maturity number is expressed as the equivalent age in hours referred to 20 C. The Arrhenius equation also recognizes that cement types vary with different energy activation levels. The mathematics of the Arrhenius equation is more complex but it gives more accurate strength predictions over a variety of cement types.

System

The James M-Meters are microprocessor based multi-channel instruments that measure the actual temperature of the maturing concrete with a disposable sensor inserted into the freshly placed concrete. Lapsed time is measured internally and integrated with the temperature reading to express the "maturity number" on the M-Meter display panel.

The maturity number is calculated every six minutes automatically (i.e. 10 "readings" per hour) and when the instrument is read the latest maturity number from each of the six channels is displayed in sequence. One reading per hour (i.e. every tenth reading) is stored in the nonvolatile memory. This reading consisting of maturity number, temperature, elapsed time in hours from the sensor connection and sensor identification. This information is available for later transfer to hard copy by a printer that can be attached to the M-Meter.

Generally the sensors are inserted at the most critical points subject to the most temperature extremes. Using the multi-channel M-Meter, the sensor showing the lowest maturity number indicates the area containing the least matured concrete.

Specifications

M-M-3056

System Accuracy	±2% of maturity number
Max Maturity Number	15000
Power Source	Rechargeable 6V Battery
Battery Life -	20 days at +20˚C continuous operation
Activation Energy Level	22000 to 56000 J/Mol. in increments of 2000
Operating Temperature Range	O˚C to 55˚C
Instrument Case Size	8.5 x 7.75 x 7 inches
Instrument Weight	7 lbs.

M-M-3009 Sensor

10 K Ohm NTC Thermister with 10 ft. of 18 GA STP-1 lamp cord

Temperature Range:	-10˚C to 80˚C
Accuracy:	±0.2%

M-M-3010 Printer

Type Impact Dot Matrix - 6 x 8
Power Source - Rechargeable Battery

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