



# HUMBOLDT

## H-3185 Freeze-Thaw Cabinet

### Rapid, Freeze-Thaw Cabinet—

The Rapid Freeze-Thaw Cabinet is used to measure the resistance of concrete to deterioration caused by repeated cycles of freezing and thawing in water. The system is designed to test up to eighteen 3" x 4" x 16" (76 x 102 x 406cm) concrete specimens simultaneously, with one being a control. Key features of system include:

- Fully automatic operation frees operator to perform other lab duties.
- Allows users to establish field control using correlations between concrete strength and durability
- Permits the evaluation of variables in concrete properties and conditioning.
- Useful in the evaluation of the durability of aggregates, as well as the properties of admixtures.

Up to eight freeze-thaw cycles are possible within a 24-hour period. But the exact number of cycles is dependent upon the time required for the temperature at the center of the control prism to from 40 to 0°F (4.4 to -17.8°C) and then back to 40°F (4.4°C). The temperature at the center of the control specimen is cycled by means of a 3/4 HP (0.6KW) refrigeration unit and electric resistance heaters with fully automatic controls. An electric temperature recorder with 24-hour, 7-day week chart is incorporated into the unit to accurately maintain a record of the control specimen temperature throughout the testing period. For corrosion resistance and long service life, the system features a stainless steel, 84" x 34" x 11" (213 x 86 x 30cm) cabinet construction with 3" (76mm) insulation on all sides. The internal test compartment measures 6" x 26" x 74" (15 x 66 x 188cm). A 30-amp circuit is required for operation. Meets ASTM C666, procedure A; and AASHTO T161, procedure A.



### Rapid, Freeze-Thaw Cabinet— H-3185B

#### Rapid, Freeze-Thaw Cabinet, 220V 50/60Hz— H-3185B.4F

The H-3185B uses on/off control of heating and cooling devices to cycle between two temperatures. It can be set to cycle continuously between two temperatures for a finite number of cycles and then stop. When set to run for a finite number of cycles, ramp rate between temperature extremes can be adjusted, as well as soak duration at each extreme.

- Set temperature min/max for cycles
- Select number of cycles
- LCD temperature display
- Analog temperature vs. time graph

### Rapid, Freeze-Thaw Cabinet— H-3185SD

#### Rapid, Freeze-Thaw Cabinet, 220V 50/60Hz— H-3185SD.4F

The H-3185SD goes beyond the basic capabilities of the B model above and provides the following capabilities:

- User-created test capabilities are possible, to change freeze time, temperature minimum, temperature maximum and the number of cycles to run.
- Real-time, on-screen testing with graphing, allowing different data views to be chosen.
- Test data can be reviewed after a test is completed, which includes tabulation and graph views.
- Touch-screen interface for easy navigation.
- Export test data to a PC using Humboldt IR Download. This includes report creation for internal or customer usage.
- Connect to the Freeze-Thaw Cabinet remotely for control and/or observation.



H-3185B

H-3185SD



# H-3185 Freeze-Thaw Cabinet



## E-Meter for Flexural Resonance of Concrete— H-3176

The E-Meter can determine flexural resonance of concrete under accelerated freezing and thawing cycles and aggressive environments, conforming to ASTM C-215 and C-666. It determines the resonant frequencies of the three modes of vibration and is the only method of calculating the following material parameters non destructively: such as Youngs Modulus of Elasticity, Modulus of Rigidity, Poissons Ratio and Damping Constant. Frequencies are automatically scanned in one of four ranges. It can handle specimen sizes up to 6 inches (150mm) in cross section and from 1.75 inches (45mm) to 28 inches (700mm) in length. A semi-automatic feature facilitates the fast identification of resonance.

Oscillator frequency range: 10 Hz to 100 kHz in 4 switched range

Frequency indicator display: 6 digit LED

Gate times: 1 sec. or 10 sec. switch selected, LED indicated

Accuracy: 20 ppm + 1 count over full operating temperature range



## Sonometer (ASTM C215, C666)— H-3175

The Sonometer determines changes in resonant frequency of concrete specimens subjected to alternate cycles of freezing and thawing with the Humboldt Freeze-Thaw Cabinet. This apparatus closely follows design parameters set up over 40 years ago by the Portland Cement Association research laboratories. The original PCA design has been modified by changing to solid state circuitry and addition of a built-in cathode ray oscilloscope. No other resonant frequency system includes an oscilloscope despite being strongly recommended in ASTM C215 paragraph 4.2. Other systems offer an oscilloscope connection. The oscilloscope confirms that peak reading on meter is actual resonance and not a harmonic.

Resonant frequency can be determined by watching the voltmeter reach its highest point. The oscilloscope verifies resonance because the meter alone also reaches high points on harmonics. When resonance occurs, the actual number is digitally displayed on the frequency counter.

The H-3175 Sonometer is the only system using a phono-type cartridge as a pickup. All other units use accelerometers, which require intimate contact with the test specimen. Changing accelerometer positions on the test specimen is time consuming. With the pickup and driver mounted on portable stands, it is not necessary to use a test bench, which is mandatory on other apparatus. This allows for greater flexibility in testing.



## Freeze-Thaw Specimen Mold— H-3195

For 3 x 4 x 16" (76 x 102 x 406mm) specimens exposed to rapidly repeated freeze-thaw cycles in water or air. Mold is cold-rolled steel with detachable base plate. Meets ASTM C233, C666; AASHTO T157, T161.



## Stainless Steel Sample Positioning Tray— H-3185T

## Stainless Steel Sample Positioning Tray with spout— H-3185TS

## Replacement Heating Element, Specify 115 or 230V— H-3185SH

## Chart Paper for Recording Thermometer— Call, specify model

## Pen Replacement Kit, (2) per kit— Call, specify model



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