

Information Sheet
The Preservation Environment Monitor
June 2006



IPI's **Preservation Environment Monitor® (PEM)** is a battery-powered temperature and relative humidity measuring device for monitoring storage and display conditions in cultural institutions.

Why buy a PEM for \$650 when you can buy a datalogger for \$150?

- **Specialization**

The PEM is the only datalogger designed specifically for cultural institutions – museums, libraries and archives. It was field-tested in hundreds of institutions AND is highly recommended by 94% of users.

- **Accuracy**

The PEM uses highly accurate temperature and humidity sensors and comes with a NIST-traceable certificate of calibration. The accuracy of the temperature sensor is $\pm .5^{\circ}\text{C}$ (1°F) across the entire operating range. The humidity sensor accuracy is $\pm 2\%$ in the 10% to 80% range, and $\pm 5\%$ from 0 to 10% or above 80% RH.

- **Metrics**

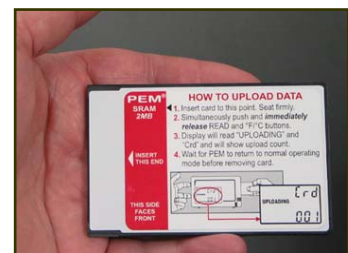
The PEM provides a real-time display of two values that represent the decay rate of organic materials stored in the monitored location. These values, the *preservation index* (PI) and the *time-weighted preservation index* (TWPI), show how temperature and humidity combine to influence organic decay in collections. The decay rate is directly related to visible deterioration, such as paper discoloration, dye fading, plastic deterioration, and textile embrittlement. These scientifically grounded measurements of the preservation quality of the storage environment provide the basis for better collection care decisions and improved communication between collection care, facilities, and administrative staff.

- **Display**

The PEM displays temperature (in Fahrenheit or Celsius) and RH alternately with PI and TWPI values on a 15-second cycle. This allows you to immediately assess the overall quality of storage conditions in a given space with respect to the natural-aging rate of organic materials stored there. The TWPI display is a powerful managerial and educational tool for collection care staff. The PEM also has a feature that allows you to visually scan conditions in the space for up to 90 previous days. The PEM display can be turned off, if desired, without interrupting data collection.

- **Download Speed and Options**

The PEM uploads stored data into a computer using a memory card (SRAM card) inserted into a slot on the side of the PEM. All data is copied to the card in less than 20 seconds. Each card can hold data from up to 16 PEMs. The card can be read by most Windows® laptop computers or by a desktop computer equipped with a card



reader accessory (available from IPI for \$375). The PEM's five-year data capacity forgives inattention and ensures that no data is lost.

- **Reliability**

Memory Capacity – Unlike other dataloggers, the PEM actually has two blocks of memory, or buffers, to store data. The 30-minute buffer contains data collected at 30-minute intervals and will hold about one year's worth of data. The four-hour buffer contains data collected at four-hour intervals and will hold about five years' worth of data. When you view the data you can choose which buffer you want to work with. In each case, PEM readings are averages of temperature and RH readings made every five minutes.

Recalibration – The PEM should be recalibrated when the main batteries are low (generally after three to four years of use). At this point IPI will recalibrate or replace the humidity sensor, replace all batteries, and reset the PEM clock. The cost for recalibration is \$125.

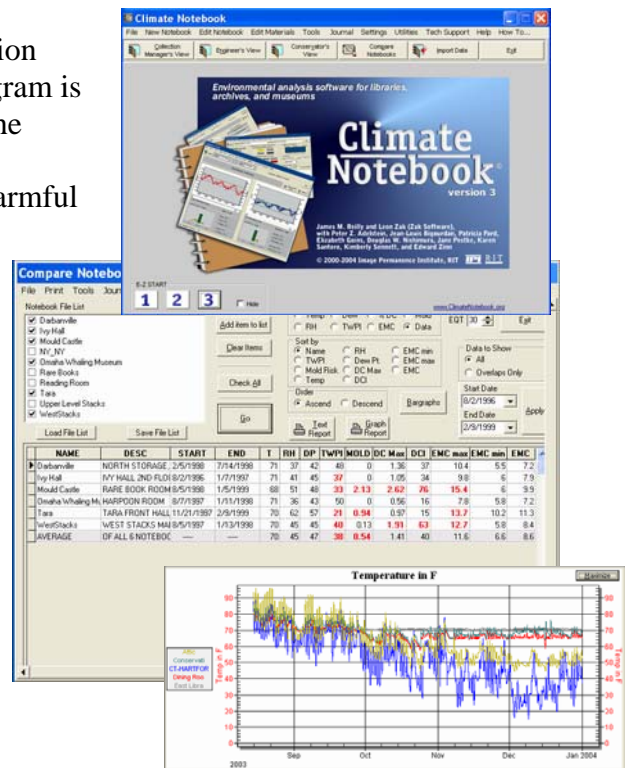
Battery Life – The batteries last between three and five years depending on the number of uploads done and how often the “History” mode is used. Most users won't need to replace the batteries for three to four years. The PEM uses 9-volt lithium or alkaline batteries. Three lithium batteries are usually sufficient although up to five may be installed. Users can easily change the batteries themselves. The PEM will continue to run normally during the battery replacement. As a backup, there is a 9-volt system battery in the PEM, which should not be changed by the user.

- **Data Organization and Analysis in Climate Notebook®**

Climate Notebook®, the companion software for the PEM is a highly sophisticated data organization and analysis tool for understanding and managing the environment.

Climate Notebook® (CNB) is Windows®-based companion software for the PEM (there is no Mac version). The program is designed specifically for cultural institutions to manage the preservation environment. CNB includes a wide range of analysis tools; graphing and reporting options; alerts to harmful environmental conditions; and metrics for understanding chemical, biological, and mechanical decay. CNB comes with a detailed workbook, an extensive help file, a database of details about the effect of the environment on materials found in most collections, and action steps for improvements to the storage environment. (CNB costs \$500 for one installation, \$125 for each additional site license.)

CNB natively supports data from the PEM, but can import data from a variety of devices and sources including ACR®, Spectrum®, Hobo®, Trak-R®, and Rotronic® datalogger data, as well as other sources like Microsoft® Excel files.



- **Support**

The PEM has a one-year warranty and will be replaced if found defective in manufacture during normal use. Technical support and advice is available from IPI at no cost as long as the PEM is in use. (Free lifetime support of Climate Notebook® is also provided.)

- **PEM Specifications**

General

Size: 6.5" x 4" x 1.75" (165 x 102 x 45 mm)

Weight: 1.2 lbs (500 g) with four batteries

Case material: ABS plastic

Operating limits: -40° F to 105° F (-40° C to 60° C)

Batteries: Four (4) 9-volt lithium, 1500 mAmp

Battery life: >5 years with four lithium batteries (as received from factory) in normal operation; less with frequent use of History mode or Read on Demand

PC card requirements

128 KB to 2 MB SRAM memory

Temperature Sensor

Type: Digital thermometer (Dallas DS1620)

Range: -67° F to 257° F (-55° C to 125° C)

Accuracy: +/- 1° F (.5° C) across entire operating range

Resolution: .1° F (.1° C)

Humidity Sensor

Type: Thin film polymer capacitive sensor (HyCal IH3605A)

Range: 0% RH to 100% RH (non-condensing)

Accuracy: +/- 2% RH in the 10% to 80% range

+/- 5% from 0 to 10% or above 80% RH

Memory

Holds one year of 30-minute readings as the average of six five-minute readings.

Holds an additional five years' worth of four-hour readings as the average of eight 30-minute readings.

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