

Environmental Monitoring Kits

ACR Datalogger
ELSEC 764 Environmental Monitor



ASSOCIATION OF
**MANITOBA
MUSEUMS**

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Introduction

The Association of Manitoba Museums Environmental Monitoring Kit contains an ELSEC 764 Environmental Monitor to take spot readings of temperature, relative humidity, visible light and ultraviolet emissions. The ACR Datalogger is also available for long-term monitoring of temperature and relative humidity. Both these instruments are available for loans to members of the AMM throughout the province. Insured round-trip shipping costs are the only costs to the borrower.

The recommended minimum monitoring period for the Datalogger kit is one month but loans up to six months can be accommodated, if the equipment has not been requested by another institution.

Why Monitor?

Appropriate levels of light, temperature and relative humidity reduce the deterioration rates of collections, while inappropriate ones increase it. This makes an appropriate and stable storage environment one of the most effective preventive conservation actions that can be taken, as it affects the largest number of artefacts with the minimum use of resources.

The conditions in some older buildings cannot easily be upgraded to the same standards as a modern purpose-built space. However, even areas with no environmental control can be improved. The first step is to monitor the existing conditions over a period of time and view the changes that occur.

What Do We Do With The Information?

Taking regular readings of light, temperature and relative humidity and then recording the information is the first step in beginning an environmental monitoring program. It is through interpreting and analysing the data that improvements can be made. Information can be compared over the course of a month, a season, the space of a year or even over several years.

The Association of Manitoba Museum's Environmental Monitoring Kit provides easy-to-use equipment to monitor the environment. In case of difficulty, the AMM's conservator is available to provide assistance.

The AMM can assist with interpretation of readings taken with the ELSEC 764 and will download and graph the data from the ACR Dataloggers.

What Are Appropriate Levels of Temperature and Relative Humidity?

Current recommended annual levels of temperature and relative humidity for collections can vary according to the type of collection; whether it's stored in boxes and drawers, or in an open space; and whether the museum is a seasonal one, unheated in winter.

It is recommended that museums aim for a steady setpoint for temperature and relative humidity, and that daily or weekly fluctuations be kept to a minimum. These setpoints can be different between summer and winter to allow for differences between dry, winter heat and humid summer air. However, fluctuations due to changing temperature or relative humidity should be avoided or minimized as they can cause more damage than slowly changing setpoints. It is important to keep relative humidity below 65% in summer and fall to prevent mould growth.

What Are Appropriate Levels of Ultraviolet and Visible Light?

Maximum 50 lux (5 foot-candles) For Extremely Sensitive Materials:

- Textiles, especially silk
- Watercolours, coloured prints, illuminated manuscripts, artwork on paper, parchment, felt pen drawings.
- Dyed leather
- Feathers
- Vegetable-dyed ethnographic material
- Lacquer

Maximum 150 lux (15 foot-candles) Sensitive Materials:

- Oil and tempera paintings, polychromes
- Undyed leather
- Horn
- Printed papers and books
- Documents
- All other organic materials not listed above (including wood).

Maximum 300 lux (30 foot-candles) Insensitive Materials:

- Metal
- Stone
- Ceramics and glass

RECOMMENDED ULTRAVIOLET LEVELS FOR DISPLAY AREAS

"Beyond the need to control the levels of visible light reaching museum objects, it is mandatory to eliminate as much as possible of the non-visible, ultraviolet radiation. It should always be remembered that the percentage of ultraviolet radiation in natural sunlight is greater than in fluorescent lighting. Incandescent lighting has virtually none. If the exhibition area is unfortunate enough to receive daylight, sensitive objects should not be placed in direct sunlight or strongly lit areas."

- C.C.I. Technical Bulletin #2, p.11

Maximum UV level: 75 mw/lumen for all display areas

The Kit and Its Equipment



The **Crawford Environmental Monitor 764** is an easy-to-use temperature and relative humidity data logger that also measures visible light (Lux) and ultraviolet light (UV).

To use, press the appropriate button (Temperature, Relative Humidity, Lux or UV) firmly and the reading is taken. If the Temperature and UV buttons are pressed together, all four readings are displayed simultaneously. The unit automatically turns off 10 seconds after the last reading unless a button is held down for over 5 seconds, which causes continuous measurements to be taken until another button is pressed. The current reading is displayed in large numbers while additional information such as maximum and minimum readings is shown in smaller characters at the bottom of the screen.

Walk around the area that you are taking readings in, pointing the unit sensor where you wish to measure, and note the reading. This information can be recorded in chart form, as per the following example:

LIGHT LEVELS	Temperature & RH	Light Levels in Lux	UV Levels
Tall Display Cabinet	22°C and 45% within cabinet;	500 Lux in front of cabinet; 200 Lux in shadow thrown over upper shelves by top of cabinet.	>50 μ W/Lumen.
Rare Book Room (Fluorescent Light)	20°C and 48%	160 - 340 Lux; 650 Lux on the shelf in front of one bookcase.	>50 μ W/Lumen.
Reading Room (Fluorescent Light with limited daylight)	24°C and 44%	500-1250 Lux depending on proximity to light source.	350 μ W/Lumen.



The **ACR SmartReader 2 Datalogger** is a small accurate device with a built-in temperature sensor and plug-in relative humidity sensor. It can be installed in one location such as a storage area for the entire loan period, or moved weekly. A record of its locations and time spent there must be kept. It may also be helpful to keep track of outdoor environmental conditions during the time that monitoring takes place.

Once the monitoring period is over, the logger can be returned to the AMM where the data will be downloaded and graphed using ACR's software.