M. C. Miller Co., Inc.
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Antimony Electrode
(Cat # 14700DS)

Operating Instructions

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Introduction

Since the electrode potential of antimony metal is a function of the pH of the soil (or solution) that the metal is contacting, a measure of the soil (or solution) pH level can be obtained by determining the potential difference (voltage) between an antimony electrode and a second electrode of known "fixed" electrode potential.

The scale on the antimony electrode allows the electrolyte (soil or solution) pH level to be assessed from the potential difference read between a copper/copper sulfate reference electrode (an electrode having a known potential) and an antimony electrode.

Test Configuration Set Up

The potential difference (voltage) between an antimony electrode and a copper/copper sulfate electrode is measured and the milli-volt reading (potential difference reading) recorded via an LC-4 voltmeter is compared to the pH value indicated on the etched scale on the side of the antimony electrode.

The copper/copper sulfate electrode (such as an RE-5 electrode) is connected to the positive side of the voltmeter and the antimony electrode is connected to the negative side of the voltmeter. This configuration will result in a positive reading. The LC-4 voltmeter range should be set on 2V and the input impedance setting should be 200MΩ. See the photograph below for the test configuration set up.

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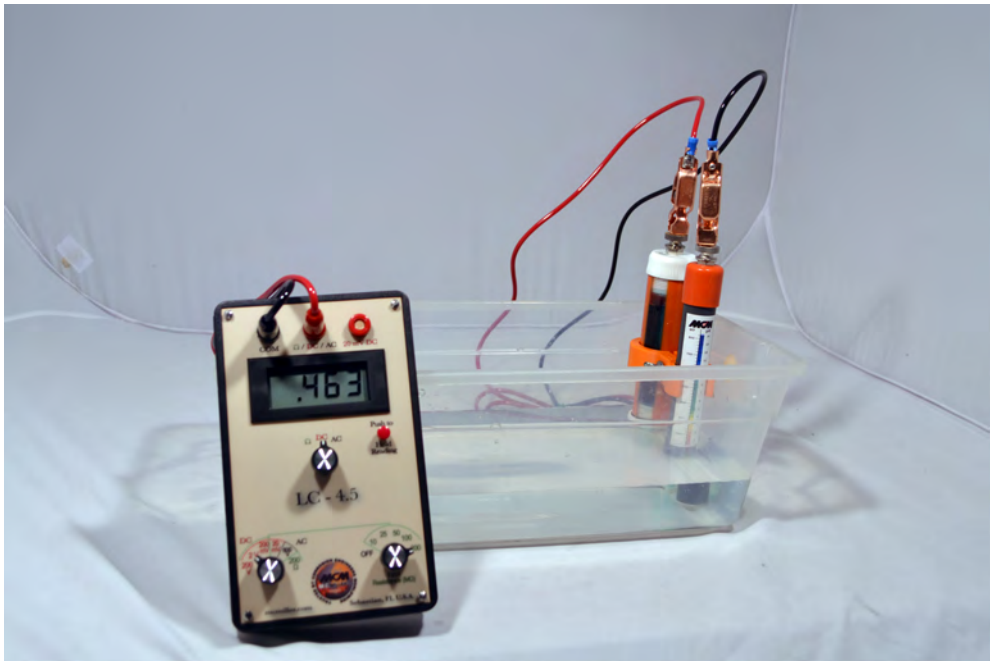
Example # 1: Tap Water Solution

As indicated in the photograph below, the voltage reading (on the LC-4) recorded with the electrode "tips" in tap water was 0.463 Volts, which is 463 mV. From the scale on the antimony electrode, the pH value of the tap water would be around 7.1 for a milli-volt potential difference reading of 463 mV. (Drinking water is quoted as having a pH value anywhere in the 7.5 to 8.0 range)



Example # 2: Dry Soil Sample

As indicated in the photograph below, the voltage reading was 0.383 Volts, which is 383 mV, with the electrode tips contacting dry soil. From the scale on the antimony electrode, the pH value of the dry soil would be approx. 5.4 for a milli-volt potential difference reading of 383 mV.

Note: It is important to select the 200 MΩ input impedance setting on the LC-4 for accurate dry soil readings, as the soil resistance is high in dry soils.

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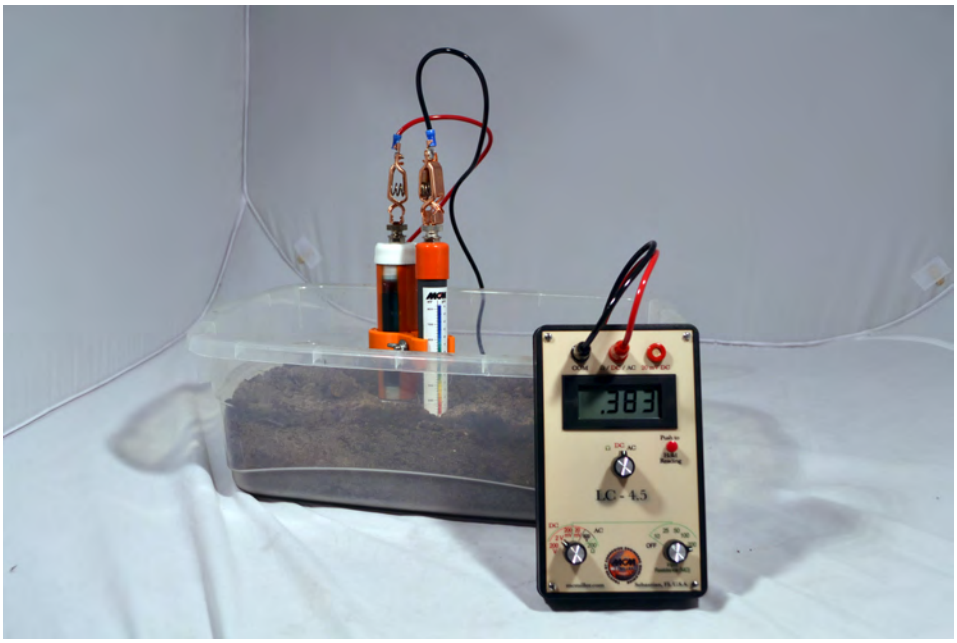

Example # 3: Wet Soil Sample
Note: Tap water was added to the above dry soil sample.
As indicated in the photograph below, the voltage reading was 0.441 Volts, which is 441 mV, in the case of the wet soil sample. From the scale on the antimony electrode, the pH value of the wet soil would be approx. 6.8 for a milli-volt potential difference reading of 441 mV.