# Chapter D

# Conductivity measured using a self contained Digital Meter

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## Principle

Conductivity is the ability of a given water sample to conduct electric current. The conductivity of the sample depends on the total concentration of ions and the temperature at which the measurement is made. The mobility of the dissolved ions and their actual and relative concentrations affect conductivity. (Standard Methods for the Examination of Water and Wastewater, 1975)

## Interferences

Error can result from obstructions in the cell, a dirty cell, sample contamination, not completely covering the electrode in the cell cup with solution, or a low battery.

## Scope

This method is applicable to drinking, surface, and ground waters, domestic and industrial wastes. 200 samples per day can be run in the 20 microsiemens to 20 millisiemens working range. Above this working range requires dilutions that take extra time, and reduce the number of samples to 50 per day.

## Apparatus

1. MYRON L Digital DS Meter, Model number DC4. This conductivity meter is calibrated to read microsiemens. It is automatically temperature compensated to $25^{o}$ C ($77^{o}$ F) for samples between $5^{o}$ to $71^{o}$ C ($41^{o}$ to $160^{o}$ F). The left three (lower) ranges display microsiems, the highest range displays millisiemens.
2. Dilution equipment such as disposable cups, pipettes, and deionized water

## Procedure

1. Rinse cell cup 3 times with sample to be tested. Sharply shake out each rinsing.
2. Fill the cell cup completely to the top with sample (15 ml)
3. Select the range with the switch and press the read button. Note: If a "1" appears to the left of the display it is indicating an over-range. Turn the range switch one position clockwise.
4. When finished with meter, rinse the cell cup with clean DI water.

### Calibration

Recommended conductivity solution; KCL- 18,000 µ S. Select 20mS/ppt range. Rinse and fill per above instructions. Adjust calibration controls as required. Discard used solution.

## Assignment of Uncertainty

### Table 1. Analytical performance summary for conductivity

[Reference materials are water samples with pv from Water Resources Division (USGS OPF 95-395, 99-259)]

| *Reference Description* | *n* | *Mean* | *s* | *pv* | *% RSD* | *% R* |
|---|---|---|---|---|---|---|
| M-150 major constituents | 30 | 137.6 | 0.69 | 137 | 0.503 | 99.5 |
| M-130 major constituents | 30 | 334.4 | 1.38 | 335 | 0.412 | 100.2 |
| M-134 major constituents | 30 | 614.9 | 0.61 | 615 | 0.099 | 100.0 |

## Bibliography


Farrar, Jerry W. and Chelboun, Kimberly M., 1999, Results of the U.S. Geological Survey's analytical evaluation program for standard reference samples distributed in March 1999. U.S. Geological Survey, Open File Report 99-259, p 22-27

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