

South Dakota State University
**Open PRAIRIE: Open Public Research Access Institutional
Repository and Information Exchange**

SDSU Extension Extra

SDSU Extension

7-1-2002

How to Measure Total Dissolved Solids (TDS) Using the HANNA Portable Conductivity Meter

Julie Walker

Dept. of Animal and Range Sciences, South Dakota State Univ., Brookings, julie.walker@sdstate.edu

Chuck Ullery

South Dakota State University

Follow this and additional works at: http://openprairie.sdstate.edu/extension_extra

Recommended Citation

Walker, Julie and Ullery, Chuck, "How to Measure Total Dissolved Solids (TDS) Using the HANNA Portable Conductivity Meter" (2002). *SDSU Extension Extra*. Paper 55.

http://openprairie.sdstate.edu/extension_extra/55

This Other is brought to you for free and open access by the SDSU Extension at Open PRAIRIE: Open Public Research Access Institutional Repository and Information Exchange. It has been accepted for inclusion in SDSU Extension Extra by an authorized administrator of Open PRAIRIE: Open Public Research Access Institutional Repository and Information Exchange. For more information, please contact michael.biondo@sdstate.edu.



Extension Extra

ExEx 2030
Animal
& Range
Sciences

COLLEGE OF AGRICULTURE & BIOLOGICAL SCIENCES / SOUTH DAKOTA STATE UNIVERSITY / USDA

How to Measure Total Dissolved Solids (TDS) Using the HANNA Portable Conductivity Meter

*Julie Walker, Extension area beef specialist,
and Chuck Ullery, Extension water and natural resources specialist*

The HANNA D4 portable conductivity meter allows you to quickly estimate the amount of total dissolved solids (TDS) present in a water sample.

To obtain valid measurements, you need to follow proper procedures in calibrating, rinsing, and measuring. Here is a step-by-step procedure for two HANNA D4 model meters, along with instructions for converting the meter reading of each meter to TDS (ppm). Depending on which meter you have, the actual meter reading will be different, but EC or TDS results are the same.

Calibrating the meter

1. Install the batteries.
2. Turn meter on to check that the batteries are working.
3. Obtain distilled water, low standard solution (0.01 N KCl, 1,400 ppm), and a high standard solution (0.10 N KCl, 12,900 ppm).
4. Allow all standards and samples to achieve room temperature (77 degrees Fahrenheit).
5. Check the statement on the back of the your meter to determine the model HANNA D4 meter you have, as some older units had a different calibration.
6. Calibration of the HANNA DIST WP 4 meter or HANNA DIST 4 meter [range 0.01-19.99 mS/cm (mmho/cm)]:
 - a. Place meter tip in an inch of distilled water. Meter should read 0.00. Solution only needs to cover the probes, and the probe should not rest on the bottom of the container.
 - b. Rinse meter tip and small container, then place meter tip in low standard solution (1,400 ppm). Meter should read 1.4. If meter reading differs, adjust calibration screw to give 1.4 reading.
 - c. Repeat calibration with high standard solution (12,900 ppm)/ Meter reading should be 12.9. If meter reading differs, adjust calibration screw to give 12.9 reading.
7. Calibration of the HANNA 4 meter (range 100/19900 μ S):
 - a. Place meter tip in an inch of distilled water. Meter should read 0.00. Solution only needs to cover the probes, and the probes should not rest on the bottom of the container.

- b. Rinse meter tip and small container, then place meter tip in low standard solution (1,400 ppm). Meter should read 14. If meter reading differs, adjust calibration screw to give 14 reading.
- c. Repeat calibration with high standard solution (12,900 ppm). Meter reading should be 129. If meter reading differs, adjust to 129.

Measuring TDS of water sample

1. After calibrating meter, rinse meter tip and small container with distilled water, then place meter tip into water sample and take meter reading. Remember to allow meter to stabilize prior to taking reading.
2. Calculating TDS (ppm):
 - a. HANNA DIST WP 4 or DIST 4 meter [range 0.01-19.99 mS/cm (mmho/cm)]:
TDS (ppm) = meter reading * 1,000
(reading of 9.00 equals 9,000 ppm TDS).
 - b. HANNA 4 meter (range 100/19900 μ S):
TDS (ppm) = meter reading * 100
(reading of 90 equals 9,000 ppm)

How meters work

Conductivity meters measure how easily water conducts an electrical current. The ease with which the current moves through water is related to the amount of dissolved salt (Na^+ , Ca^{++} , Mg^{++} , K^+ , Cl^+ , SO_4^{++} , HCO_3^+ , and CO_3^{++}) predominant. Total dissolved solids (TDS) is determined by multiplying the electrical conductivity by an appropriate constant, with the constant depending on the specific HANNA Model 4 meter used. The TDS values obtained through using HANNA Model 4 meters provide a good estimate of TDS but not an exact measurement because other factors such as type of salt have a small effect.

Suitability of livestock water

Use the TDS table in "Livestock Water Quality" by O.E. Olson and D.G. Fox to determine the livestock suitability of the sample. Preliminary research results from SDSU research on livestock water quality indicate that additional information should be obtained if the TDS reading is over 3,000 ppm.

More information

Additional information on using portable conductivity meters to determine TDS, the water quality requirements of livestock, and how to obtain laboratory analysis of water is available from your local county Extension office.

This publication can be accessed electronically from the SDSU College of Agriculture & Biological Sciences publications page at <http://agbiopubs.sdstate.edu/articles/ExEx2030.pdf> or from the Extension Service Drought Information Website at <http://sdces.sdstate.edu/drought/>

Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the USDA. Larry Tidemann, Director of Extension, Associate Dean, College of Agriculture & Biological Sciences, South Dakota State University, Brookings. SDSU is an Affirmative Action/Equal Opportunity Employer (Male/Female) and offers all benefits, services, and educational and employment opportunities without regard for ancestry, age, race, citizenship, color, creed, religion, gender, disability, national origin, sexual preference, or Vietnam Era veteran status. ExEx 2030: 150 copies printed by CES at a cost of 6 cents each. July 2002.