Water Quality Meters
FSOP 3.1.5 (March 30, 2016)
Ohio EPA Division of Environmental Response and Revitalization

1.0 Scope and Applicability

1.1 Water quality meters are a class of portable instruments used to determine surface water or ground water chemistry in the field. These "field parameter" measurements may be collected to evaluate:

- General water quality/chemistry
- Ground water stabilization during monitoring well development or sampling
- Regulatory standards for surface water analytes that are dependent on pH, temperature or other parameters

1.2 There are many models and manufacturers of water quality meters. Meters are typically equipped with sensors to measure field parameters including pH, specific conductance, temperature, total dissolved solids, salinity, dissolved oxygen, oxidation-reduction potential and/or turbidity. Some meters are equipped with "flow-through" cells that allow multiple parameters to be continuously measured over time. Flow-through cells are very useful for evaluating ground water stabilization when continuously purging a monitoring well with a pump.

1.3 DERR owns several water quality meter models. The user should be familiar with the capabilities and operation of a particular meter prior to use, and should always review the manufacturer's instruction manual prior to use.

2.0 Definitions

Not applicable

3.0 Health and Safety Considerations

3.1 Always be conscious of hazards associated with the water body during surface water sampling, especially if sampling a lake, pond, wetland, lagoon, impoundment, river or stream. Never enter a river or stream under high-flow conditions.

3.2 Be aware of slip, trip or fall hazards along river banks and lagoon or impoundment slopes.

3.3 Be aware of the dangers of working near low-head dams (e.g., rapid flow and undercurrents) as well as hazards that may be posed by other man-made structures such as manholes, vaults, weirs, pump houses and associated electrical or mechanical equipment.

3.4 If sampling from a boat, always wear a personal flotation device (PFD) and follow Ohio EPA's Boating Safety SOP (SP10-12).

3.5 Never walk on a surface crust or partially submerged debris in a lagoon or impoundment.

3.6 Do not collect samples from a frozen lake, pond, lagoon, or impoundment unless authorized by a site-specific health and safety plan. Never collect samples from atop of a river, stream or any other flowing water body that is frozen over.

3.7 When collecting surface water samples, use the "buddy system," with at least two people present at all times.

3.8 Be aware of biological hazards (e.g., snakes, ticks, bees, mosquitoes and poison ivy).

3.9 Always review the site-specific health and safety plan (HASP) for site-specific sampling hazards before beginning work.

4.0 Procedure Cautions

4.1 The user should be familiar with the capabilities and operation of the meter. Consult the user's manual for operation and calibration instructions prior to use.

4.2 Remove the batteries to prevent potential damage if the meter is not going to be used for an extended period of time.

4.3 Always transport the meter in its protective case.

4.4 Do not to drop the meter or immerse the body of the meter in a surface water body. Some meters are not waterproof.

4.5 Clean meter cells and sensors with distilled water after each use or as otherwise indicated in the user's manual.

4.6 For meters equipped with a pH probe that has a bulb-type sensor with a cap or cover, be sure to place a small amount of pH storage solution or slightly acidic pH solution (e.g., pH 4.0) in the probe's cap or cover to keep the pH probe bulb moist during storage. Allowing the pH probe bulb to dry out will shorten its life.

4.7 Don't use expired calibration standard fluids to calibrate a meter.

5.0 Personnel Qualifications

Ohio EPA personnel working at sites that fall under the scope of OSHA's hazardous waste operations and emergency response standard (29 CFR 1910.120) must meet the training requirements described in that standard.

6.0 Equipment and Supplies

6.1 Water quality meter with a copy of the operation manual

6.2 Standard calibration fluids
6.3 Spare batteries
6.4 Equipment and supplies to decontaminate and clean meter after each use, including spray bottles, distilled or deionized water, paper towels, etc.
6.5 Log book, log sheets, or appropriate field forms with pens or markers
6.6 Personal protective equipment appropriate for site-specific work activities

7.0 Procedures

7.1 Consult the user's manual for both general procedures and meter-specific operating functions prior to using the meter.

7.2 Be sure the meter battery is fully charged.

7.3 Calibrate the meter according to the manufacturer's instructions before use with the appropriate standard calibration solutions.

7.4 If the meter has a measurement cup cell, rinse the cell three times with the standard solution or the sample to be measured.

7.5 If the meter has a flow-through cell, allow three volumes of purge water to pass through the cell before recording water quality parameter measurements.

7.6 If the meter has a probe, fill a clean jar with the sample to be measured or, in surface water bodies, place the probe directly in the water body.

7.7 Allow the meter readings to stabilize before recording.

7.8 For temperature readings, make sure the probe is placed in a sufficient volume of water to account for the temperature of the probe body on very hot or cold days. If the sample jar is small, water may need to be added to the sample jar several times to achieve an accurate temperature measurement.

7.9 Record water quality parameter readings as appropriate.

7.10 Decontaminate the meter between sampling locations in accordance with the user's manual and/or FSOP 1.6, Sampling Equipment Decontamination as appropriate.

8.0 Data and Records Management

Refer to FSOP 1.3, Field Documentation

9.0 Quality Assurance and Quality Control

Not applicable

10.0 Attachments

None

11.0 References

FSOP 1.3, Field Documentation

FSOP 1.6, Sampling Equipment Decontamination