

Calibration Verification of Chlorine Meters (an alternate procedure)

The calibration verification procedure required for chlorine meters has been one of the more difficult and technique dependent procedures performed in many of Ohio's certified laboratories. Most of this difficulty is due to the use of a micro-pipette to create a series of chlorine standards. The calibration verification is needed to ensure meters are determining the chlorine concentration properly. The procedure is not, however, intended to test the analysts' ability to use a micro-pipette. The procedure outlined in the "Ohio EPA Laboratory Manual for Chemical Analyses of Public Drinking Water 2014" is a verification of the meter's calibration; not a calibration of the meter itself. Since laboratories are not establishing the meter's calibration, the Ohio EPA's Laboratory Certification Section is now permitting an alternate procedure to verify the meter is reading within acceptable limits. The use of secondary standards for calibration verification is an acceptable alternative to the current method of making up various standards and reading them in the chlorine meters.

What are Secondary Standards?

At this time only a few chlorine kit manufacturers provide secondary standards (i.e., Hach and LaMotte). Typically, the secondary standard sets contain four vials (a blank and three standards) filled with gel or liquid that simulates the chlorine at various concentrations.

Each set of standards is specific to the manufacturer and the meter's analytical range; low-range (LR), mid-range (MR) and high-range (HR). Verification must be performed per manufacturer's instructions. Secondary standards are good until the manufacturer's expiration date and must be stored per manufacturer's instructions.



Calibration Verification Requirements for Secondary Standards

Meters must be verified for all tested chlorine ranges. If chlorine concentrations are observed greater than the limits of the LR setting, then a meter with a MR setting or the meter in the HR setting must be verified using the appropriate secondary standards. However, if chlorine concentrations do not exceed the limits of the meter's LR setting (2.20 mg/L (Hach); 4.00mg/L (LaMotte)), then only the LR setting must be verified.

1. All chlorine meters must be checked at least once every three months.
2. Observed readings must be within 10% of the manufacturer's assigned value. If the observed readings are outside the acceptable range, the meter must be serviced or replaced.
3. A minimum of three secondary standards must be verified.
4. Verification must be recorded and records must be maintained with the laboratory's QC records.
5. The blank standard provided with a set of standards, must only be used with the same set of standards (i.e., LR blank with LR standards of the same lot number).
6. All analytical ranges used for reporting chlorine concentrations must be verified (i.e., LR setting with LR standards, MR setting with MR standards and HR setting with HR standards).

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Breakdown of Calibration Verification Requirements

	Verification Using Current Lab Cert Manual	Verification Using Secondary Standards
Verification Frequency	Once Every Three Months	Once Every Three Months
Range of Acceptance	Prepared standards must be within 10% of calculated value	Meter readings must be within 10% of the standard's certified value
Records	Recorded on calibration verification record and stored with lab QC records	Recorded on calibration verification record and stored with lab QC records
Standard Storage Requirement	Chlorine free ampules and prepared potassium permanganate stored in refrigerator or per manufacturer's recommendations	Secondary standards stored per manufacturer requirements, in original box
Standard Maximum Storage Time	Chlorine free ampules: manufacturer's expiration date Or Potassium permanganate: 1 year after opening or manufacturer's expiration date, whichever occurs first	Manufacturer's expiration date
DI Blank Check	Prior to calibration verification with a total chlorine reagent	None, but the meter must be zeroed with the blank standard provided with the secondary standard kit

Daily Use Requirements for a Meter Verified by Secondary Standards

Samples must be analyzed using a verified meter in the appropriate setting (LR, MR or HR). During sample analysis, meters must be zeroed with the sample to be tested, without DPD reagent added. A meter cannot be zeroed with the blank standard from the secondary standard kit.

Timeframe for Implementation

Laboratories may continue to use the verification procedure described in the "Ohio EPA Laboratory Manual for Chemical Analyses of Public Drinking Water 2014". However, effective immediately, secondary standards may be used as an alternative to this procedure. Laboratories must use the correct bench sheet for the appropriate verification procedure. [Click Here](#) for a copy of the required bench sheets.

Contact

If any questions, please contact a member of the Ohio EPA's Laboratory Certification Section or email DWLabCert@epa.ohio.gov. Contact information can be found at the following link: [Laboratory Certification Contacts](#).