

Measuring Up to the **Standard**

The critical requirements for the effective operation and management of distribution systems from the **AWWA G200 Standard**.



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Introduction

- What is the G200 Standard?
- History of the Standard
- Why should you care?

Introduction

- What's covered by the standard?
 - Section 4.1 Water Quality Issues
 - Section 4.2 Distribution System Management Programs
 - Section 4.3 Facility Operations and Maintenance
 - Section 5.0 Verification

Introduction

- What's not covered by the standard?
 - Finances and Rates
 - M1 Principles of Water Rates, Fees, and Charges
 - Safety
 - M3 Safety Practices for Water Utilities
 - New Service Areas
 - M31 Distribution System Requirements for Fire Protection
 - M32 Computer Modeling of Water Distribution Systems

Section 4.1 Water Quality

- 4.1.1 *Compliance with regulatory requirements.* Meet or exceed all applicable regulations.

Section 4.1 Water Quality

4.1.2 *Monitoring and control.*

- 4.1.2.1 Sampling plan.
 - Establish a routine representative sampling plan.
 - Review annually.
 - Action plan to respond to changes.

Section 4.1 Water Quality

4.1.2 *Monitoring and control.*

- 4.1.2.2 Sample sites.
 - Sample sites shall include, at a minimum, sites required for regulatory compliance monitoring.
 - Representative of all known distribution system conditions.
 - Problem locations require more frequent sampling.

Section 4.1 Water Quality

4.1.2 *Monitoring and control.*

- 4.1.2.3 Sample collection.
 - Collected in accordance with Standard Methods for the Examination of Water and Wastewater.
 - Use proper forms.

Section 4.1 Water Quality

4.1.2 *Monitoring and control.*

- 4.1.2.4 Sample taps.
 - Protected from outside sources of contamination.
 - Inspect annually.

Section 4.1 Water Quality

4.1.3 *Disinfectant residual maintenance.*

Minimum Disinfectant residual.

- The utility shall maintain a detectable disinfectant residual
- Monitor and record disinfectant residual as described in the sampling plan

Section 4.1 Water Quality

4.1.3 *Disinfectant residual maintenance.*

- 4.1.3.2 Nitrification control. *Monitor and Control.*
- 4.1.3.3 Booster disinfection. *Monitor and Control.*
- 4.1.3.4 Disinfection by-product monitoring and control.
 - Program to monitor and control disinfection by-products.
 - Establish goals for DBPs at critical points.
 - Action plan to respond to DBP problems including specific actions to take should the DBP levels exceed the established goals.

Section 4.1 Water Quality

4.1.4 Additional requirements for utilities not utilizing a disinfectant residual. Not Applicable.

4.1.5 Internal corrosion monitoring and control.

- Have an action plan to respond to internal corrosion and deposition problems.
- The action plan, at a minimum, shall include
 - Monitoring and sampling plan for corrosion-related parameters.
 - The scale-forming potential shall be measured by the appropriate indices.
 - Inspection, when exposed, of the condition of piping.
 - Procedures to control lead and copper levels.
 - Guidelines for controlling other corrosion related by-products, such as iron, color, zinc, and taste and odor.

Section 4.1 Water Quality

4.1.6 *Aesthetic water quality parameters.*

- 4.1.6.1 and 4.1.6.2 Staining, color, taste and odor.
 - Have an action plan that includes:
 - An inquiry call system in place that can differentiate between inquiries and track them.
 - Trained personnel who can handle customer inquiry calls, can explain system problems that are known, and can collect pertinent information for response personnel.
 - Communication of inquiry information to a response team for a timely resolution.
 - Review of inquiry records for data trends to identify problem areas.

Section 4.1 Water Quality

4.1.7 *Customer relations.*

- 4.1.7.1 Customer inquiries.
 - Record all important information.
 - Establish an annual goal to continually reduce the number of complaints and track trends.
 - Customer inquiries shall receive an initial contact by the investigator within 8 hours of the receipt of the inquiry.
 - Have trained personnel who can handle customer inquiries.
 - Review of inquiry records to identify problem areas.

Section 4.1 Water Quality

4.1.7 *Customer relations.*

- 4.1.7.2 Service interruptions.
 - Document all planned and unplanned service interruptions.
 - Have an annual goal to continually reduce unplanned service interruptions.

Section 4.1 Water Quality

4.1.8 *System flushing.*

- Develop and implement a systematic flushing program that meets the needs of the utility.
- At a minimum, incorporate the following items:
 - Use a preventive approach.
 - Perform system flushing at the appropriate velocity.
 - Have written procedures.

Section 4.2 Distribution System Management Programs

4.2.1 *System pressure.*

- 4.2.1.1 Minimum residual pressure.
 - The minimum residual pressure at the service connection under all operating conditions shall not be less than 20 psi.
- 4.2.1.2 Pressure monitoring.
 - Monitored at key locations.
 - Pressure alarms may be used to alert operators of pressure conditions outside the utility requirements.

Section 4.2 Distribution System Management Programs

4.2.2 *Backflow prevention.*

- Have a comprehensive cross connection control and backflow-prevention program as required by regulations and at least as stringent as those provided in AWWA Manual M14.

Section 4.2 Distribution System Management Programs

4.2.3. *Permeation prevention.*

- If the utility has permeable (plastic) components (seals, pipes, valves, etc.) that may be susceptible to external contamination (solvents, gasoline, and other organic contaminants), the issue shall be addressed in the utility operation plan.

Section 4.2 Distribution System Management Programs

4.2.4 *Water losses.*

- 4.2.4.1 Water loss.
 - Have an annual goal for the amount of water loss and document it.
- 4.2.4.2 Response program.
 - Respond if the annual goal is not met.
- 4.2.4.3 Leakage.
 - Have a system for estimating leakage on an annual basis.

Section 4.2 Distribution System Management Programs

4.2.5 *Valve exercising and replacement.*

- Have a valve exercising program.
- Include at least the following elements:
 - A goal for the number of valves to be exercised annually.
 - Document that the goals are met and actions if they are not attained.
 - Identify Critical valves for exercising on a regular basis.
 - Track the annual results and set goals to reduce the percent of inoperable valves.

Section 4.2 Distribution System Management Programs

4.2.6 Fire hydrant maintenance and testing.

- Have a hydrant maintenance and fire flow testing program.
- Testing and maintenance shall comply with the requirements of AWWA Manual M17.
- Include as a minimum the following elements:
 - A goal for the number of hydrants to be inspected and tested.
 - Procedures for opening and closing hydrants to minimize potential damage.

Section 4.2 Distribution System Management Programs

4.2.7 Materials in contact with potable water.

- Use AWWA Standards, NSF Standard 61, or other appropriate standards to specify approved coatings or linings for components that come into contact with potable water.

Section 4.2 Distribution System Management Programs

4.2.8 *Metering.*

- 4.2.8.1 Metering requirements.
 - Meter the volume of water entering the system and accumulate historical data.
- 4.2.8.2 Metering devices.
 - All metering devices shall meet the requirements of AWWA or other applicable standards.
- 4.2.8.3 Testing.
 - To ensure meter accuracy, have a goal to test or replace meters at the frequencies recommended in AWWA Manual M6.

Section 4.2 Distribution System Management Programs

4.2.9 *Flow.*

- Be capable of delivering the maximum-day demand and fire flow for individual and public fire requirements.

Section 4.2 Distribution System Management Programs

4.2.10 *External corrosion.*

- 4.2.10.1 Leaks/breaks.
 - Have a standardized system for recording and reporting pipeline leak or break information.
- 4.2.10.2 Monitoring program.
 - Have an external corrosion monitoring program.
 - Corrosion surveys shall include potential measurements, line current measurements, soil resistivity, and soil chemical analysis.

Section 4.2 Distribution System Management Programs

4.2.11 *Design review for water quality.*

- 4.2.11.1 Policies and procedures.
 - Have a formal, standardized design procedure that provides for comprehensive review of all construction projects to reduce the potential for water quality degradation during and following installation of the project.
- 4.2.11.2 Records.
 - Prepare as-built drawings of all installed facilities and shall maintain records associated with inspection, design, and construction of all new and retrofitted facilities.

Section 4.2 Distribution System Management Programs

4.2.12 *Energy management.*

- Have a program to review and optimize electrical energy usage.
- Include the following elements:
 - A review of energy usage, identification of energy use trends and cost or usage tracking versus time.
 - Consideration of energy costs in its evaluation of new facilities.

Section 4.3 Facility Operations and Maintenance

4.3.1 *Treated water storage facilities.*

- 4.3.1.1 Storage capacity.
 - Establish minimum operating levels in storage facilities based on pressure in the distribution system, fire flow requirements, emergency storage requirements, and other site-specific conditions.
- 4.3.1.2 Operating procedures.
 - Have a goal to reduce water age in the finished water storage facility.
 - Have a written target turnover rate along with minimum and maximum operating levels.
- 4.3.1.3 Inspection.
 - Have a written inspection program outlining frequency, procedures and maintenance of records that includes routine (daily/weekly); periodic (monthly/quarterly); and comprehensive (3–5 years) inspections.

Section 4.3 Facility Operations and Maintenance

4.3.1 *Treated water storage facilities.*

- 4.3.1.4 Maintenance.

- Have a maintenance program that includes periodic cleaning and refurbishing of facilities, as required.
- Internal inspection conducted at a minimum of every 5 years and for uncovered reservoirs, at least annually.
- Perform a full internal and external inspection according to AWWA Manual M42.
- Conduct an external visual inspection of the storage facility at least seasonally to assess and repair damage, assess security, and verify the integrity of vents and screens.
- Based on ANSI/AWWA Standards D102 and D103.

Section 4.3 Facility Operations and Maintenance

4.3.1 *Treated water storage facilities.*

- 4.3.1.5 Disinfection.
 - The storage facility and any divers or remote operational vehicles shall be disinfected according to ANSI/AWWA C652 for the inspections.
 - Disposal of heavily chlorinated water shall be done in accordance with regulations.
- 4.3.1.6 Additional requirements.
 - All treated water storage facilities shall be covered and protected from contamination or shall incorporate additional treatment of the water as it leaves the reservoir.

Section 4.3 Facility Operations and Maintenance

4.3.2 *Pump station operations and maintenance.*

- 4.3.2.1 Operating procedures.
 - Establish written operating and maintenance procedures.
 - Operating logs shall record operational conditions, such as inlet pressure, discharge pressure, individual pump run times, flow rate, and other operational variables.
- 4.3.2.2 Maintenance program.
 - Have written maintenance procedures.
 - Document all inspections and any service performed.

Section 4.3 Facility Operations and Maintenance

4.3.3 *Pipeline rehabilitation and replacement.*

- Evaluate and upgrade existing portions of the system as required.
- Maintain records that document the physical condition of the pipes.
- Establish an annual goal in terms of breaks/100 mi/yr of distribution pipe.

Section 4.3 Facility Operations and Maintenance

4.3.4 *Disinfection of new or repaired pipes.*

- 4.3.4.1 Disinfection of new or repaired pipes.
 - All new and repaired pipe sections disinfected and tested in accordance with the requirements of ANSI/AWWA C651.
 - Disposal of heavily chlorinated water shall be done in accordance with regulations.

Section 5.0 Verification

Sec. 5.1 Documentation Required

- Define critical activities and create written procedures for each.
- Have a training component for personnel.
- Maintain an adequate record-keeping system so that compliance can be measured.
- Records shall remain legible, readily identifiable, and retrievable.

Section 5.0 Verification

Sec. 5.2 Human Resources

- 5.2.1 *General.*
 - Personnel performing work affecting system operation shall be competent.
- 5.2.2 *Competence, awareness, and training.*
 - Determine the necessary competence for personnel.
 - Provide training or take other actions to satisfy these needs.
 - Ensure that personnel are aware of the importance of their activities.
 - Maintain appropriate records.

Measuring Up to the **Standard**

The critical requirements for the effective operation and management of distribution systems from the **AWWA G200 Standard**.



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