

**Joint Committee on Administrative Rules**  
**ADMINISTRATIVE CODE**

TITLE 35: ENVIRONMENTAL PROTECTION  
SUBTITLE F: PUBLIC WATER SUPPLIES  
CHAPTER II: ENVIRONMENTAL PROTECTION AGENCY  
PART 653 DESIGN, OPERATION AND MAINTENANCE CRITERIA  
SECTION 653.601 CHLORINATION - ENGINEERING DESIGN CRITERIA

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**Section 653.601 Chlorination - Engineering Design Criteria**

- a) Procedure for Submitting Plans and Specifications - Design documents for chlorination shall be prepared and submitted in accordance with 35 Ill. Adm. Code 602.
- b) Chlorinator equipment shall be:
  - 1) capable of maintaining a minimum free chlorine residual of 0.2 mg/l or a minimum combined residual of 0.5 mg/l in all active parts of the distribution system at all times;
  - 2) large enough to satisfy the immediate chlorine demand and give a measurable residual of at least 2.0 mg/l under all operating conditions after contact; and
  - 3) capable of feeding chlorine to the water being treated at a dosage rate of at least 5.0 mg/l except when the water has a high chlorine demand. Factors in determining chlorine demand are:
    - A) pH;
    - B) water temperature;
    - C) contact time;
    - D) presence in the water of substances having chlorine demand such as hydrogen sulfide, iron, manganese and nitrogenous compounds including ammonia; and
    - E) supplemental treatment such as aeration which reduces chlorine demand.
- c) Selection of Chemical - Chlorine compounds shall meet requirements of Section 653.202 and AWWA Standards for Disinfection B300.
- d) Chemical Feed Equipment

- 1) Gas or solution feed equipment shall be used for adding chlorine.
  - 2) Duplicate chlorination facilities shall be provided when operating conditions do not allow repair of the chlorinator during off-pumping periods.
  - 3) Standby chlorination equipment shall be installed and operational at water supplies treating surface water.
  - 4) Spare parts consisting of at least the commonly expendable parts such as glassware, fittings, hose clamps and gaskets shall be available for emergency repairs.
- e) Equipment Location and Storage of Chemical
- 1) Gas Feed Equipment
    - A) Gas feed equipment and all cylinders shall be located in a separate room away from other operating areas. The room shall be free from excessive heat.
    - B) Chlorination equipment shall be accessible for repair and maintenance.
    - C) Ventilation shall be provided for gas chlorinators and cylinders.
      - i) Mechanical forced-air ventilation shall be installed where natural ventilation to the outside atmosphere is not available.
      - ii) Mechanical forced-air ventilation shall be capable of providing one complete air change per minute. Suction shall be located within 12 inches of floor level.
      - iii) Mechanical forced-air ventilation equipment shall be capable of producing a negative pressure in the area contaminated with chlorine gas and discharging the chlorine gas to a safe location away from the evacuated space.
    - D) All 150 pound chlorine cylinders - full, empty or in use - shall be chained upright. One ton containers shall be secured to prevent movement.
    - E) Chlorine cylinders shall be stored in an area not exposed to direct sunlight.
    - F) One set of corrosion-resistant scales shall be provided for

weighing each gas chlorine cylinder in service.

- 2) Solution Feed Equipment
  - A) Corrosion-resistant containers shall be provided for solution feeders.
  - B) Containers shall have non-corrodible covers with overhanging edges. Openings shall be constructed to prevent contamination.
  - C) Scales or a volumetric measuring device shall be provided for determining the amount of solution fed.
  
- f) Safety-Respiratory Protection Equipment
  - 1) Respiratory protection equipment consisting of self-contained, pressure-demand breathing units meeting requirements of the National Institute for Occupational Safety and Health (NIOSH) shall be provided where gas chlorination is used.
    - A) The units shall use compressed air and have at least a 30 minute capacity.
    - B) It is recommended that the units be compatible with or exactly the same as units used by the local fire department.
  - 2) Respiratory protection equipment shall be stored in an accessible location outside the room housing gas chlorination facilities.
  - 3) All personnel involved in the use and maintenance of gas chlorination facilities shall be able to properly operate the breathing equipment. All personnel shall have periodic refresher training exercises using the equipment.
  - 4) A source of certified air under 29 CFR Section 1910.183 (1983) shall be used for refilling the tanks.
  - 5) The equipment shall be checked at regular intervals to assure that it is in good working condition.