

# PROPOSED SUBSTANTIVE CHANGES TO RULE R309-535-5

The Division of Drinking Water is requesting authorization to make substantive changes to the content and organization of Section R309-535-5, *Fluoridation*. The proposed amendment updates the requirements by incorporating information about fluoridation systems that the division has gained through plan review, facility inspections, and fluoridation training.

The current fluoridation rule basically borrows its fluoridation requirements from *Recommended Standards for Water Works* (commonly known as the Ten States' Standards). The information from the Ten States' Standards is useful but somewhat limited in its scope. Therefore, the proposed amendment retains most of the current requirements and adds other requirements to provide a more comprehensive design regulation.

Changes to the substance of the fluoridation rule include the following:

- Deleted general accuracy requirement for fluoride chemical feeding equipment
- Deleted requirements related to feed pump pumping rate and anti-siphon device construction
- Deleted the restriction of fluoride saturators to up-flow saturators
- Added requirements for secondary containment for fluoride tanks
- Added fluoride chemical storage requirements
- Added requirements for fluoride injectors and injection points
- Added requirements for fluoride secondary controls
- Added requirements for fluoride building security, heating, lighting, and ventilation
- Added cross-connection prohibitions to protect the water supply
- Updated and expanded the personal protective equipment requirements

The proposed amendment also substantially reorganizes R309-535-5 as follows:

1. *General Requirements* apply to all types of fluoridation facilities
2. *Additional Requirements for Fluorosilicic Acid Installations* apply only to facilities that use fluorosilicic acid
3. *Additional Requirements for Fluoride Saturator Installations* apply only to fluoride saturator facilities
4. *Additional Requirements for Fluoride Dry Feed Installations* apply only to fluoride dry feed facilities

Two versions of the R309-535-5 amendment are enclosed:

- **The Division of Administrative Rules (DAR) Version:** DAR maintains the official version of rules and oversees the rulemaking process. The official rulemaking document for R309-535-5 is in the format required by DAR. The DAR format has limited formatting, uses strikeouts for deleted words, and underlines added words. In this case, because the extensive reorganization, the entire current section is struck through and the new section is entirely underlined. This is the version of the rule amendment that will be published in the Utah State Bulletin.

- **The Division of Drinking Water Version:** DDW provides a separate version of the rule. The rule content of the DDW version is the same as the DAR version. However, the DDW version is formatted for easier reading and contains DDW's interpretations of the rule (in the form of guidance paragraphs). To aid in identifying the differences between the current rule and the proposed amendment, the DDW version of the current rule shows requirements that are not included in the proposed amendment as struck through and in red. The DDW version of the proposed amendment shows new requirements as underlined and in red. The DDW version is for information only and will not be published in the Utah State Bulletin.

**Staff Recommendation:** Because the proposed changes are substantive, the staff recommends **that the Board authorize Division staff to begin the rulemaking process to amend R309-535-5 and to file the proposed rule amendment for publication in the Utah State Bulletin on October 1, 2016.**

## List of Proposed Revisions to R309-535-5. *Fluoridation.*

The below list gives deletions from the current rule, additions to the proposed rule, and changes between the two rules.

### Deletions

R309-535-5: Deleted the requirement that fluoride compounds other than sodium fluoride, sodium fluorosilicate, or fluorosilicic acid be approved by the Director. Instead, R309-535-5(1)(a)(i) of the proposed amendment requires fluoridation chemicals to be certified to comply with ANSI/NSF 60.

R309-535-5(1): Deleted the requirement that unsealed storage units for fluorosilicic acid be vented to the atmosphere at a point outside any buildings because it is adequately covered in two parts of the amendment. R309-535-5(1)(b) of the proposed amendment requires fluoride chemicals to be stored in covered or sealed containers; R309-535-5(1)(j)(ii) and (iii) require ventilation in the fluoride operating area to provide a minimum of six room-air changes per hour and to be vented to the outside atmosphere.

R309-535-5(2)(a): Deleted the requirement that scales, loss-of-weight recorders or liquid level indicators for chemical feeding be accurate to within five percent of the average daily change in reading.

R309-535-5(2)(b): Deleted the requirement that fluoride feeders be accurate to within 5% of the desired feed rate.

R309-535-5(2)(e): Deleted the requirement that fluoride be supplied by a positive displacement pump providing a minimum of 20 strokes per minute.

R309-535-5(2)(f): Deleted the requirement that fluoride feed lines and water dilution lines have spring-opposed diaphragm type anti-siphon devices.

R309-535-5(2)(j): Deleted the requirement that fluoride solutions be injected at a point of continuous positive pressure or a suitable air gap be provided.

R309-535-5(2)(l): Deleted the requirement that only up-flow saturators be permitted. Therefore, the proposed amendment permits the use of up-flow and down-flow saturators.

R309-535-5(6): Deleted "Testing Equipment," which required that equipment be provided to measure the fluoride level in the water and that it be approved by the Director.

### Additions

Introduction: Added an introductory statement indicating that the fluoridation rule does not require public water systems to fluoridate, but if they do, they must meet the fluoridation rule requirements.

R309-535-5(1)(iii): Added the requirement that metal parts used in fluoridation equipment or fluoridation rooms be corrosion resistant.

R309-535-5(1)(b)(i): Added the requirement that fluoride chemicals be stored away from heat.

R309-535-5(1)(b)(v): Added the requirement that solution tanks be labeled to identify their contents.

R309-535-5(1)(c): Added secondary containment requirements for tanks containing corrosive fluoride solutions.

R309-535-5(1)(d)(iii): Added the requirement that a sampling point be provided for measuring the fluoride level in treated water.

R309-535-5(1)(e)(i): Added the requirement that a fluoride feed pump be sized for operational efficiency and to prevent fluoride overfeed.

R309-535-5(1)(f)(ii): Added the prohibition that a fluoride feed pump not be plugged in to a continuously active electrical outlet, instead it must be wired so that it operates only when a well or feed pump supplying water is activated.

R309-535-5(1)(g)(i): Added the requirement that the fluoride injection line enter at a point in the lower 1/3 of the water line.

R309-535-5(1)(g)(ii): Added the requirement that the fluoride injection point allow for adequate mixing.

R309-535-5(g)(iv): Added the requirement that a fluoride injector be selected based on quantity of fluoride to be fed, water flow, back pressure, and injector operating pressure.

R309-535-5(g)(v): Added the requirement that if injecting fluoride under pressure, the injection line must be secured by a corporation stop and safety chain.

R309-535-5(h)(ii): Added the requirement that fluoridation facilities without operators on site must have a day tank or two alternative secondary controls to prevent fluoride overfeed.

R309-535-5(1)(i): Added the requirement that fluoridation equipment be housed in a secure building sized for handling and storing fluoride chemicals.

R309-535-5(1)(j): Added heating, lighting, and ventilation requirements for fluoride buildings and operating areas.

R309-535-5(1)(k): Added the requirement that cross-connection contamination of the water supply be prevented by physical separation, an air gap, or backflow prevention assembly.

R309-535-5(2)(a): Added the prohibition to diluting fluorosilicic acid on site.

R309-535-5(2)(b): Added requirements for fluorosilicic acid solution tank vents.

R309-535-5(2)(c): Added a requirement that a view window be installed between a fluoride control room and a fluoride operating area in fluorosilicic acid installations constructed after January 1, 2017.

R309-535-5(2)(e): Added a requirement that a neutralizing chemical be available for small acid spills.

R309-535-5(3)(a): Added the requirement that a water meter be installed on the make-up water line for a fluoride saturator and that it and the master meter be read daily to determine that the fluoride solution is being properly fed.

R309-535-5(3)(b): Added the requirement that minimum depth of undissolved fluoride required to produce a saturated solution be marked on the outside of a saturator tank.

R309-535-5(3)(c): Added the prohibition of operating a fluoride saturator in a manner that draws undissolved sodium fluoride into the pump suction line.

R309-535-5(3)(e)(ii): Added the requirement that a sediment filter be installed in the make-up water line between a water softener and a water meter.

R309-535-5(4)(a) and (b): Added the requirements that volumetric and gravimetric dry feeders include solution tanks and mechanical mixers.

## **Changes**

R309-535-5(1) of the current rule requires fluoride chemicals to be isolated from other chemicals to prevent contamination. R309-535-5(1)(b)(ii) of the amendment is reworded to prohibit fluoride chemicals from being stored with incompatible chemicals.

R309-535-5(2)(a) of the current rule requires scales, loss-of-weight recorders or liquid level indicators, as appropriate, be accurate to within five percent of the average daily change in reading and be provided for chemical feeds. R309-535-5(1)(d)(ii) of the amendment simply requires that a means be provided to measure the solution level in a tank and the quantity of the chemical used.

R309-535-5(2)(k) dealing with the electrical outlet for a fluoride feed pump was reworded and moved to R309-535-5(1)(f)(i) but the requirements were not substantially changed.

R309-535-5(3), Secondary Controls, was reworded and expanded and is now found in R309-535-5(1)(h), Minimize Fluoride Overfeed, in the proposed amendment.

R309-535-5(4), Protective Equipment, in the current rule is a separate section that deals generally with protective equipment. It has been replaced by individual protective equipment sections tailored for each method of fluoridation (acid, saturator, dry) in the proposed amendment.

## Current DDW Version of R309-535-5, Fluoridation

Note: The attached version of the current fluoridation rule shows the requirements that will not be included in the proposed amendment struck through and in red. In actuality, the entire current rule will be deleted and replaced by the proposed amendment.

## **R309-535-5. Fluoridation.**

Sodium fluoride, sodium silicofluoride and fluorosilicic acid shall conform to the applicable AWWA standards and/or ANSI/NSF Standard 60. ~~Other fluoride compounds which may be available must be approved by the Director.~~ [NOT IN PROPOSED AMENDMENT]

### **(1) Fluoride compound storage.**

Fluoride chemicals shall be isolated from other chemicals to prevent contamination. Compounds shall be stored in covered or unopened shipping containers and shall be stored inside a building. ~~Unsealed storage units for fluorosilicic acid shall be vented to the atmosphere at a point outside any building.~~ [NOT IN PROPOSED AMENDMENT]  
Bags, fiber drums and steel drums shall be stored on pallets.

### **(2) Chemical feed equipment and methods.**

In addition to the requirements in R309-525-11 "Chemical Addition", fluoride feed equipment shall meet the following requirements:

~~(a) scales, loss of weight recorders or liquid level indicators, as appropriate, accurate to within five percent of the average daily change in reading shall be provided for chemical feeds,~~ [NOT IN PROPOSED AMENDMENT]

~~(b) feeders shall be accurate to within five percent of any desired feed rate,~~ [NOT IN PROPOSED AMENDMENT]

(c) fluoride compound shall not be added before lime-soda softening or ion exchange softening,

(d) the point of application of fluorosilicic acid, if into a horizontal pipe, shall be in the lower half of the pipe,

~~(e) a fluoride solution shall be applied by a positive displacement pump having a stroke rate not less than 20 strokes per minute,~~ [NOT IN PROPOSED AMENDMENT]

~~(f) a spring opposed diaphragm type anti-siphon device shall be provided for all fluoride feed lines and dilution water lines,~~ [NOT IN PROPOSED AMENDMENT]

(g) a device to measure the flow of water to be treated is required,

(h) the dilution water pipe shall terminate at least two pipe diameters above the solution tank,

(i) water used for sodium fluoride dissolution shall be softened if hardness exceeds 75 mg/l as calcium carbonate,

~~(j) fluoride solutions shall be injected at a point of continuous positive pressure or a suitable air gap provided, [NOT IN PROPOSED AMENDMENT]~~

(k) the electrical outlet used for the fluoride feed pump shall have a nonstandard receptacle and shall be interconnected with the well or service pump,

~~(l) saturators shall be of the upflow type and be provided with a meter and backflow protection on the makeup water line. [NOT IN PROPOSED AMENDMENT]~~

(m) lead weights shall not be used in fluoride chemical solutions to keep pump suction lines at the bottom of a day or bulk storage tank.

### **(3) Secondary controls.**

Secondary control systems for fluoride chemical feed devices shall be provided as a means of reducing the possibility for overfeed; these may include flow or pressure switches or other devices.

### **(4) Protective equipment.**

Personal protective equipment as outlined in R309-525-11(10) shall be provided for operators handling fluoride compounds. Deluge showers and eye wash devices shall be provided at all fluorosilicic acid installations.

### **(5) Dust control.**

(a) Provision must be made for the transfer of dry fluoride compounds from shipping containers to storage bins or hoppers in such a way as to minimize the quantity of fluoride dust which may enter the room in which the equipment is installed. The enclosure shall be provided with an exhaust fan and dust filter which place the hopper under a negative pressure. Air exhausted from fluoride handling equipment shall discharge through a dust filter to the outside atmosphere of the building.

(b) Provision shall be made for disposing of empty bags, drums or barrels in a manner which will minimize exposure to fluoride dusts. A floor drain shall be provided to facilitate the hosing of floors.

**(6) Testing equipment.**

~~Equipment shall be provided for measuring the quantity of fluoride in the water. Such equipment shall be subject to the approval of the Director.~~ [NOT IN PROPOSED AMENDMENT]

DDW Version of Proposed Amendment to R309-535-5,  
Fluoridation

Note: The attached version of the proposed amendment to the fluoridation rule shows new requirements that are not in the current rule but will be included in the proposed amendment underlined and in red. In actuality, the entire proposed amendment will be adopted and will replace the current rule.

## **R309-535-5. Fluoridation.**

This rule does not require the addition of fluoride to drinking water by a public water system. A public water system that chooses to add fluoride to drinking water shall comply with the fluoridation facility design and construction requirements of this rule. [NEW]

### **Guidance:**

*A public water system may not exceed the primary maximum contaminant level for fluoride of 4.0 mg/L per R309-200-5(1)(c). A public water system that exceeds the secondary maximum contaminant level of 2.0 mg/L must issue the public notification required by R309-220-11.*

*A public water system that chooses to add fluoride to drinking water should comply with the testing, monitoring and reporting requirements established by the local health department.*

*In Salt Lake and Davis counties, the local health departments have established the optimal level of fluoride in drinking water and the fluoridation monitoring and reporting requirements. Currently, the U.S. Department of Health and Human Services recommends an optimal fluoride concentration of 0.7 mg/L in drinking water to reduce cavities and tooth decay.*

### **(1) General Requirements for all Fluoridation Installations.**

The following requirements apply to all types of fluoridation.

#### (a) Chemicals and Materials.

(i) All chemicals used for fluoridation shall be certified to comply with ANSI/NSF Standard 60.

(ii) Materials used for fluoridation equipment shall be compatible with chemicals used in the fluoridation process.

(iii) Metal parts used in fluoridation equipment and present in the fluoridation room shall be corrosion resistant.[NEW]

(iv) Lead weights shall not be used in fluoride chemical solutions to keep pump suction lines at the bottom of a day or bulk storage tank.

*Guidance: Acid-resistant floor coating or a containment structure should be provided for areas likely to have acid spills.*

#### (b) Chemical Storage.

(i) Fluoride chemicals shall be stored in covered or sealed containers, inside a building, and away from heat.[NEW]

- (ii) Fluoride chemicals shall not be stored with incompatible chemicals.
- (iii) Bags or other containers for dry materials shall be stored on pallets.
- (iv) Fiber drums for storing dry materials shall be kept closed to keep out moisture.
- (v) A solution tank shall be labeled to identify the contents of the tank.[NEW]

(c) Secondary Containment.[NEW]

- (i) Secondary containment shall be provided for tanks containing corrosive fluoride solutions.[NEW]
- (ii) Secondary containment shall be sized to contain the quantity of solution handled.[NEW]
- (iii) Secondary containment shall be designed to be acid resistant.[NEW]

***Guidance: Secondary containment may consist of curbs, sumps, double-walled tanks, etc.***

(d) Means to Measure.

- (i) A means to measure the flow of treated water shall be provided.
- (ii) A means shall be provided to measure the solution level in a tank and the quantity of the chemical used.

***Guidance: The means to measure the solution level in a tank may include a liquid level indicator, a calibrated level gauge on the side of a translucent tank, weight scales, etc.***

- (iii) A sampling point shall be provided downstream of the fluoridation facility for measuring the fluoride level of treated water.[NEW]

(e) Fluoride Feed Pump

- (i) Sizing of fluoride feed pumps shall consider prevention of fluoride overfeed and operation efficiency.[NEW]
- (ii) A fluoride feed pump shall have an anti-siphon device.

(f) Electrical Outlet for Fluoride Feed Pump

(i) The electrical outlet used for a fluoride feed pump shall have interlock protection by being wired electrically in series with the well or service pump, such that the feed pump is only activated when the well or service pump is on.

(ii) The fluoride feed pump shall not be plugged into a continuously active ("hot") electrical outlet.[NEW]

(g) Fluoride Injection

(i) The fluoride injection line shall enter at a point in the lower one-third of the water pipe[NEW], and the end of the injection line shall be in the lower half of the water pipe.

(ii) The fluoride injection point shall allow adequate mixing.[NEW]

(iii) The fluoride injection point shall not be located upstream of lime softening, ion exchange, or other processes that affect the fluoride level.

(iv) Each injector shall be selected based on the quantity of fluoride to be added, water flow, back pressure, and injector operating pressure.[NEW]

***Guidance: The design should minimize localized corrosion near the injection point.***

(v) If injecting fluoride under pressure, a corporation stop and a safety chain shall be used at the fluoride injection point to secure the injection line.[NEW]

(vi) An anti-siphon device shall be provided for all fluoride feed lines at the injection point.

(h) Minimize Fluoride Overfeed

(i) In addition to the feed pump control, a secondary control mechanism shall be provided to minimize the possibility of fluoride overfeed. It may be a day tank, liquid level sensor, SCADA control, a flow switch, etc.

***Guidance: The intent of the day tank is to limit the fluoride supply to the feed pump, especially if a large-size bulk tank is present. It is recommended that the day tank be sized to hold no more than 3 days of supply.***

(ii) For fluoridation facilities that do not have operators on site, a day tank is required to minimize fluoride overfeed, unless two alternative secondary controls are provided.[NEW]

*Guidance: For example, a fluoridation facility without operators on site may use both the bulk tank liquid level sensor and the treated water fluoride level SCADA data as secondary controls.*

*Guidance: To avoid fluoride overfeed, a flooded suction line should be avoided for the fluoride feed pump. The elevation of a fluoride feed pump should be based on pump priming requirements and suction head limitations.*

(i) Housing

Fluoridation equipment shall be housed in a secure building that is adequately sized for handling and storing fluoride chemicals.[NEW]

(j) Heating, Lighting, Ventilation[NEW]

(i) The fluoridation building shall be heated, lighted and ventilated to assure proper operation of the equipment and safety of operator.[NEW]

(ii) The ventilation in the fluoride operating area shall provide at least six complete room-air changes per hour.[NEW]

(iii) The fluoride operating area shall be vented to outside atmosphere and away from air intakes.[NEW]

(iv) Separate switches for fans and lights in the fluoride operating area shall be provided. The switches shall be located outside of, or near, the entrance to the fluoride operating area, and shall be protected from vandalism.[NEW]

(k) Cross Connection Control

Cross connection shall be eliminated by physical separation, an air gap, or an approved and properly operating backflow prevention assembly.[NEW]

## **(2) Additional Requirements for Fluorosilicic Acid Installations.**

(a) Fluorosilicic acid shall not be diluted manually on site before injection.[NEW]

(b) Solution Tank Vents.[NEW]

- (i) A solution tank shall be adequately vented to the outside atmosphere away from air intakes, above grade, and where least susceptible to contamination.[NEW]
- (ii) A bulk tank shall not share a vent with a day tank if there is a risk of solution overflow from the bulk tank to the day tank.[NEW]
- (iii) A non-corrodible fine mesh (No. 14 or finer) screen shall be placed over the discharge end of a vent.[NEW]
- (c) If separate rooms are provided in a fluoride building constructed after January 1, 2017, the design shall include a view window between the control room and the fluorosilicic acid operating area.[NEW]

*Guidance: It is recommended to have a separate room for the fluoride operating area due to possible damage from fluoride chemicals and vapors to other equipment.*

- (d) Emergency eyewash stations and showers shall be provided.
- (e) A neutralizing chemical shall be available on site to handle small quantity accidental acid spills.[NEW]

*Guidance: The immediate use of a neutralizing chemical to handle an accidental acid spill is only suitable for small quantity spills during operation or maintenance, for example, minor spillage from the quick connect during unloading. For large quantity acid spills, the secondary containment is the primary means of containing the acid to allow proper handling of the acid later on.*

- (f) The use of personal protective equipment (PPE) is required when handling fluorosilicic acid, and shall include the following:
  - (i) Full-face shield and splash-proof safety goggles
  - (ii) Long gauntlet acid-resistant rubber or neoprene gloves with cuffs
  - (iii) Acid-resistant rubber or neoprene aprons
  - (iv) Rubber boots

### **(3) Additional Requirements for Fluoride Saturator Installations.**

- (a) A water meter shall be provided on the make-up water line for a saturator so that calculations can be made to confirm that the proper amounts of fluoride

solution are being fed. This meter and the master meter shall be read daily and the results recorded.[NEW]

(b) The minimum depth of undissolved fluoride chemical required to maintain a saturated solution shall be marked on the outside of the saturator tank.[NEW]

***Guidance: Sodium fluorosilicate should not be used in saturators due to its poor solubility.***

(c) The saturator shall not be operated in a manner that undissolved chemical is drawn into the pump suction line.[NEW]

(d) The make-up water supply line shall, at a minimum, terminate at least two pipe diameters above the solution tank or have backflow protection.

(e) Make-up Water Softening

(i) The make-up water used for sodium fluoride saturators shall be softened whenever the hardness exceeds 75 mg/L.

(ii) A sediment filter (20 mesh) shall be installed in the make-up water line going to the saturator. The filter shall be placed between the softener and the water meter.[NEW]

(f) Dust Control.

Provisions shall be made to minimize the creation of fluoride dust during the transfer of dry fluoride compounds.

(i) Air exhausted from fluoride handling equipment shall discharge through a dust filter to the outside atmosphere of the building.

(ii) Provisions shall be made to minimize dust when disposing of empty bags, drums or barrels.

(iii) A floor drain shall be provided to facilitate floor cleaning.

(g) Emergency eyewash shall be provided.

(h) The use of personal protective equipment (PPE) is required when handling dry chemicals and shall include the following:

(i) National Institute for Occupational Safety and Health (NIOSH) approved particulate respirator with a soft rubber face-to-mask seal and replaceable cartridges

- (ii) Chemical dust-resistant safety goggles
- (iii) Acid-resistant gloves
- (iv) Acid-resistant rubber or neoprene aprons
- (v) Rubber boots

#### **(4) Additional Requirements for Fluoride Dry Feed Installations.**

- (a) Volumetric and gravimetric dry feeders shall include a solution tank.[NEW]
- (b) A mechanical mixer shall be installed in the solution tank.[NEW]
- (c) Dust Control.

Provisions shall be made to minimize the creation of fluoride dust during the transfer of dry fluoride compounds.

- (i) If a hopper is provided, it shall be equipped with a dust filter and an exhaust fan that places the hopper under negative pressure.
  - (ii) Air exhausted from fluoride handling equipment shall discharge through a dust filter to the outside atmosphere of the building.
  - (iii) Provisions shall be made to minimize dust when disposing of empty bags, drums or barrels.
  - (iv) A floor drain shall be provided to facilitate floor cleaning.
- (d) Emergency eyewash shall be provided.
  - (e) The use of personal protective equipment (PPE) is required when handling dry chemicals and shall include the following:
    - (i) National Institute for Occupational Safety and Health (NIOSH) approved particulate respirator with a soft rubber face-to-mask seal and replaceable cartridges
    - (ii) Chemical dust-resistant safety goggles
    - (iii) Acid-resistant gloves
    - (iv) Acid-resistant rubber or neoprene aprons
    - (v) Rubber boots

**Rule R309-535. Facility Design and Operation: Miscellaneous Treatment Methods.**

**R309-535-5. Fluoridation.**

~~[Sodium fluoride, sodium silicofluoride and fluorosilicic acid shall conform to the applicable AWWA standards and/or ANSI/NSF Standard 60. Other fluoride compounds which may be available must be approved by the Director.~~

~~(1) Fluoride compound storage.~~

~~Fluoride chemicals shall be isolated from other chemicals to prevent contamination. Compounds shall be stored in covered or unopened shipping containers and shall be stored inside a building. Unsealed storage units for fluorosilicic acid shall be vented to the atmosphere at a point outside any building. Bags, fiber drums and steel drums shall be stored on pallets.~~

~~(2) Chemical feed equipment and methods.~~

~~In addition to the requirements in R309-525-11 "Chemical Addition", fluoride feed equipment shall meet the following requirements:~~

~~(a) scales, loss-of-weight recorders or liquid level indicators, as appropriate, accurate to within five percent of the average daily change in reading shall be provided for chemical feeds,~~

~~(b) feeders shall be accurate to within five percent of any desired feed rate,~~

~~(c) fluoride compound shall not be added before lime-soda softening or ion exchange softening,~~

~~(d) the point of application of fluorosilicic acid, if into a horizontal pipe, shall be in the lower half of the pipe,~~

~~(e) a fluoride solution shall be applied by a positive displacement pump having a stroke rate not less than 20 strokes per minute,~~

~~(f) a spring opposed diaphragm type anti-siphon device shall be provided for all fluoride feed lines and dilution water lines,~~

~~(g) a device to measure the flow of water to be treated is required,~~

~~(h) the dilution water pipe shall terminate at least two pipe diameters above the solution tank,~~

~~(i) water used for sodium fluoride dissolution shall be softened if hardness exceeds 75 mg/l as calcium carbonate,~~

~~(j) fluoride solutions shall be injected at a point of continuous positive pressure or a suitable air gap provided,~~

~~\_\_\_\_\_ (k) the electrical outlet used for the fluoride feed pump shall have a nonstandard receptacle and shall be interconnected with the well or service pump,~~

~~\_\_\_\_\_ (l) saturators shall be of the upflow type and be provided with a meter and backflow protection on the makeup water line.~~

~~\_\_\_\_\_ (m) lead weights shall not be used in fluoride chemical solutions to keep pump suction lines at the bottom of a day or bulk storage tank.~~

~~\_\_\_\_\_ (3) Secondary controls.~~

~~\_\_\_\_\_ Secondary control systems for fluoride chemical feed devices shall be provided as a means of reducing the possibility for overfeed; these may include flow or pressure switches or other devices.~~

~~\_\_\_\_\_ (4) Protective equipment.~~

~~\_\_\_\_\_ Personal protective equipment as outlined in R309-525-11(10) shall be provided for operators handling fluoride compounds. Deluge showers and eye wash devices shall be provided at all fluorosilicic acid installations.~~

~~\_\_\_\_\_ (5) Dust control.~~

~~\_\_\_\_\_ (a) Provision must be made for the transfer of dry fluoride compounds from shipping containers to storage bins or hoppers in such a way as to minimize the quantity of fluoride dust which may enter the room in which the equipment is installed. The enclosure shall be provided with an exhaust fan and dust filter which place the hopper under a negative pressure. Air exhausted from fluoride handling equipment shall discharge through a dust filter to the outside atmosphere of the building.~~

~~\_\_\_\_\_ (b) Provision shall be made for disposing of empty bags, drums or barrels in a manner which will minimize exposure to fluoride dusts. A floor drain shall be provided to facilitate the hosing of floors.~~

~~\_\_\_\_\_ (6) Testing equipment.~~

~~\_\_\_\_\_ Equipment shall be provided for measuring the quantity of fluoride in the water. Such equipment shall be subject to the approval of the Director.]~~

This rule does not require the addition of fluoride to drinking water by a public water system. A public water system that chooses to add fluoride to drinking water shall comply with the fluoridation facility design and construction requirements of this rule.

(1) General Requirements for all Fluoridation Installations. The following requirements apply to all types of fluoridation.

(a) Chemicals and Materials.

(i) All chemicals used for fluoridation shall be certified to comply with ANSI/NSF Standard 60.

(ii) Materials used for fluoridation equipment shall be compatible with chemicals used in the fluoridation process.

(iii) Metal parts used in fluoridation equipment and present in the fluoridation room shall be corrosion resistant.

(iv) Lead weights shall not be used in fluoride chemical solutions to keep pump suction lines at the bottom of a day or bulk storage tank.

(b) Chemical Storage.

(i) Fluoride chemicals shall be stored in covered or sealed containers, inside a building, and away from heat.

(ii) Fluoride chemicals shall not be stored with incompatible chemicals.

(iii) Bags or other containers for dry materials shall be stored on pallets.

(iv) Fiber drums for storing dry materials shall be kept closed to keep out moisture.

(v) A solution tank shall be labeled to identify the contents of the tank.

(c) Secondary Containment.

(i) Secondary containment shall be provided for tanks containing corrosive fluoride solutions.

(ii) Secondary containment shall be sized to contain the quantity of solution handled.

(iii) Secondary containment shall be designed to be acid resistant.

(d) Means to Measure.

(i) A means to measure the flow of treated water shall be provided.

(ii) A means shall be provided to measure the solution level in a tank and the quantity of the chemical used.

(iii) A sampling point shall be provided downstream of the fluoridation facility for measuring the fluoride level of treated water.

(e) Fluoride Feed Pump

(i) Sizing of fluoride feed pumps shall consider prevention of fluoride overfeed and operation efficiency.

(ii) A fluoride feed pump shall have an anti-siphon device.

(f) Electrical Outlet for Fluoride Feed Pump

(i) The electrical outlet used for a fluoride feed pump shall have interlock protection by being wired electrically in series with the well or service pump, such that the feed pump is only activated when the well or service pump is on.

(ii) The fluoride feed pump shall not be plugged into a continuously active ("hot") electrical outlet.

(g) Fluoride Injection

(i) The fluoride injection line shall enter at a point in the lower one-third of the water pipe, and the end of the injection line shall be in the lower half of the water pipe.

(ii) The fluoride injection point shall allow adequate mixing.

(iii) The fluoride injection point shall not be located upstream of lime softening, ion exchange, or other processes that affect the fluoride level.

(iv) Each injector shall be selected based on the quantity of fluoride to be added, water flow, back pressure, and injector operating pressure.

(v) If injecting fluoride under pressure, a corporation stop and a safety chain shall be used at the fluoride injection point to secure the injection line.

(vi) An anti-siphon device shall be provided for all fluoride feed lines at the injection point.

(h) Minimize Fluoride Overfeed

(i) In addition to the feed pump control, a secondary control mechanism shall be provided to minimize the possibility of fluoride overfeed. It may be a day tank, liquid level sensor, SCADA control, a flow switch, etc.

(ii) For fluoridation facilities that do not have operators on site, a day tank is required to minimize fluoride overfeed, unless two alternative secondary controls are provided.

(i) Housing

Fluoridation equipment shall be housed in a secure building that is adequately sized for handling and storing fluoride chemicals.

(j) Heating, Lighting, Ventilation

(i) The fluoridation building shall be heated, lighted and ventilated to assure proper operation of the equipment and safety of operator.

(ii) The ventilation in the fluoride operating area shall provide at least six complete room-air changes per hour.

(iii) The fluoride operating area shall be vented to outside atmosphere and away from air intakes.

(iv) Separate switches for fans and lights in the fluoride operating area shall be provided. The switches shall be located outside of, or near, the entrance to the fluoride operating area, and shall be protected from vandalism.

(k) Cross Connection Control

Cross connections shall be eliminated by physical separation, an air gap, or an approved and properly operating backflow prevention assembly.

(2) Additional Requirements for Fluorosilicic Acid Installations.

(a) Fluorosilicic acid shall not be diluted manually on site before injection.

(b) Solution Tank Vents.

(i) A solution tank shall be adequately vented to the outside atmosphere away from air intakes, above grade, and where least susceptible to contamination.

(ii) A bulk tank shall not share a vent with a day tank if there is a risk of solution overflow from the bulk tank to the day tank.

(iii) A non-corrodible fine mesh (No. 14 or finer) screen shall be placed over the discharge end of a vent.

(c) If separate rooms are provided in a fluoride building constructed after January 1, 2017, the design shall include a view window between the control room and the fluorosilicic acid operating area.

(d) Emergency eyewash stations and showers shall be provided.

(e) A neutralizing chemical shall be available on site to handle small quantity accidental acid spills.

(f) The use of personal protective equipment (PPE) is required when handling fluorosilicic acid, and shall include the following:

(i) Full-face shield and splash-proof safety goggles

(ii) Long gauntlet acid-resistant rubber or neoprene gloves with cuffs

(iii) Acid-resistant rubber or neoprene aprons

(iv) Rubber boots

(3) Additional Requirements for Fluoride Saturator Installations.

(a) A water meter shall be provided on the make-up water line for a saturator so that calculations can be made to confirm that the proper amounts of fluoride solution are being fed. This meter and the master meter shall be read daily and the results recorded.

(b) The minimum depth of undissolved fluoride chemical required to maintain a saturated solution shall be marked on the outside of the saturator tank.

(c) The saturator shall not be operated in a manner that undissolved chemical is drawn into the pump suction line.

(d) The make-up water supply line shall, at a minimum, either terminate at least two pipe diameters above the solution tank or have backflow protection.

(e) Make-up Water Softening

(i) The make-up water used for sodium fluoride saturators shall be softened whenever the hardness exceeds 75 mg/L.

(ii) A sediment filter (20 mesh) shall be installed in the make-up water line going to the saturator. The filter shall be placed between the softener and the water meter.

(f) Dust Control.

Provisions shall be made to minimize the creation of fluoride dust during the transfer of dry fluoride compounds.

(i) Air exhausted from fluoride handling equipment shall discharge through a dust filter to the outside atmosphere of the building.

(ii) Provisions shall be made to minimize dust when disposing of empty bags, drums or barrels.

(iii) A floor drain shall be provided to facilitate floor cleaning.

(g) Emergency eyewash shall be provided.

(h) The use of personal protective equipment (PPE) is required when handling dry chemicals and shall include the following:

(i) National Institute for Occupational Safety and Health (NIOSH) approved particulate respirator with a soft rubber face-to-mask seal and replaceable cartridges

(ii) Chemical dust-resistant safety goggles

(iii) Acid-resistant gloves

(iv) Acid-resistant rubber or neoprene aprons

(v) Rubber boots

(4) Additional Requirements for Fluoride Dry Feed Installations.

(a) Volumetric and gravimetric dry feeders shall include a solution tank.

(b) A mechanical mixer shall be installed in the solution tank.

(c) Dust control.

Provisions shall be made to minimize the creation of fluoride dust during the transfer of dry fluoride compounds.

(i) If a hopper is provided, it shall be equipped with a dust filter and an exhaust fan that places the hopper under negative pressure.

(ii) Air exhausted from fluoride handling equipment shall discharge through a dust filter to the outside atmosphere of the building.

(iii) Provisions shall be made to minimize dust when disposing of empty bags, drums or barrels.

(iv) A floor drain shall be provided to facilitate floor cleaning.

(d) Emergency eyewash shall be provided.

(e) The use of personal protective equipment (PPE) is required when handling dry chemicals and shall include the following:

(i) National Institute for Occupational Safety and Health (NIOSH) approved particulate respirator with a soft rubber face-to-mask seal and replaceable cartridges

(ii) Chemical dust-resistant safety goggles

(iii) Acid-resistant gloves

(iv) Acid-resistant rubber or neoprene aprons

(v) Rubber boots

KEY: drinking water, miscellaneous treatment, stabilization, iron and manganese control

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