**Section 653.701 Fluoridation - Engineering Design Criteria**

a) Procedure for Submitting Plans and Specifications - Design documents for fluoridation shall be prepared and submitted in accordance with 35 Ill. Adm. Code 602.

b) Basis of Design - Equipment shall have the capacity to maintain the fluoride content in the finished water between 0.9 and 1.2 mg/l.

c) Selection of Chemical - Fluoride compounds shall meet requirements of Section 653.202 and the AWWA Standards.

d) Chemical Feed Equipment - Feeders shall be accessible for repair and maintenance, protected against dust hazard and be accessible to the chemical storage area.

1) Weighing scales for measuring the daily amount of chemicals shall be provided for dry feeders.

2) Scales or a volumetric device shall be provided for determining the amount of solution fed.

3) Dust collection equipment and ventilation shall be provided where loading operations may create dust hazards.

4) Corrosion-resistant containers with non-corrodible covers and over-hanging edges shall be provided for solution feeders. Openings shall be constructed to prevent contamination.

5) A free chlorine residual of 10 mg/l shall be maintained in solutions prepared from dry chemicals. This chlorine residual shall not replace the chlorination requirement of 35 Ill. Adm. Code 604.401.

6) Chlorine shall not be added to hydrofluosilicic acid solutions.

7) Corrosion-resistant parts shall be used in the pump headers when hydrofluosilicic acid is fed.

e) Point of Application - The point of fluoride application shall be selected to provide uniform fluoride concentrations in the distribution system. Fluoride solutions shall not be applied ahead of ion exchange or lime softening processes.

f) Operating Controls - Controls which eliminate any possible hazard of over-dosing shall be provided and operate feed equipment only when there is flow past the point of application. Automatic stop-start operation and proportional feeding shall be used. Separate equipment installations shall be used where fluoridation at a single point is not possible.

g) Back-Siphonage Safeguards - Anti-siphon devices shall be provided for all make-up and dilution water lines and on the discharge side of the chemical feeder. An air gap or a siphon breaker in compliance with Section 653.801(d) on the downstream side of the last control valve in the water supply line serving the feeder shall be provided.

h) Auxiliary Treatment - Water used for preparing batch solutions or used for dry feeders shall be softened or stablilized with polyphosphates if precipitation of fluoride compounds interferes with the accuracy of the fluoride feeding equipment.

i) Safety Items - Rubber gloves and a dust mask shall be provided with each installation using dry chemicals. Rubber gloves, acid-resistant aprons and protective goggles shall be provided where hydrofluosilicic acid solutions are fed.

j) Metering - Facilities shall be provided for metering the dilution water and the plant discharge to the distribution system.

k) Testing Equipment - Testing equipment for fluoride ion concentration determination shall be provided and shall be:

1) a colorimetric comparator, or

2) a specific ion electrode with expanded scale pH meter.

l) Sampling Taps - Sampling taps shall be provided and located such that representative samples can be obtained from:

1) the raw water line before fluoride solution is added, and

2) after fluoride solution is added and has thoroughly mixed with the water being fluoridated.