

HOW TO CALCULATE AND REPORT FLUORIDE USAGE

By Russ Topp, Circuit Rider

As many of you are probably aware, the State Legislators have passed a bill that requires public water supplies over 1,000 in population to fluoridate their water supply unless it was voted out by the people. There were several systems across Nebraska that will now have to fluoridate their water supply and the deadline is quickly approaching. I have gotten a few calls recently from water operators concerning fluoridation. Some operators are asking how to calculate the dosage and what reporting requirements they will have to comply with. A couple of years ago I wrote an article on this subject but I think it might be a good time for a refresher.

Andy Kahle is the manager of this rule and he has developed a reporting form for water operators to use. Water systems are required to track daily fluoride usage. Usually a day tank is used on a small balance beam-type scale at the point of entry. The operator must weigh the fluoride tank every day and record each day's use in the appropriate column. The amount of water treated must be recorded in its column and a simple calculation to determine in ppm the amount of fluoride that has been added to the water. For Fluorosilicic Acid the equation is (pounds of chemical added x percent purity (0.23) x percent fluoride ion (0.79)) ÷ (8.34 x million gallons of water treated). This form must be filled out each month and either mailed or e-mailed to Andy by the 10th of the following month. The Operator must also collect a monthly sample to be sent to the state lab for analysis. This sample usually comes with your monthly coliform sample. The optimal fluoride level is 1.0 ppm. Sample results should be between 0.8 ppm and 1.5 ppm with 0.8 ppm to 1.3 ppm being optimal. If you have samples over 2.0 ppm you could be issued a secondary violation, and if samples are over 4.0 ppm you could be subject to an MCL violation.

The best way to insure the fluoride pumps are set to the 1.0 ppm level is to perform your own fluoride test. Most of you either have or have used a chlorine pocket colorimeter. Lab equipment companies make a fluoride tester that looks much the same as the chlorine tester. Most of these tests kits use the SPADNS reagents. If you purchase one of these test kits and would like me to stop by and show you how to operate it, just give me a call.

The other way is to calculate your fluoride levels. This is not nearly as precise as using a test kit. First you must know your natural fluoride in your ground water. Most ground water in Nebraska is between 0.1 ppm and 0.4 ppm.

Here is an example of how to calculate the dose for your chemical feed pump to inject Fluorosilicic Acid.

- Remember 1.0 ppm is the optimum level.
- The natural level in our well is 0.3 ppm.
- 1ppm - 0.3ppm = 0.7ppm. This means we need to set our pump to inject 0.7 ppm.
- In this example our well pumps 600 gallons per minute.

- We have a 5 gallon per day feed pump.
- The equation for fluoride dosing is: million gallons per day (MGD) x Dose ÷ (percent strength x actual fluoride Ion)
- Normally Fluorosilicic Acid is 23% strength and the fluoride Ion is 79%. Be sure to check the label on your chemical tank.
- Normally the denominator will be 0.23 x 0.79 or 0.1817
- Remember our well pumps 600 gpm so 600 x 1440 (minutes in a day) = 864,000 gallons.
- Move the decimal point 6 places to the left this equals 0.864 MGD.
- Remember the dose is 0.7 ppm
- $0.864 \text{ MGD} \times 0.7 \text{ ppm} = 0.6048$
- $0.6048 \div 0.1817 = 3.32$ gallons per day
- $3.32 \div 5 \text{ GPD pump} = 66\%$
- Set the pump at 66%
- This should give you 1.0 ppm total fluoride.
- Remember the chemical pump must be plugged into you chemical feed outlet.

After all that, the tester looks a lot simpler to use, doesn't it?

Let me know if you need some help with your fluoride reporting.