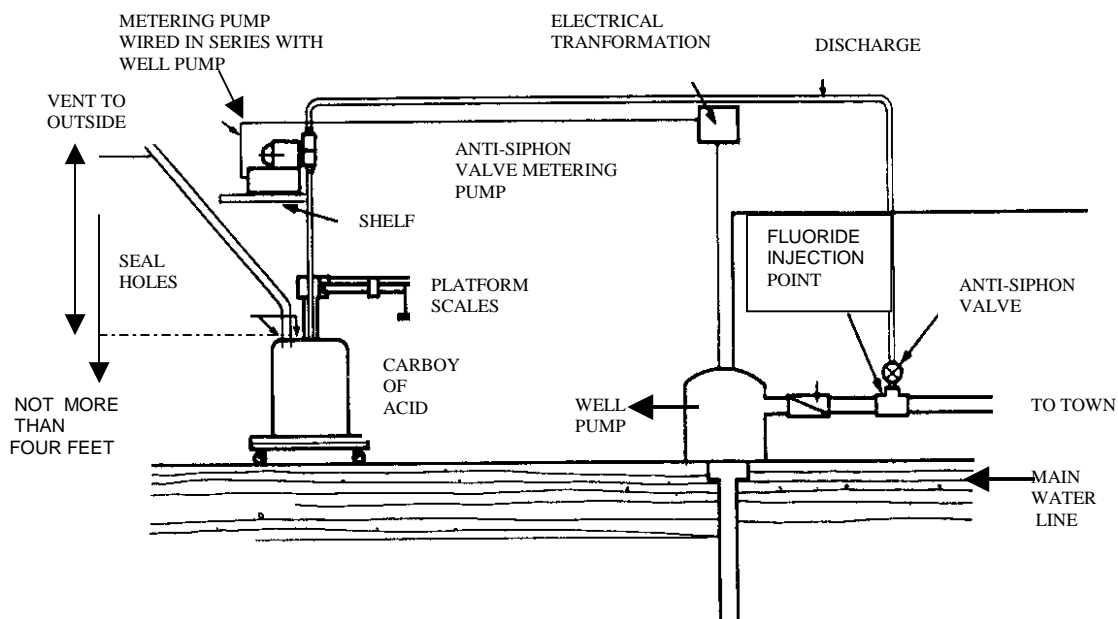


The metering pump should be located on a shelf not more than 4 feet above the carboy or solution container, if possible. Note: Many manufacturers recommend that the pump be located so that it has a hooded suction line (low). This is not recommended in fluoridation. The suction line should be as short and straight as possible, there should be a foot-valve and strainer at the bottom and, if necessary, a weight to hold it down.

FIGURE 4-5
FLUOROSILICIC ACID INSTALLATION - CARBOY (DRUM) STORAGE



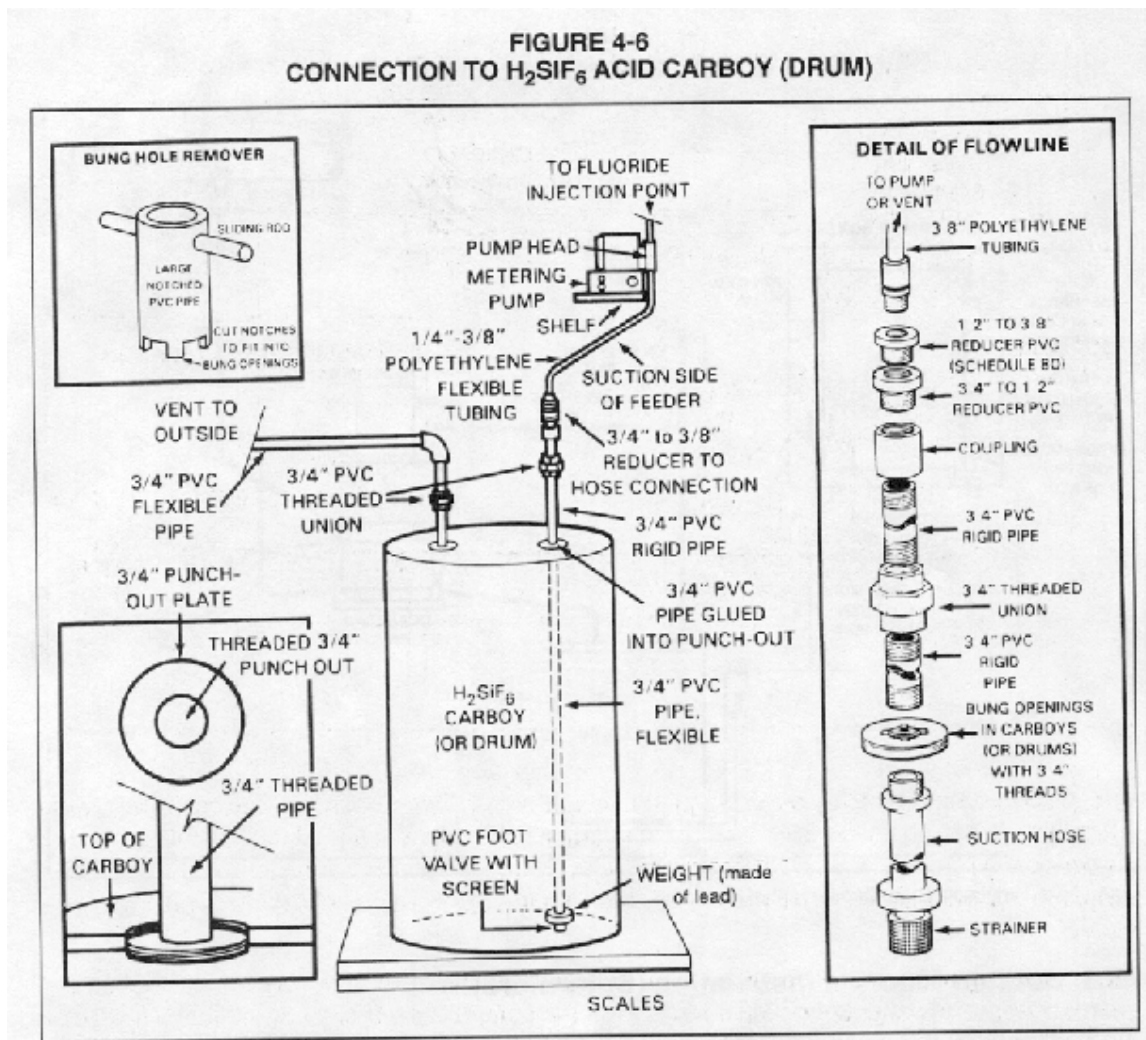
The discharge line from the metering pump should be as short and straight as possible. Avoid sharp curves or loops in the line. Injecting solution into the top of a pipe should be avoided, since air collects there and can work its way into the metering pump check valve or the discharge line and cause air-binding. It is recommended that an anti-siphon valve be installed at the injection point.

Many metering pumps come equipped with, or have available as an accessory, an anti-siphon discharge valve. This may be mounted directly on the pump head. If solution is to be fed into an open channel or a low-pressure pipeline, a "loaded" discharge valve should be used. This is a spring-loaded check or diaphragm valve, which will not open until the pump discharge pressure exceeds a certain timed value. A common setting is about 15 psi.

As mentioned above, the carboy of acid should be completely sealed. This is a major problem at many fluoridation sites. Several kinds of carboys are used as containers for acid. The most common (and the latest style) is a flat top. An example of how the carboy or drum container can be sealed is shown in **Figure 4-6 below**.

Many states are concerned about the possibility of a fluoride overfeed not only because of the risk to health involved but also because of the adverse publicity. If this becomes a major consideration, a physical break box can be used. (See **Figure 4-7 page 73**) The break box reduces the chance for an overfeed from siphoning, with only a marginal increase in cost. Only the amount of acid in the break box can be siphoned into the main water line. Even in very small installations, this amount would be relatively insignificant. This rather ingenious installation was developed by the state of Minnesota. The major difference in cost is the dual head metering pump instead of a single head metering pump.

**FIGURE 4-6
CONNECTION TO H₂SIF₆ ACID CARBOY (DRUM)**

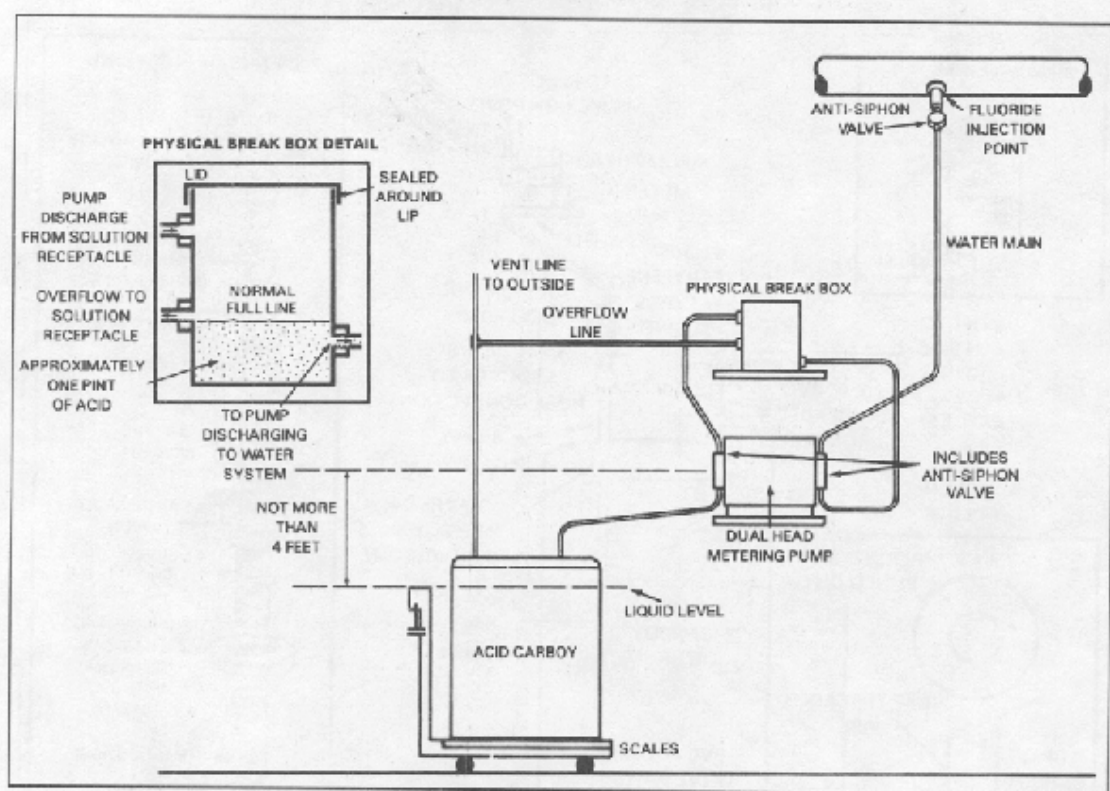


The installation of an acid feed system in a larger water plant that uses bulk storage is similar to the simple well installation with some exceptions. (See **Figure 4-8 page 75**) A day tank is necessary instead of a carboy. Under normal operating conditions, the day tank should not contain over a 2 days' supply of acid. The day tank must also be sealed around the outer lip of the container, the vent hole, the pump suction line opening, and the fill pipe entrance.

There should be flexible connections in the bulk storage line and in the pump suction line (if it is not flexible tubing). This is to prevent inaccurate reading on the scales. The vent line should go from the day tank to the bulk storage tank (near the top), instead of just to an outside wall. The metering pump should discharge the acid into the line going into a clearwell. If the discharge is directly into the clearwell, the anti-siphon device is still needed at this discharge point.

The bulk storage tank must be vented on top and should be surrounded by a berm to contain any spills. The acid will freeze if exposed to sustained temperatures at or below 4 degrees F. Therefore, in northern climates, the bulk storage tank must be protected from freezing.

**FIGURE 4-7
BREAK BOX INSTALLATION**



*Courtesy of Minnesota State Department of Health

4.5.3 Sodium Fluoride Installation (Saturators)

The sodium fluoride saturator is a very simple fluoridation system. It requires only a little more space and piping than the straight acid feed. Many of the same comments made on the acid feed installations apply to the saturator installations. The metering pump should be located not more than 4 feet over the low saturated water line in the saturator. The suction line should be as short as possible. The metering pump should be equipped with an anti-siphon valve. There also should be an anti-siphon valve at the fluoride injection point if the fluoride solution is injected into a water main.

The fluoride saturator does not need to be sealed as tightly as the acid carboy. Saturator systems should have a water meter and, if necessary, a water softener. The feed water line should contain a Y-strainer and sufficient unions to allow easy removal of piping.

When mounting a metering pump on a shelf or platform above the saturator, it is advisable to offset it sufficiently to permit access to the container for filling and cleaning. Mounting the metering pump on the lid of the saturator is not recommended.

A saturator should never be pushed to its design capacity limit for any length of time. When a saturator's capacity is approached, then another method of fluoridation should be considered, such as the use of fluorosilicic acid.

**FIGURE 4-8
FLUOROSILICIC ACID INSTALLATION - BULK STORAGE**

