ALABAMA COOPERATIVE Extension SYSTEM

ALABAMA A&M AND AUBURN UNIVERSITIES

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Possible Treatments
Chemical Feed Pumps

A chemical feeder or a chemical feed pump feeds chemical compounds, either as dry, soluble crystals or as a solution, into water. This method can be used to treat several water quality problems. Acidity (corrosiveness), bacterial contamination, and high iron content can all be treated with chemical feed pumps.

How Chemical Feed Pumps Work

The chemical feeder consists of a tank filled with a chemical compound. The tank is installed so that water passes through it and picks up the chemical. The rate at which the water picks up the chemical is controlled by either (1) how fast the chemical dissolves or (2) how fast the water flows through the tank. (Some feeders use both methods.)

A chemical feed pump has a tank filled with a chemical compound. The pump can be set to inject a specific amount of the compound in liquid solution from the chemical feeder tank into the water at regular intervals. If the chemical feed pump is wired to operate with a well pump of the same voltage or through a transformer, then the solution is accurately proportioned to the water flow. The chemical solution and water are then mixed in the pressure tank. All chemical feeders must be refilled with the chemical compound periodically.

How fast water flows through the tank can be regulated in several ways. Some chemical feeders incorporate pressure differential devices, precision orifices, or both within the feeder. Other feeders are used with a valve in the main water line to create slight resistance to flow and force some water flow through the feeder tank. Sometimes this valve is incorporated directly into the feeder design.

What Chemical Feed Pumps Treat

Acidity (Corrosiveness). Corrosion caused by a high concentration of dissolved minerals in slightly acid water can be controlled by either food-grade polyphosphate or silicate compounds. These compounds can be fed into the water system where they deposit a very thin film on interior metal surfaces to minimize the water-to-metal contact. The film redissolves slowly, so the amount of polyphosphate or silicate material that is fed should be controlled carefully to maintain the protective film. Initially, old corrosion deposits often loosen and flush through the system. They appear to make a "red water" problem worse. A higher feed rate cleans the system and reestablishes the film.

Another method of neutralizing acid water and, thus, controlling corrosion is to feed a soda ash solution, or sodium carbonate, to the water supply through a chemical feed pump. This pump can operate with a well pump to produce an adequate amount of soda ash in the water flow. Soda ash solution added ahead of the pressure tank produces the best results. The rate of the feed pump should produce a treated water pH of 7.5 to 8.0.

Bacterial Contamination. Continuous chlorination to disinfect a private water source and control bacterial contamination is also accomplished with the chemical feed pump. The pump is used to inject a chlorine solution into the water line between the well pump and the pressure tank. A chlorine solution may be prepared from household hypochlorite bleach, strong hypochlorite solutions used by commercial laundries, or from dry powder or tablet forms of calcium hypochlorite. These materials are available in most areas.

An activated carbon filter in the water line placed after the pressure tank removes any precipitated matter, any chlorinated by-products, and the bad tastes and odors of high chlorine concentrations. A small sampling valve in a tee ahead of the filter makes checking chlorine concentration convenient.

High Iron Content. When both high iron content and bacterial contamination are a problem, hypochlorite bleach and soda ash may be mixed in a single solution and fed into the water system with the same pump. Precipitated iron must then be filtered out before water goes to a storage tank. An activated carbon filter should be placed after the storage tank to remove excess chlorine and potential by-products.

An alternative treatment for high iron is stabilization with polyphosphates. Food-grade polyphosphate compounds are fed into the water by a chemical feeder or a chemical feed pump. These polyphosphate compounds react chemically with the dissolved iron to keep it in solution and thus prevent problems caused by staining and deposits in pipes and water-using equipment. The feeder is connected ahead of the pressure tank because the iron must still be in solution for the polyphosphate to work. Once the iron-laden water has been exposed to air in the pressure tank, rust particles form and the polyphosphate is ineffective. Polyphosphate feeders handle up to 2 mg/L of dissolved iron. These units are ineffective if the iron is oxidized and already settled out as rust particles, or if iron bacteria are present.

Treatment with polyphosphate has its drawbacks. Heat will convert the polyphosphates to orthophosphate which no longer keeps the iron in solution. Most polyphosphates are sodium salts like sodium hexametaphosphate and, thus, add sodium to the water. Finally, the use of polyphosphates can stimulate bacterial growth and cause water pollution. For these reasons chlorination followed by filtration is considered a better alternative for treatment of iron.

Chemical Feed Pumps At A Glance

How Chemical Feed Pumps Work: Feed compounds either as dry soluble crystals or as a solution.

Pros/Cons: *Chlorine:* Most effective in removing high iron. Combines with organics or with inorganics such as ammonia to produce chlorinated organic chemicals. Test to assure proper chlorine levels. *Polyphosphates:* May stimulate bacterial growth and pollute water.

Maintenance: Refill periodically with the chemical compound.

References

Hermanson, Ronald E. 1991. Corrosion From Domestic Water. EB1581. Washington Cooperative Extension Service. Washington State University. Pullman, WA.

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For more information, call your county Extension office. Look in your telephone directory under your county's name to find the number.

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