



RECOMMENDATIONS FOR THE TREATMENT OF DRIP IRRIGATION SYSTEMS WITH ACID

CAUTION: Always consult with an authorized distributor for proper guidance before utilizing any of the steps listed here. Always add acid to the water and not water to the acid.

GENERAL

Treatment with acid is mainly needed to dissolve precipitates of lime (calcium carbonate) and calcium residue from fertilizer applied under high pH conditions from in the irrigation system. It might be used to clean the drippers' water passages from other mineral deposits like ferric oxides. This does not treat algae and other organic matter problems.

TYPE OF ACID: To save money, concentrated and inexpensive technical acids should be used, such as concentrated technical hydrochloric, nitric or sulfuric acid. Phosphoric acid, applied as fertilizer through the drip system, might, under certain conditions, act also as a preventive measure against the formation of precipitates.

SAFETY PRECAUTIONS: Contact of the acid with the skin can cause burns. Contact with the eyes could be extremely dangerous. During treatment, and especially when filling containers with acid, wear protective goggles, clothes and boots. Follow the instructions on the Material Safety Data Sheet (M.S.D.S.) attached to the delivered acid. Always add acid to the water and not water to the acid.

PROBLEMS OF CORROSION: Polyethylene and PVC tubes are resistant to acid. Aluminum, steel, (with or without inner concrete coating) and asbestos-cement pipes are damaged by corrosion. In every case, resume normal water flow through the system after completion of treatment for at least one hour in order to flush any remaining acid. The importance of flushing cannot be over emphasized when the pipes used are particularly sensitive to corrosion.

METHOD OF OPERATION: Acid can be applied through the drip-irrigation system by a fertilizer pump resistant to acids or by conventional control head with a fertilizer tank.

CALCULATION METHOD

The injection rate of the acid to the treated zone can be figured in the following way:

$$(\text{FLOW IN GPM}) \times .36 = \text{INJECTION RATE IN G.P.H.}$$

For example: Flow = 100 g.p.m. $100 \times 0.36 = 36 \text{ g.p.h.}$

Question: What amount of acid (in gallons) is required?

Answer: Since the acid should be injected for only fifteen minutes, the total gallons of acid to be used will always be a fourth of the injection rate.

For example: $36/4 = 9$ gallons.

NOTE: Under certain conditions, i.e., hard water with a very high pH, there might be a need to raise the acid concentrate in the system to 1%. Please consult your local fertilizer supplier, extension service or consultant prior to such a treatment.

APPLICATION OF ACID BY FERTILIZER PUMP

The goal of acid treatment is to lower the pH level of the water in the irrigation system to values between two to three for a short time (twelve – fifteen minutes). This is achieved by injection of a suitable quantity of acid into the system.

INSTRUCTIONS:

1. Determine the discharge of the water from the system through which the acid will be injected, and the discharge of the fertilizer pump.
2. Calculate the required amount of acid that should be injected into the system in order to get 0.6% of acid concentration in the irrigation water.
3. Inject the acid into the system within fifteen minutes only after the system has reached maximum operation pressure.

NOTE: Acids suitable to be injected in 0.6% concentrations are:

Nitric Acid	60%	Phosphoric Acid	75% - 85%
Sulfuric Acid	90% - 96%	Hydrochloric Acid	30% - 35%

It seems that the most economical acids are sulfuric acid (battery acid) and hydrochloric acid (swimming pool acid).

4. Immediately after applying the acid, clean the filters.
5. Flush the system with clean water as follows: flush the mainlines first, then the manifold lines and finally the drip lines by opening several lines at a time (for example: ten lines) so that enough pressure is maintained to get a vigorous flush. Flush the lines for about 1 minute or until the water is clear. Close the open ten lines and open the next ten lines.

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