Maintenance Considerations for Drip Irrigation Systems

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Summary. Because drip irrigation systems are very susceptible to clogging, maintenance revolves around flushing the system. Both primary and secondary filters and main and lateral lines and drip tubes require flushing on a regular basis. Chlorination and use of acid often are necessary for keeping lines clear of contaminants. Rubber gaskets and diaphragms should be replaced every 2 years. A water meter will assist in assuring that desired application rates are being obtained. The use of air vents assures that air locks do not reduce system efficiency. The calibration of injector pumps should be verified at least two times per season.

The maintenance of a drip irrigation system is almost as critical as its design. The operator must take the responsibility for proper maintenance. Maintenance can be summed up in three words: "flush, flush, flush." This may appear to be an oversimplification, but more often than not clogging of drip lines is the result of insufficient flushing. All parts of the system, i.e., primary and secondary filters, main, lateral, and drip lines, require regular flushing. Another essential component of a good maintenance program is frequent observation to assure that all parts are operating properly. Using ,a water meter will give early warning of possible malfunctions within the system, because altered flow compared with that expected in a given time period may indicate clogging or leaks.

Primary filters such as sand, screen, or disk filters should be flushed when the pressure differential across the filter exceeds 5 psi. Backflushing of media filters should not be required more frequently than every 30 min. If it is required more frequently when using stream water, irrigation should be delayed until the stream clears. If water from an impoundment such as a pond is used and backflushing is required more frequently than every 30 min, the pond should be treated to eliminate the contaminants. If a well is the water source, then an additional contaminant-handling system should be added. It is important to prevent the build-up of contaminants in a sand/media filter (5 psi differential usually indicates-1 inch of contamination in the sand/media). The deeper the contamination is in the sand/media bed, the more difficult it becomes to backflush the system. When the cores of screen or disk filters become clogged, they need to be exchanged with clean cores to allow adequate time to clean the dirty core. The new spin-clean units increase ease of operation, since they clean themselves when triggered by a pressure differential.

If the ***secondary filter*** reaches the 5 psi differential more than once per day, attention should be given to the primary and secondary filter systems. It is wise to have a spare secondary filter core to prevent down-time of the system.

It is essential to flush ***main and lateral lines*** when system use begins each spring. Soil and other foreign material can enter the system during the winter. Using an acid or chlorine wash at the end of the season also reduces contamination. However, it is important to flush all acid and chlorine from the system before closing it for winter.

Flushing ***drip lines*** is a simple task that can be performed by the system operator on a regular basis. Automatic flush valves on the ends of lines can be useful but are often an unnecessary expense. If the operator determines that there is contamination in the ends of the drip lines, the end stopper on 10 to 15 drip lines can be removed to check what flushes from the line. Usually by the time the last stopper is removed, the first line is clear. Then simply double back and replace the stoppers. Some operators prefer to tie a knot in the end of the line and cut it open when flushing; this can work, but often it results in wasting water because of end leaks. Checking lines weekly will help prevent problems.

Chlorine and/or injection of acid into the irrigation water often is done during theseason. The need and frequency for these additions will depend on the water quality and degree of contamination. Both products are corrosive, may harm injection pumps, and should be flushed thoroughly from the pump before system shutdown.

The small amount of light that penetrates the PVC pipe or fittings will allow algal growth. All white PVC pipe and fittings should be painted with latex paint and kept painted to reduce algal growth.

Rubber ages and loses its flexibility, causing ***seals and diaphragms*** to malfunction. Rubber seals are replaced as needed, usually every 3 to 5 years, to avoid time-consuming repairsduring the busy operation season. Solenoid diaphragms usually are made of rubber and should have a similar replacement schedule.

In-field ***computers*** are subject to lightning strikes. There are several lightning arresters on the market. It is wise to install one with your computer to minimize damage. However, you should keep a spare computer mother board on hand in case of damage. A direct strike can "fry" the whole system. Besides the high voltage there is usually a lot of static electricity generated in the air, which goes around any in-line protection. Lightning is a very limiting factor on some sites.

A ***water meter*** may not seem like a maintenance item, but regular observation can be used to determine that every part of the system is operating properly. Recording water application in gallons, rather than time of application, assures that the crop is receiving the desired amount of water and that the irrigation system is functioning properly.

Air vents are an important part of an irrigation system. Even with the relatively low operating pressures of a drip system, air hammer can cause severe damage. Replacement of a cracked supply line during the season when a crop needs water can be very costly. Installation of air vents at the high spots of the system is important, but it is also a good idea to have air vents at major turning points in the system, at the pump, and at the end of main lines.

Fertigation is a critical function of most drip irrigation systems. The ***calibration of fertigation*** pumps is essential. There are enough variables in an irrigation system without adding fertilizer variation. Over- or underfertilization, because a fertigation pump is not calibrated properly or is notfunctioning properly, is wasteful. Such variation also may result in uneven plant growth and affect quantity and quality of production.

With time, the sand or crushed granite in a ***sand/media filter*** becomes contaminated and should be replaced. Also, some sand or granite is lost each time the filter is backflushed, so the depth of the media bed and its effectiveness are reduced over time. The sand or granite level needs to be checked twice per season and replaced at least every 2 years. Depending on wear, filter cores in secondary filters should be replaced every 5 or 6 years.

Pressure regulators are essential to maintain the design flow rates in the system. It is important to check the calibration and pressure in drip lines at least once per season. If drip line pressures are not within specifications, clogging may have occurred, or the system may be designed beyond component capacities.

Pressure gauges should be checked to ensure that they function properly. High-quality gaugeswill eliminate many gauge operation problems.

Finally, regular pump maintenance during the off-season helps assure smooth operation during the irrigation season. Attention should be paid to proper and timely motor or engine service and parts replacement

Drip irrigation system maintenance involves common sense. It is not complicated, but it does require timely practice. Careful and appropriate maintenance will help to assure trouble-free operation.

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