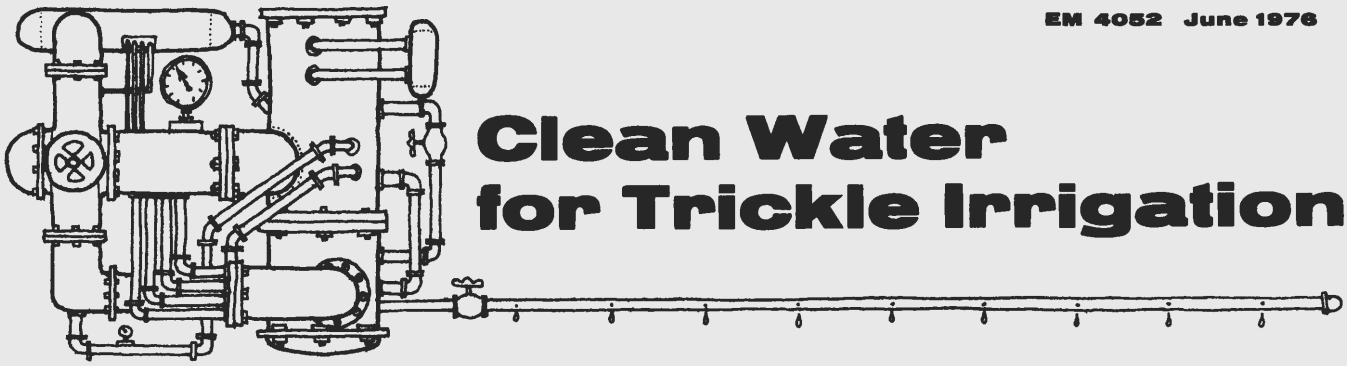
EM 4052 June 1976



Clean Water for Trickle Irrigation

Emitter plugging or blockage is the major deterrent to the use of trickle irrigation.

Satisfactory operation of trickle systems has been obtained by cleaning up irrigation water in a series of steps according to the severity of the solids, floating material, and chemical and bacterial content of the water. Equipment and procedures should be planned to meet the worst projected conditions.

The following applications have given satisfactory results.

1. Clean well or spring water without sand and bacterial growth and low in mineral content should need no cleaning after lines are installed and flushed.

2. Well water with sand only will need a settling basin and/or separator.

3. Slightly dirty or silty water or water with algae will need a screen and sand filters. A double reverse flushing type is preferable.

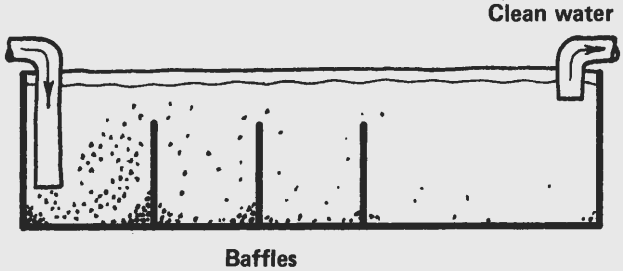
4. Very dirty and silty water needs a screen, settling basin, separator, and sand filters. An automatic reverse flushing type is preferred.

5. All lateral and main lines will need flushing regularly to remove fine material not removed by filters. Periodic checks should be made of emitter flow. If one emitter is plugged, usually more will be partially plugged. Plugged emitters can be opened using syringes or tire pumps or shop tank-type compressors to blow into the ends of lateral lines. The main lines should be open.

6. Chlorine should be used at 10 ppm residual for 20 minutes each day or 1 ppm residual applied continuously in water with a potential of bacterial growth. Ten ppm should not be used if there is a possibility of anyone drinking the water. Liquid chlorine is available in many concentrations, with higher concentrations costing less. Dairy supply houses are one source of high concentration liquids. Other bactericides can be used. Liquids can be fed into the pump bay, into the pump intake, or put into the line under pressure. Crystal forms can be placed in noncorroding containers with holes and placed anywhere in the system, preferably before the water goes through the sand filter. The amount of residual chlorine can be checked with a simple indicator kit usually sold by swimming pool suppliers or drug stores.

7. Well water with iron, sulfur, or heavy concentrations of any minerals should be checked to determine the amounts and forms of these materials for possible chemical correction.

8. Emitters should not be operated in a pool of water or in mud which can be sucked back into the line when the water is turned off. This helps prevent bacterial growth and plugging.



SETTLING BASIN—the longer and deeper the better, but build so sediment can be cleaned out.

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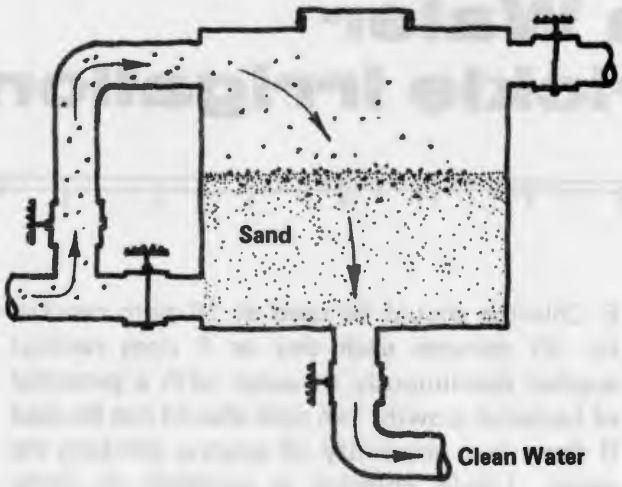
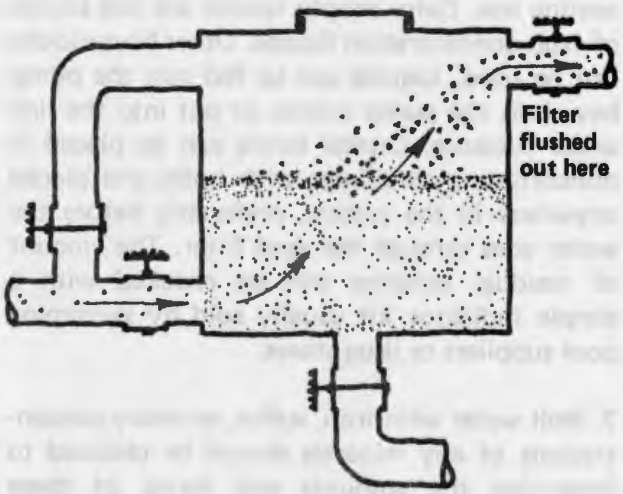
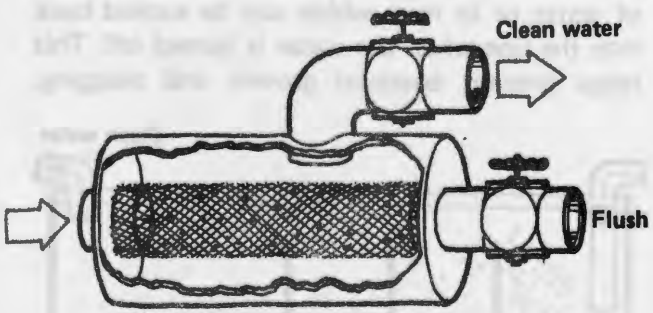
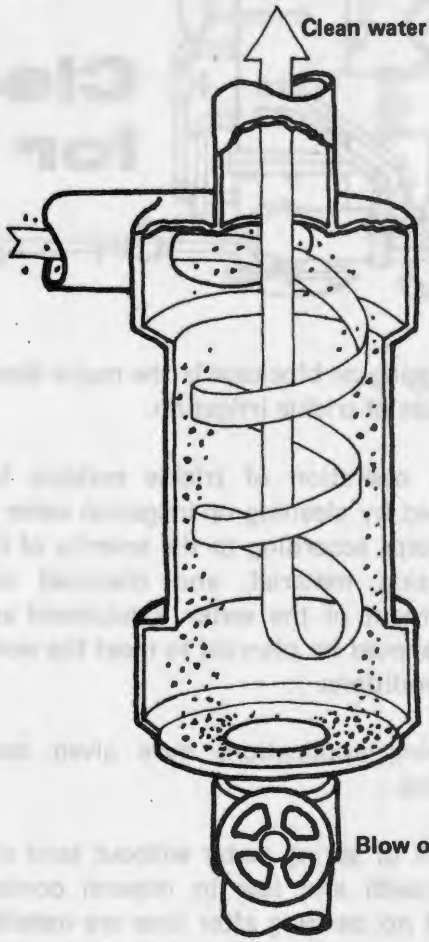




SAND FILTER—commercially available.



SCREEN FILTER—available commercially in singles, multiples, and automated for reverse flushing.

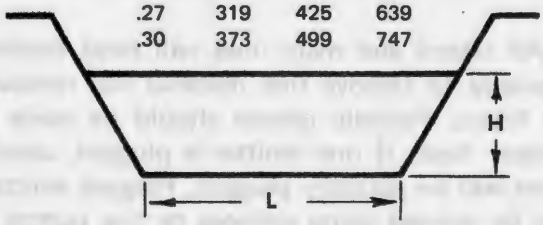


CYCLONIC FILTER—commercially available.

AIDS FOR DETERMINING AMOUNT OF CHLORINE TO APPLY

flow rates over a weir blade

	L (ft)		
	1.5	2.0	3.0
H (ft)	gal/min		
.10	72	96	143
.15	132	176	264
.20	203	271	406
.25	284	379	567
.27	319	425	639
.30	373	499	747



For 10 ppm—multiply flow rate (gal/min) x .0128 = ounces
10 ppm—multiply flow rate (gal/min) x .0378 = cc

Example: If flow rate is .2' over a 1.5' weir blade, there are 203 gal/min flowing.

203 x .0378 = 7.67 cc/min x 20 min = 153 cc = actual chlorine needed per treatment

Household bleach at 6% chlorine would require $\frac{153}{.06}$ = 2550 cc

To check residual chlorine, use a test kit and sample at emitters.

By Pat Middleton, Associate Agricultural Engineer, and Mel Hagood, Extension Irrigation Specialist, Washington State University, Pullman.