

Maintaining Microirrigation Systems When Using Well Water

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Groundwater issues which can cause clogging of microirrigation systems

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2. Groundwater quality may result in chemical precipitation.

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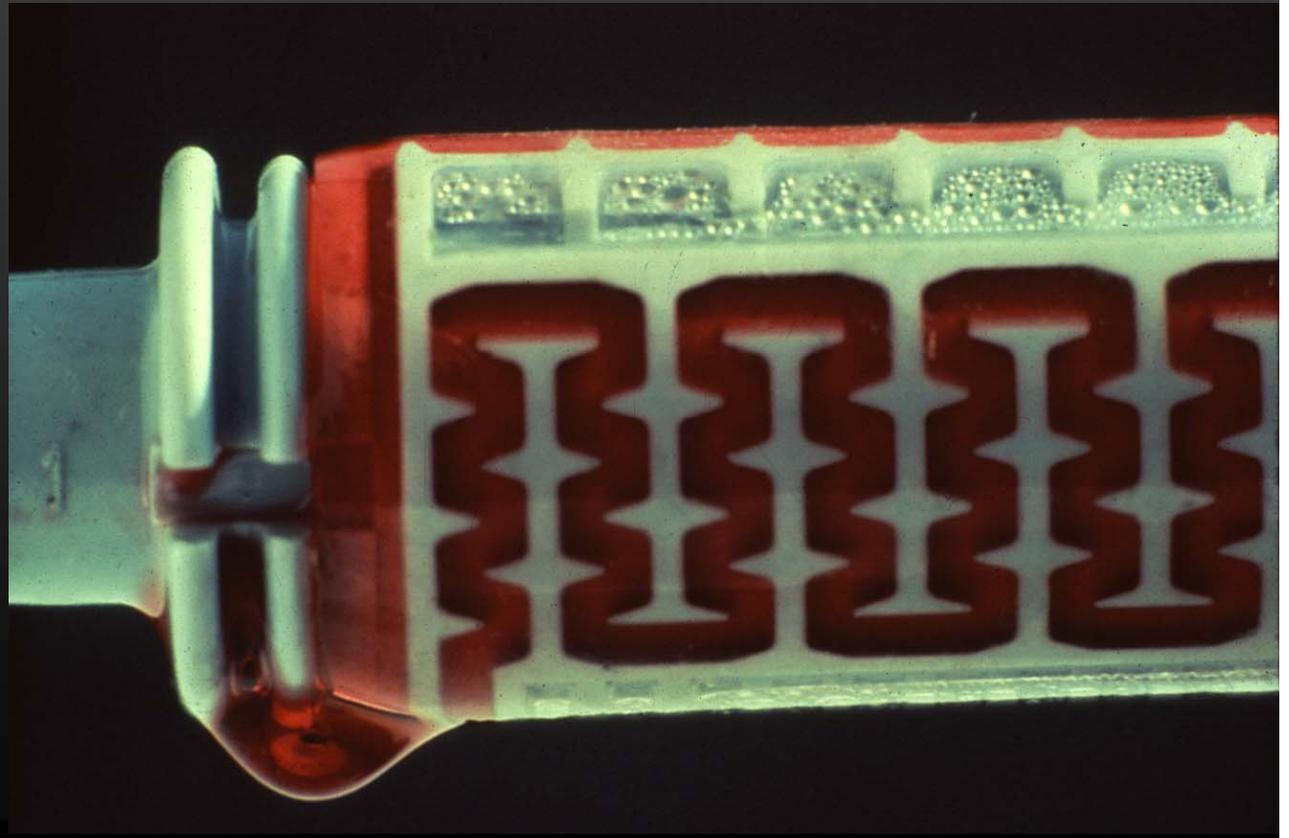
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2. Groundwater quality may result in chemical precipitation.
3. Biological clogging issues not as common with groundwater
 - Iron bacteria problems can occur.

Groundwater issues which can cause clogging of microirrigation systems

1. Sand and other particulates can be pumped from the well.

Emitters:

Passageways for drippers and microsprinklers are very small.



Clogging of Microirrigation Systems

Source: Physical Clogging - Particulates

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Solution: Filtration



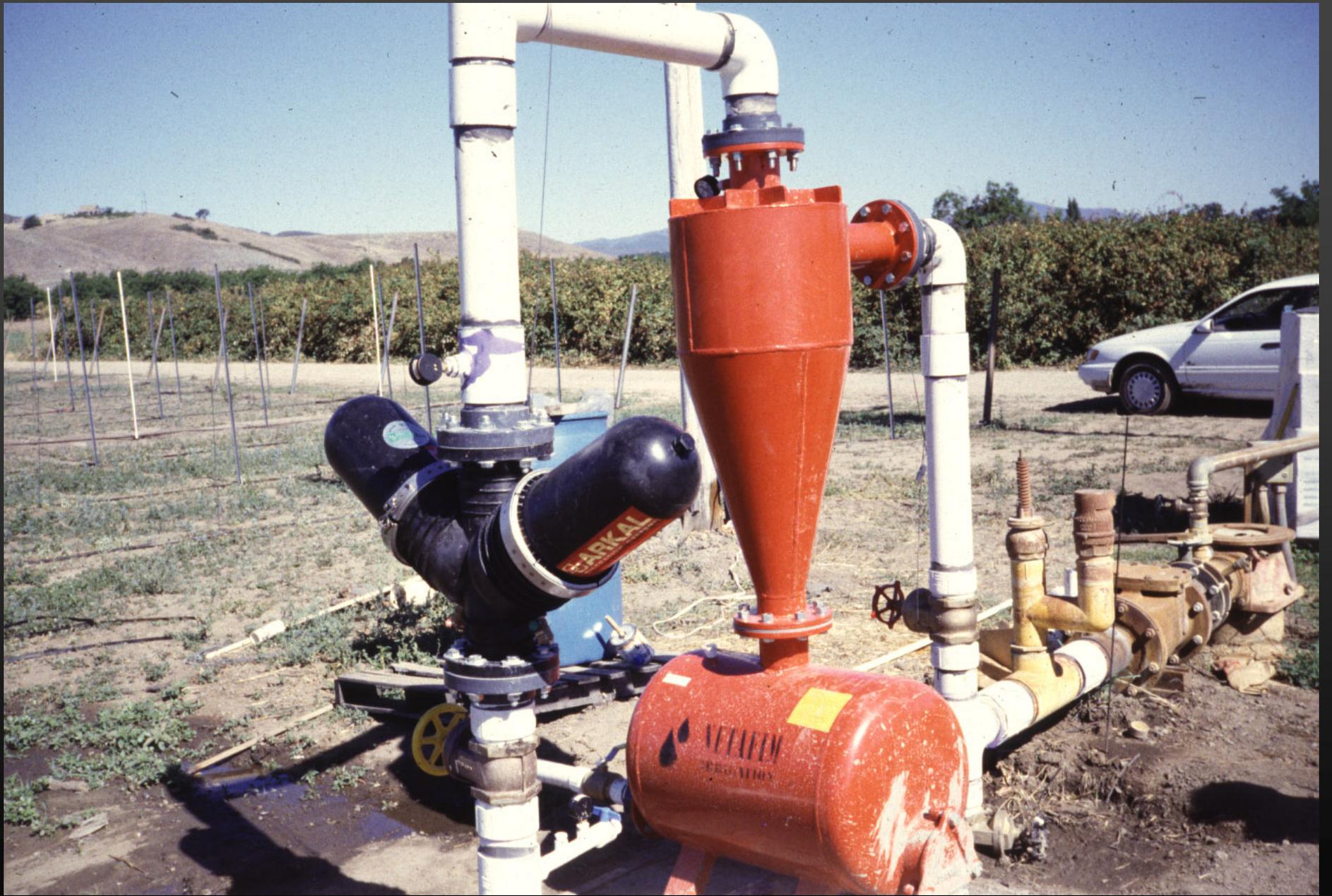
Filters:

- Screen, disk, and sand media filters are all available.
- They can all filter to the same degree
BUT
they req. different frequency of cleaning.



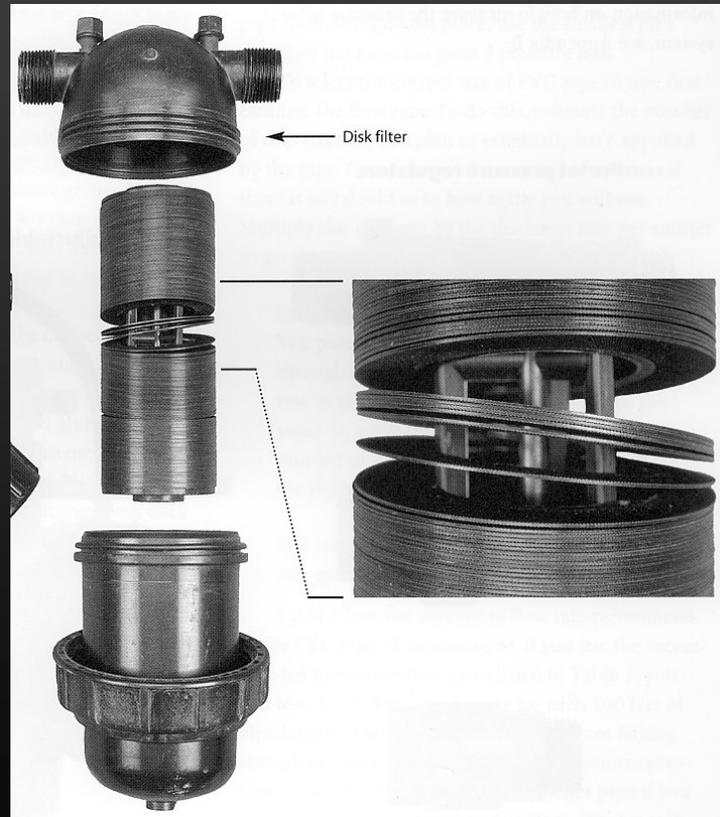
Screen Filters:

Soil Particle	Particle Diam (mm)	Mesh Size	Mesh Opening Size (mm)
Very coarse sand	1 - 2		
Coarse sand	0.5 - 1	20	0.711
Medium sand	0.25 - 0.5	40	0.420
Fine sand	0.1 - 0.25	100	0.152
Very fine sand	0.05 - 0.10	200	0.074
Silt	0.002 - 0.05	320	0.044
Clay	< 0.002		



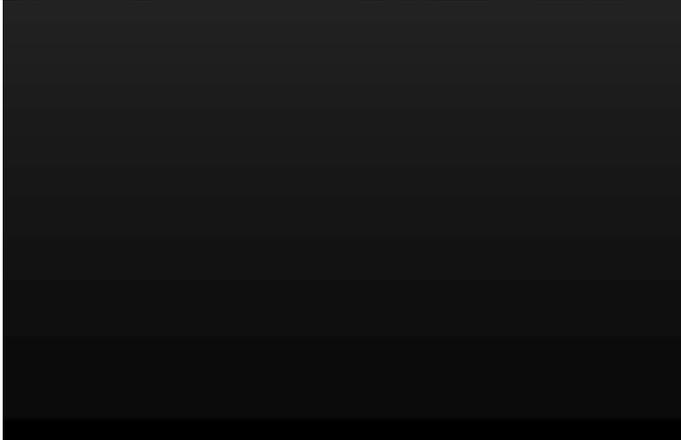
Disk Filters

- Filtration designated as mesh size.



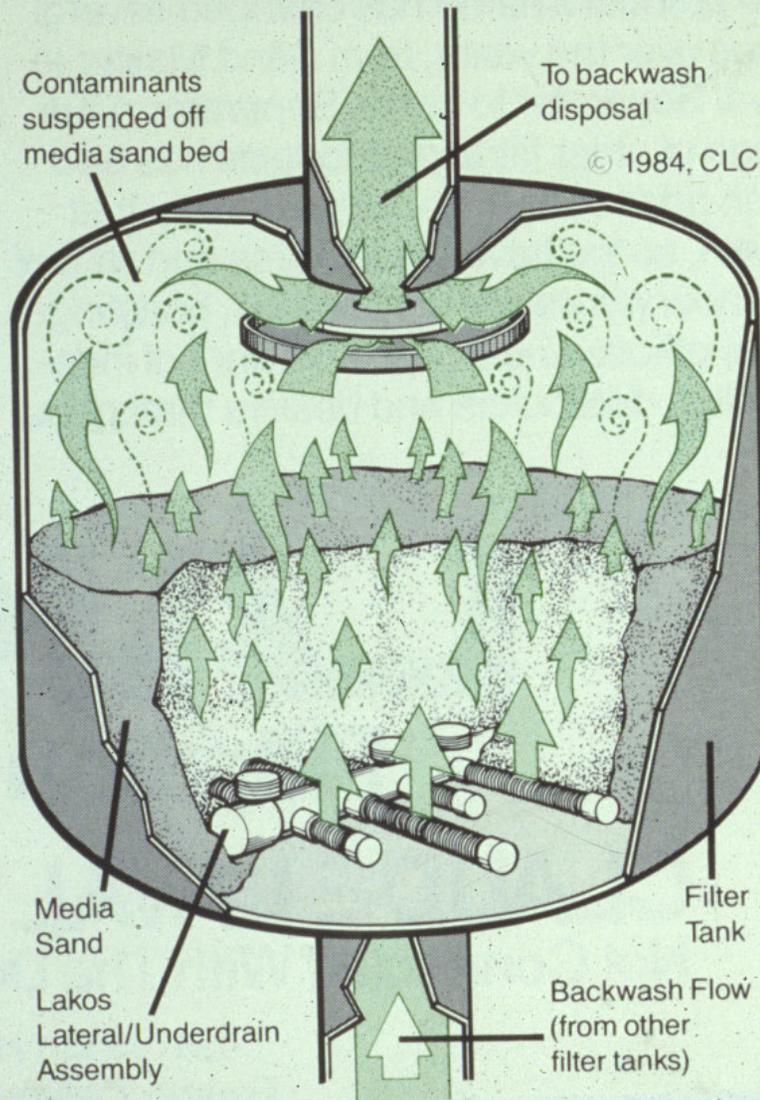
Disk Filters

- Organic matter clogs them quickly.

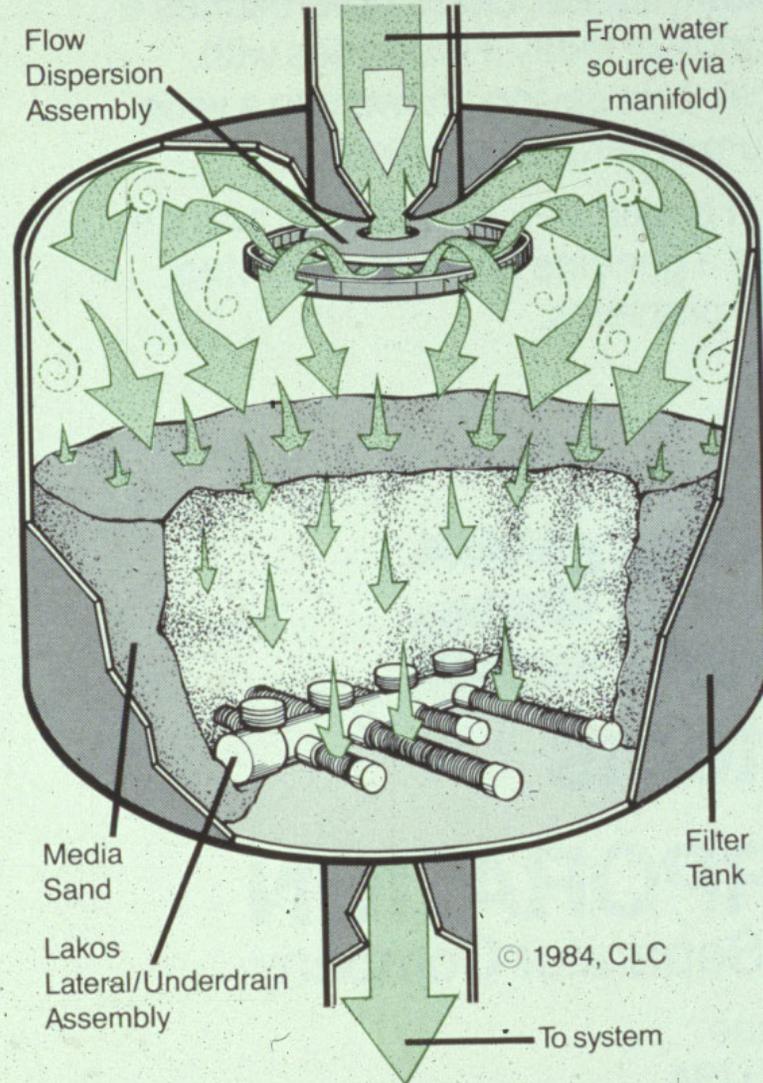




Backwash Process

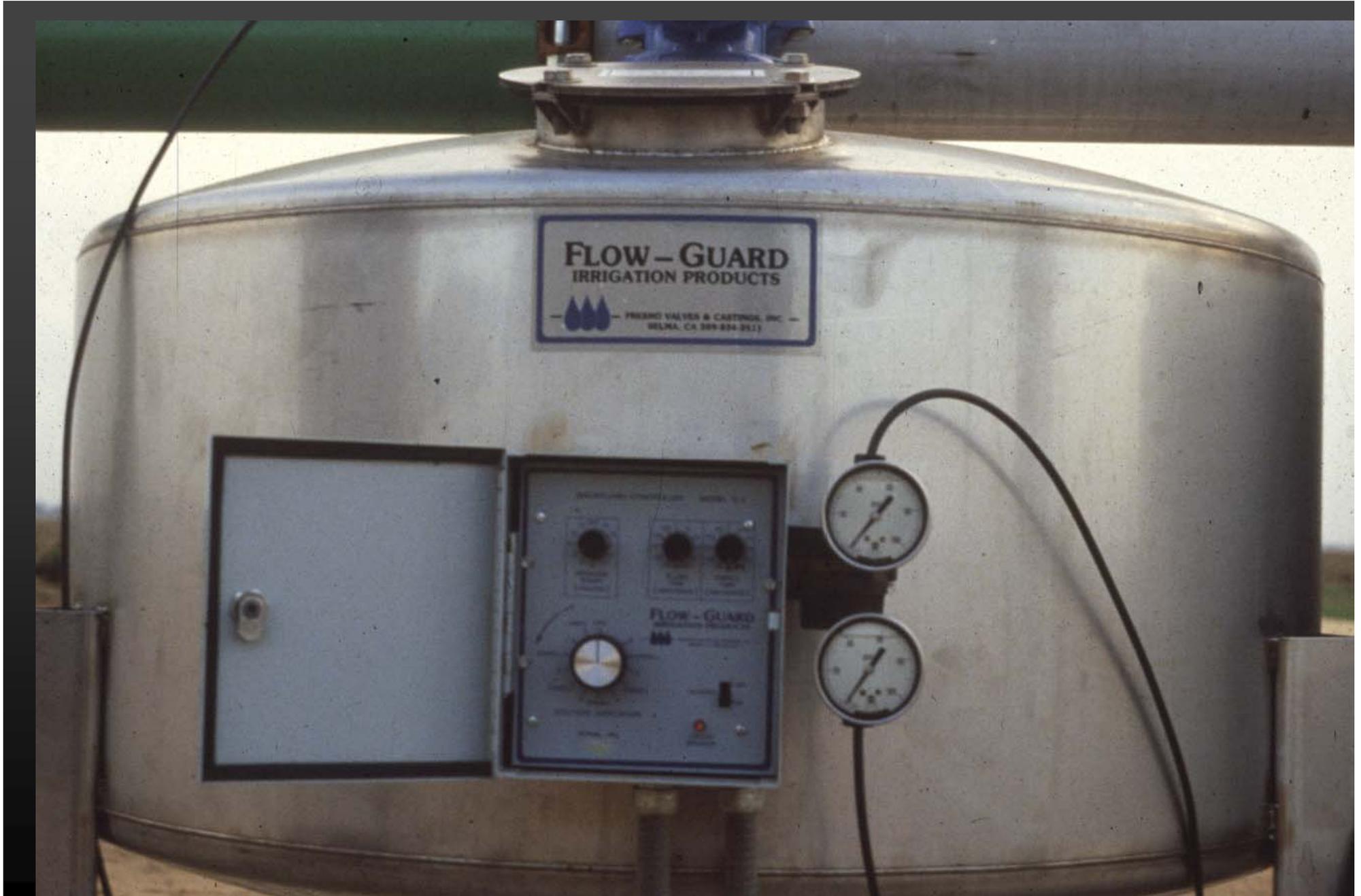


Filtering Process



Sand Media Filters

Media Designation Number	Material	Mean Effective Sand Size		Filtration Quality
		(mm)	(in.)	(mesh)
8	crushed granite	1.50	0.059	100-140
11	crushed granite	0.78	0.031	140-200
16	crushed silica	0.66	0.026	140-200
20	crushed silica	0.46	0.018	200-230
30	crushed silica	0.34	0.013	230-400



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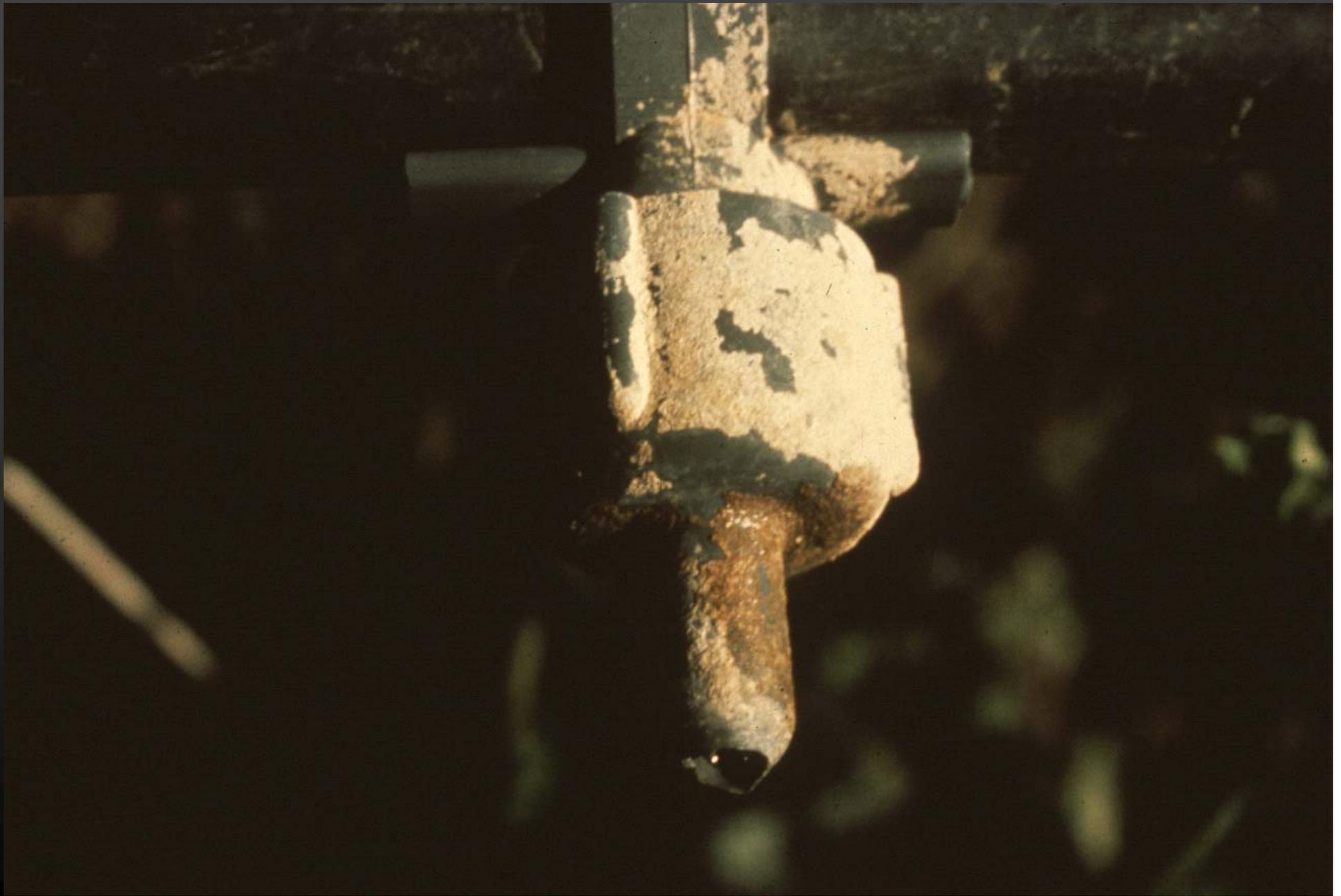
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Clogging of Microirrigation Systems

Source: Chemical Precipitates

- **Lime (calcium carbonate) and iron are the most common problems.**





Chemical Precipitate Clogging of Microirrigation Systems

Water quality levels of concern:

- **Calcium:** pH > 7.5 and 2.0 meq/l (120 ppm) of bicarbonate
- **Iron:** pH > 4.0 and 0.5 ppm iron
 - Special handling when sampling for iron.

Clogging of Microirrigation Systems

Source: Lime

Solution: pH Control (pH of 6 to 6.5)

+

filtration

Dealing with Iron Precipitation:

1. Precipitate iron in a pond / reservoir



Dealing with Iron Precipitation:

1. Precipitate iron in a pond / reservoir
2. Chemicals (e.g. phosphonic acid, phosphonate) may keep iron in solution
 - Maintenance, not clean-up products

Groundwater issues which can cause clogging of microirrigation systems

1. Sand and other particulates can be pumped from the well.
2. Groundwater quality may result in chemical precipitation.
3. Biological clogging issues not as common with groundwater as with surface waters.
 - Iron bacteria problems can occur.

Iron Bacteria

- Usually growing in the well and moves to the microirrigation system. Slimy and jelly-like. Smells.

Iron Bacteria

- Usually growing in the well and moves to the microirrigation system.
- **Need to treat the well and your irrigation system**
 - For info. on treating the well: go to web and Google “Iron bacteria in well”

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- **Need to treat the well and your irrigation system**
 - For info. on treating the well: go to web and Google “Iron bacteria in well”
 - For the microirrigation system:

Clogging of Microirrigation Systems

Source: Biological Sources

Solution: Filtration (usually media filters)

+

Biocide

Biological Clogging

Acid may deter
but not eliminate

biocide

chlorine copper

Chlorine

- Sources:
 - Liquid - sodium hypochlorite.
 - Solid - calcium hypochlorite.
 - Gas chlorine.



Chlorine as a Biocide

	Free Chlorine
prevent growth	1 - 2 ppm
periodic injection	10 - 20
super chlorination (reclamation)	500 - 1000

Test for chlorine using a pool / spa test kit

Chlorine: Injection Rates

■ Sodium hypochlorite (liquid)

- Example: household bleach w/ 5.25% active chlorine.

$$\text{Chlorine injection rate (gal/hr)} = \frac{\text{System flow rate (gpm)} \times \text{Desired Cl Conc. (ppm)} \times 0.006}{\text{Strength of Cl soln (\%)}}$$

■ Calcium hypochlorite (solid)

- 65-70% available chlorine.
- 12.8 lbs. of calcium hypochlorite added to 100 gallons of water forms a 1% solution.
- Use above formula.

Controlling iron bacteria with chlorine

- Chlorine will cause iron that is in solution in the well water to precipitate quickly.

Controlling iron bacteria with chlorine

- Chlorine will cause iron that is in solution in the well water to precipitate quickly.
 - Be prepared to let this iron precipitate settle out in a reservoir or filter it out (usually with sand media filters).

Questions?

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For Powerpoint presentation and microirrigation system evaluation
handout, go to:

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