Microirrigation Systems

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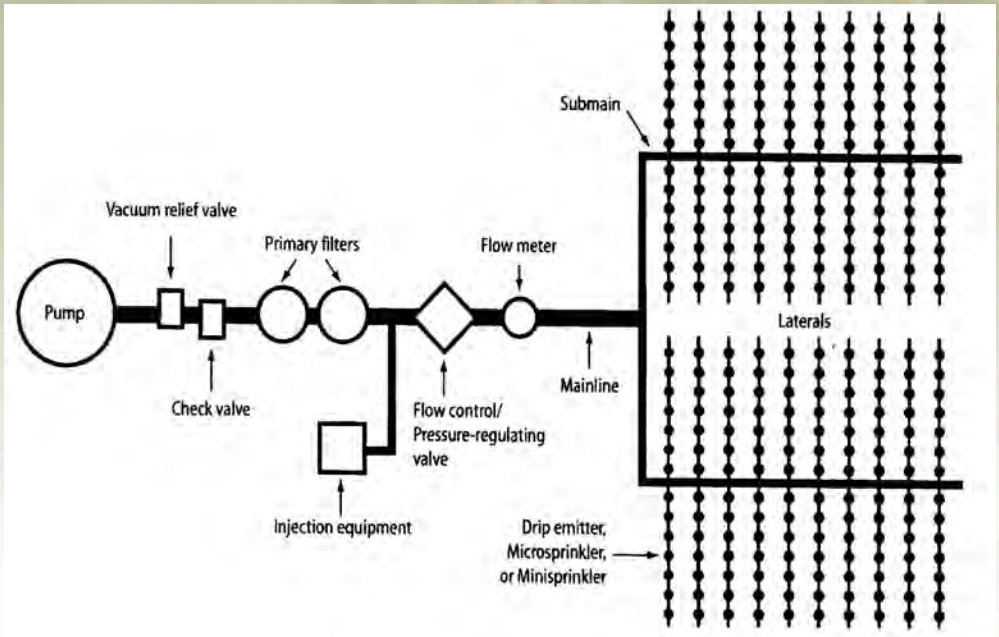
Microirrigation Systems

- Choosing drip or microsprinkler system.
- Microirrigation system management.
- Maintenance of microirrigation systems.



Microirrigation Systems

Which is better?

- Surface drip, subsurface drip, or microsprinklers?
- One lateral line or two?

Surface drip:

Advantages:

- **Usually the least expensive**
- **Less weed growth than microsprinklers**
- **Easier to monitor than subsurface drip**

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- Less weed growth than microspr
- Easier to monitor than subsurface drip

Disadvantages:

- **Doesn't wet a very large area**
- **Can clog more easily than microsprinklers**

Drip: One lateral vs. two laterals

Two lateral line systems:

- **Wets a larger area - appropriate for soils which don't wet laterally well.**
- **Increases the application rate so reduces the set time.**
- **Increases the cost.**

Subsurface drip:

Advantages:

- **Protected from damage by above-ground sources**
- **Little weed growth**
- **Can irrigate just about anytime**

Subsurface drip:

Advantages:

- Protected from damage by abov
- Little weed growth
- Can irrigate just about anytime

Disadvantages:

- **Can't inspect by observation**
- **Root intrusion & varmit damage**
- **Single line doesn't wet a large area**
- **Costs more if use herbicide-protected product**

Microsprinklers:

Advantages:

- Wets a larger area
- Easy visual inspection
- Larger orifice openings-may clog less
- Higher application rate

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Disadvantages:

- **Insects, etc. can clog orifices**
- **More weed growth**
- **Wind & evap. effects**
- **Cost**

Cost of Microirrigation Systems:

- About 2/3 of the system cost is in filters, pipelines, etc. The size of these is dependent on the flow rate (gpm/acre).
  - Lower flow rate = longer irrigation times
  - Higher flow rate = shorter irrigation times

Irrigation Water Management

- **Determining the Application Rate.**
- **How often to irrigate?**

How much water are you applying?

Application rate:

- Tree water use (ET) given in inches/day
- Emitter discharge in gallons/hr

Tree Water Use

Convert tree water use (in/day to gal/day):

Water use by the tree (gal/day)	=	Tree spacing (ft^2)	x	Tree water use (in/day)	x	0.623

Example: Tree spacing = 20 ft. x 20 ft. = 400 ft^2

Tree water use = 0.3 in./day

Water use by:

the tree (gal/day) = 400 ft^2 x 0.3 in/day x 0.623

= 75 gal/day

How Often to Irrigate?

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May be controlled by the capacity of your irrigation system, especially at peak water use periods.

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- **Soil conditions (soil water-holding capacity, lateral wetting) may also be a factor.**

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- May be controlled by the capacity of your irrigation system. Especially at peak water use periods.
- Soil conditions (soil water-holding capacity, lateral wetting) may also be a factor.
- **At peak ET:**
  - **Most drip systems will require daily irrigation.**
  - **Microsprinklers - typical would be an irrigation interval of 3 days or more.**

Maintenance of Microirrigation Systems

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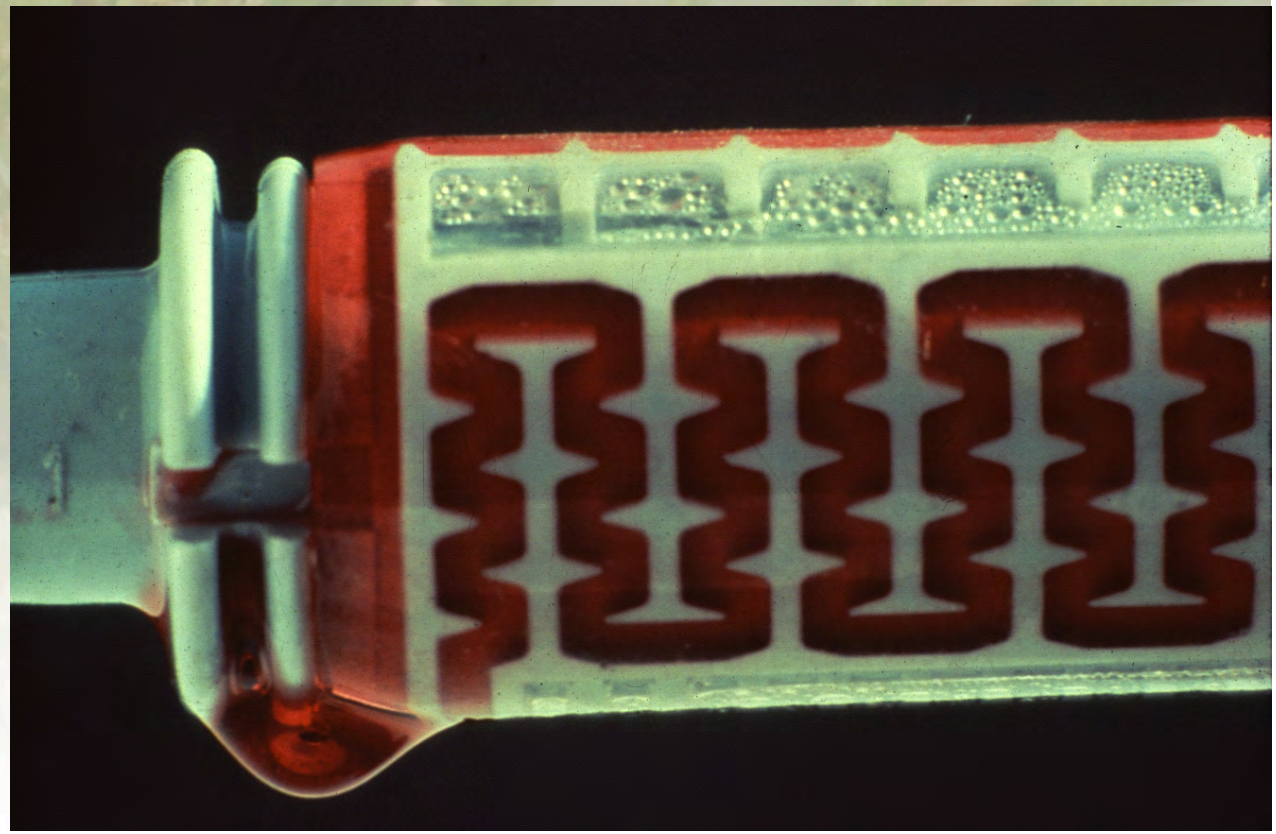
Microirrigation:

Clogging is the greatest “threat” to emitters.



Clogging of Microirrigation Systems

Source: Physical Clogging - Particulates

Clogging of Microirrigation Systems

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Solution: Filtration

Filters:

Screen, disk, and sand media filters are all available.

They all filter to the same degree

BUT

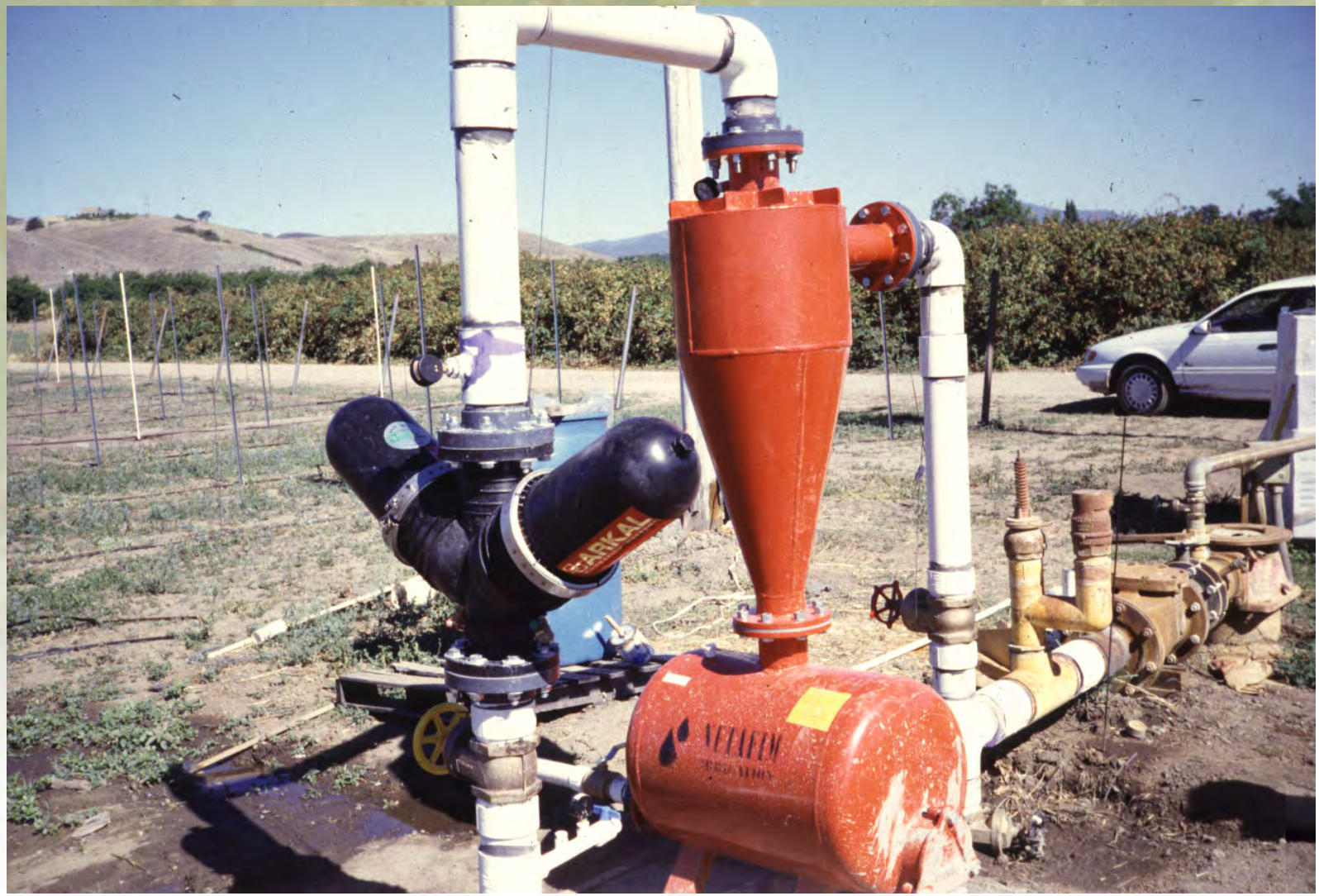
they req. different frequency of cleaning.

Filters:

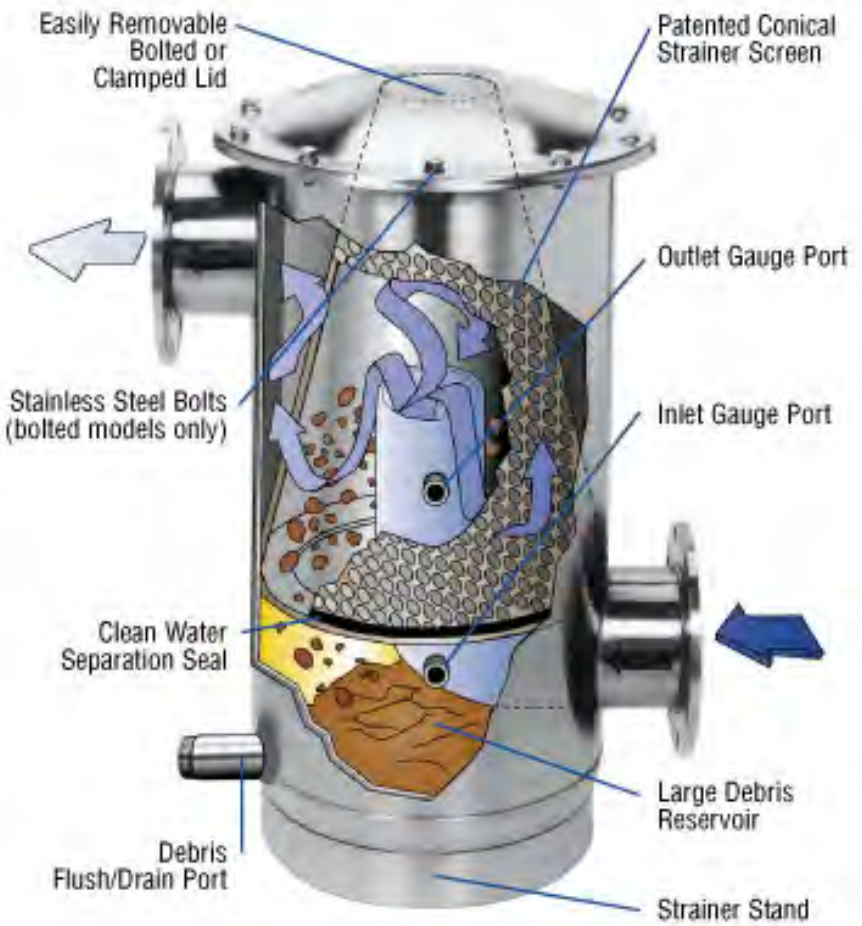
- Prefilters - sand separators
- Sand media filters
- Screen filters
- Disk filters

- These filters take out <u>suspended</u> particles, not things in solution.

Sand Separators:



Screen Filters:



Screen Filters:

- Advantages:
  - Cost
  - Simple
- Disadvantages:
  - Quickly clogged if have organic contaminants

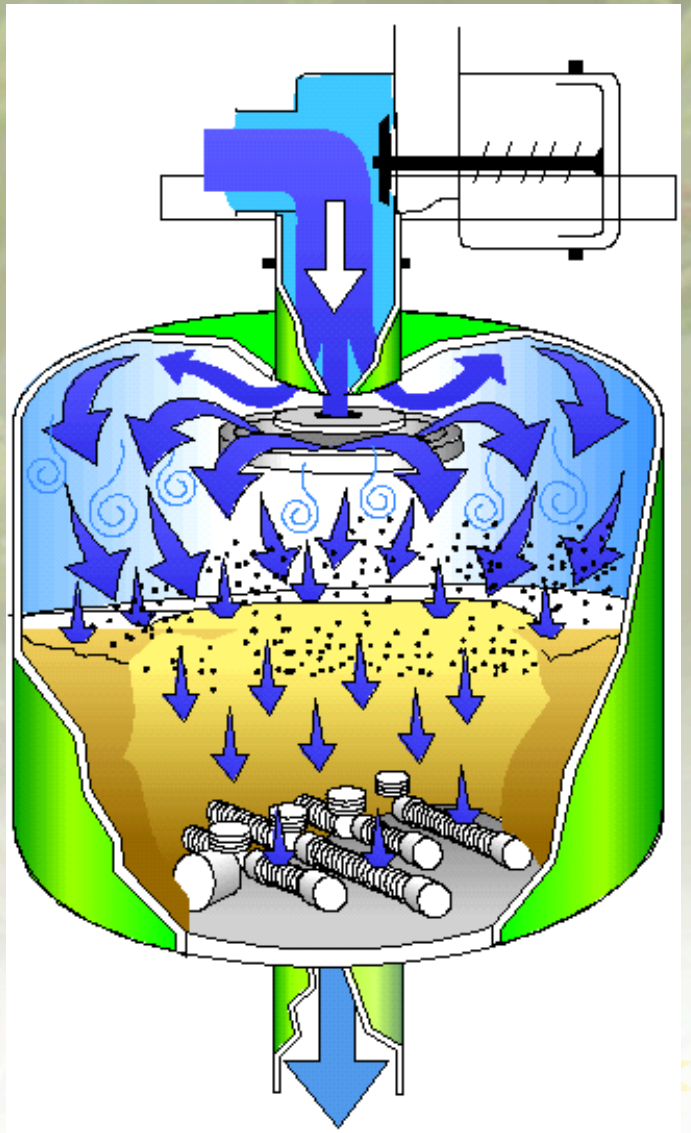
Disk Filters

Disk Filters

- Advantages:
  - Increased filtration area over screens
  - Simple
- Disadvantages
  - Cost - more expensive than screens.
  - Quickly clogs if have organic contaminants.
  - Cleaning - automatic backwash are available.

Disk Filters

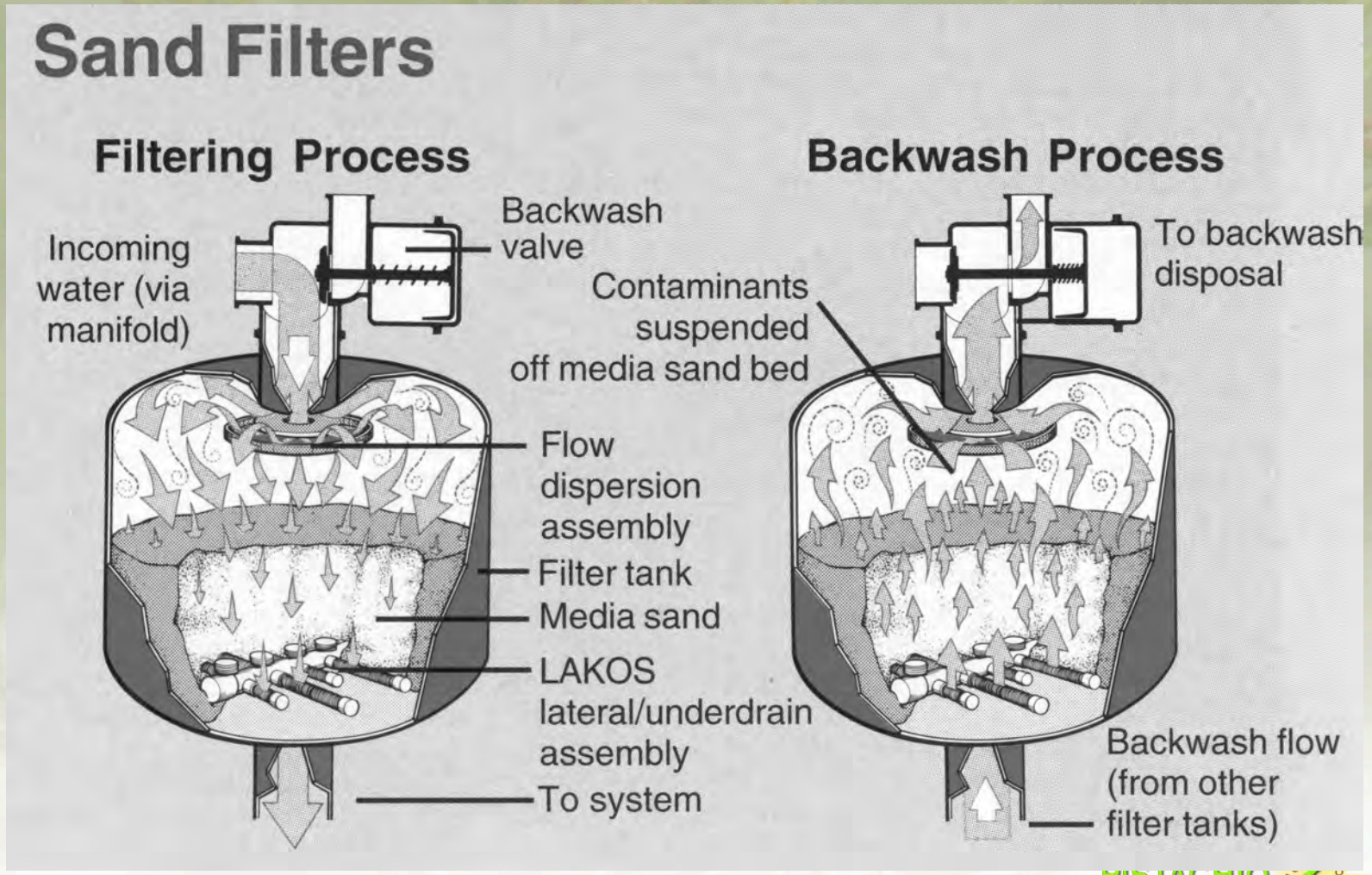
Sand Media Filters:



Sand Media Filters:

- Screen, disk, and sand media filters can all filter to the same degree.
- The difference is in how often you need to clean them.
  - **If you have high organic content in your water, sand media filters are recommended.**

Sand Media Filters:



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

Chemical Precipitate Clogging of Microirrigation Systems

Source: Lime

Solution: pH Control (Acidification)

+

filtration

Acidification to a pH of 6 or 6.5 will take care of most lime precipitate problems.

Chemical Precipitate Clogging of Microirrigation Systems

Water quality levels of concern:

- Iron: pH > 4.0 and 0.5 ppm iron

Dealing with Iron Precipitation:

1. Precipitate iron in a pond / reservoir

2. Chemicals (e.g. phosphonic acid or phosponates) may keep iron in solution or interfere with the crystal formation.

Clogging of Microirrigation Systems

Source: Biological Sources

Clogging of Microirrigation Systems

Source: Biological Sources

Solution: Filtration (usually media filters)

+

Biocide

Biolgical 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

Flushing of microirrigation systems:

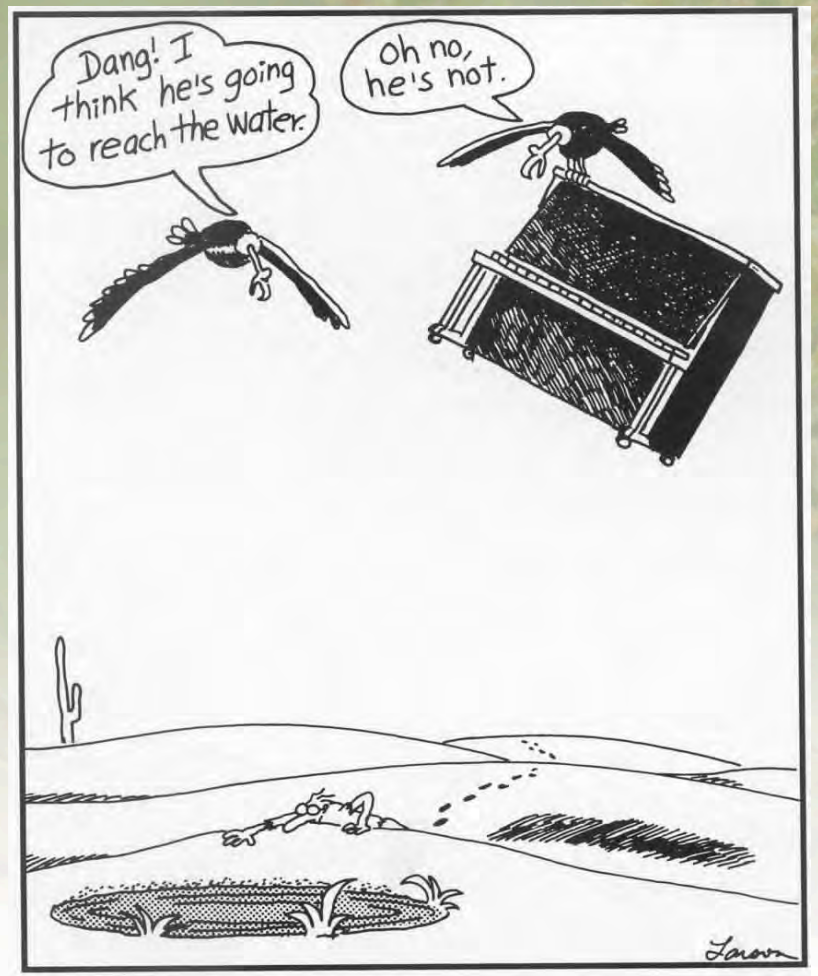
- Silts and clay particles pass through even the best filters.

Flushing

- Silts and clay particles pass through even the best filters.
- Need to flush the system - mainlines, submains, and laterals (in that order).
  - Flush laterals by hand or use automatic flushing end caps.

Stay on Top of Your Maintenance

Questions?



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