Pretreatment Inspection

ATUS,

TREATMENT FILTERS,

DISINFECTION & DRIP

NAWT Inspection

Is the ‘Pretreatment’ meeting Limits?

OPERATIONAL & WATERTIGHT

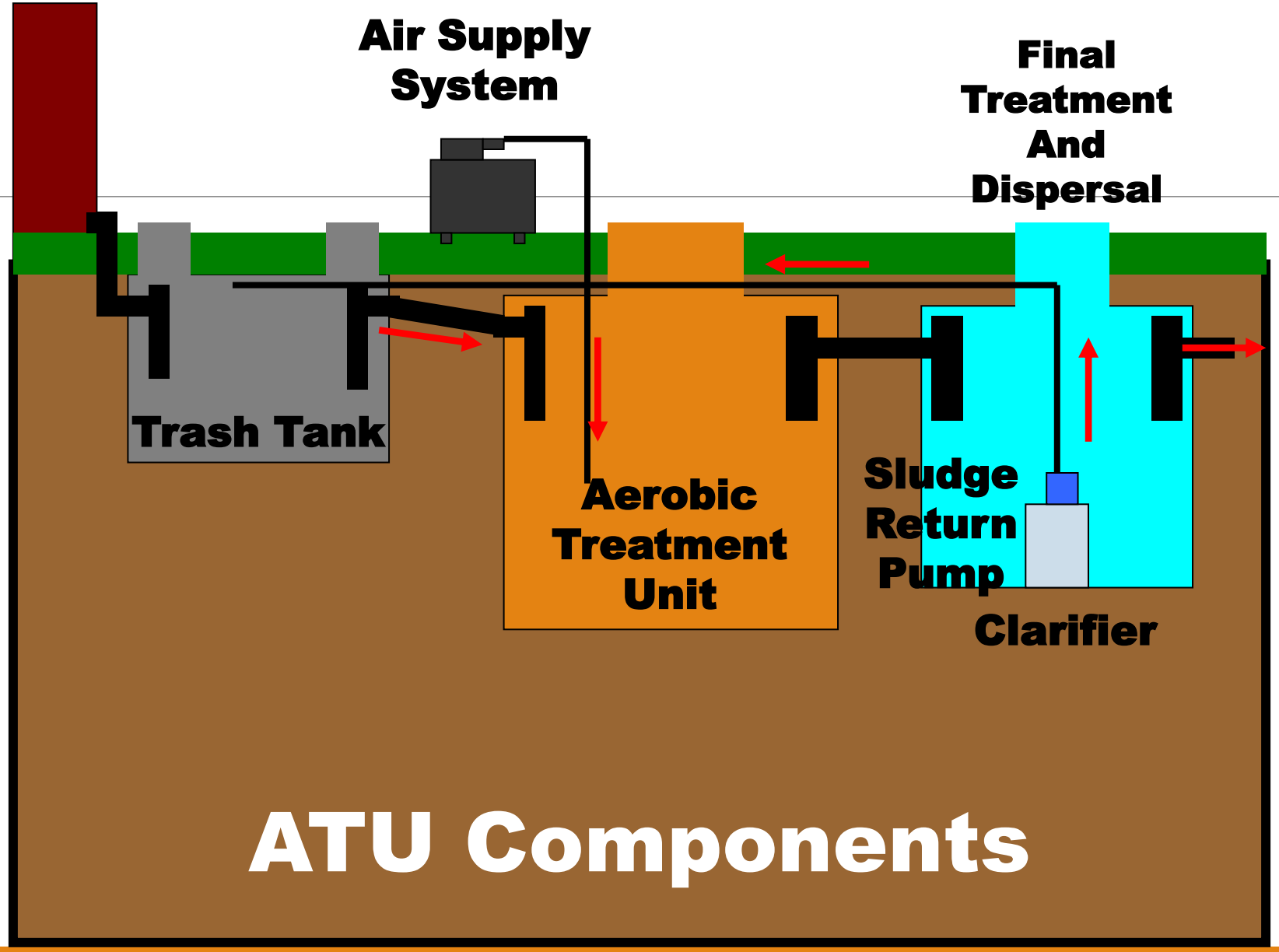
Treatment
- Pathogens
- Nutrients

Acceptance
- BOD/TSS
- FOG

Other

CHECK WITH THE SERVICE PROVIDER

Aerobic Treatment Units (ATU)



ATU Components

How do they work

WATERTIGHT~
AT RIGHT OPERATING LEVEL

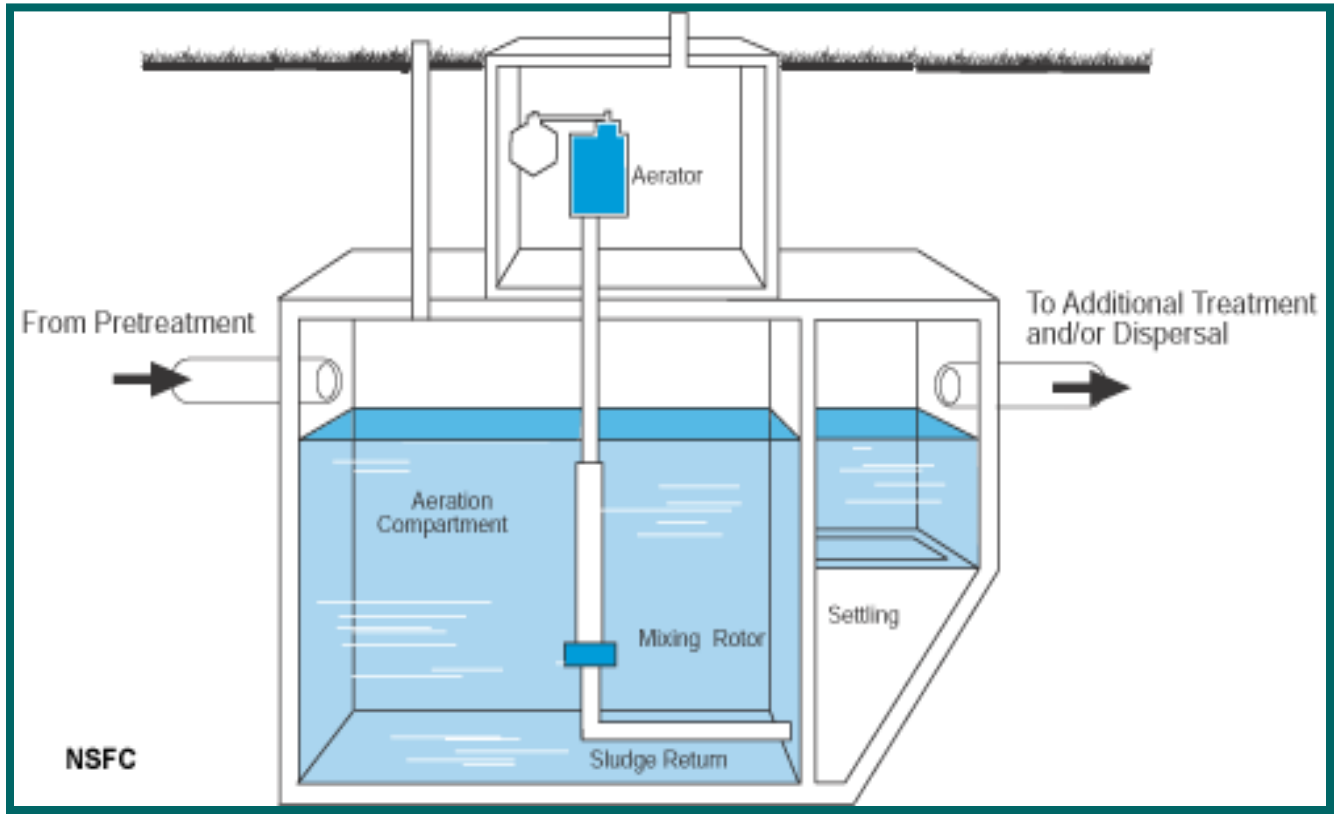
Saturated environment

Aeration

- Dissolved oxygen (DO)

Aerobic Bacteria

Eat BOD & Settle out



Aeration System

On

AEROBIC

Odor

Color

DO


Bubble pattern

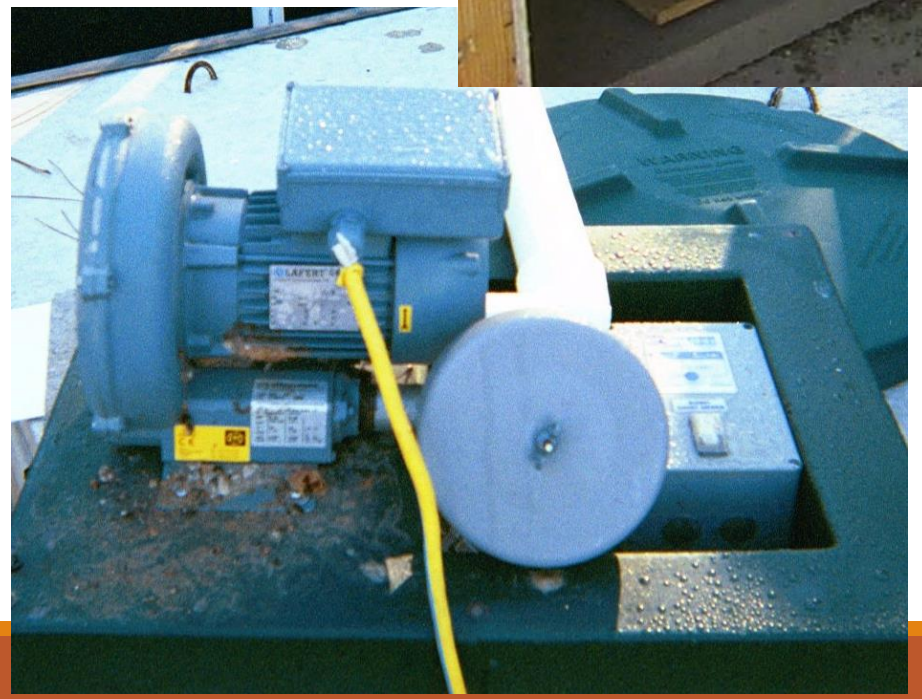
Dissolved Oxygen [DO] in Clarifier

DO Testing

Meter

Kit

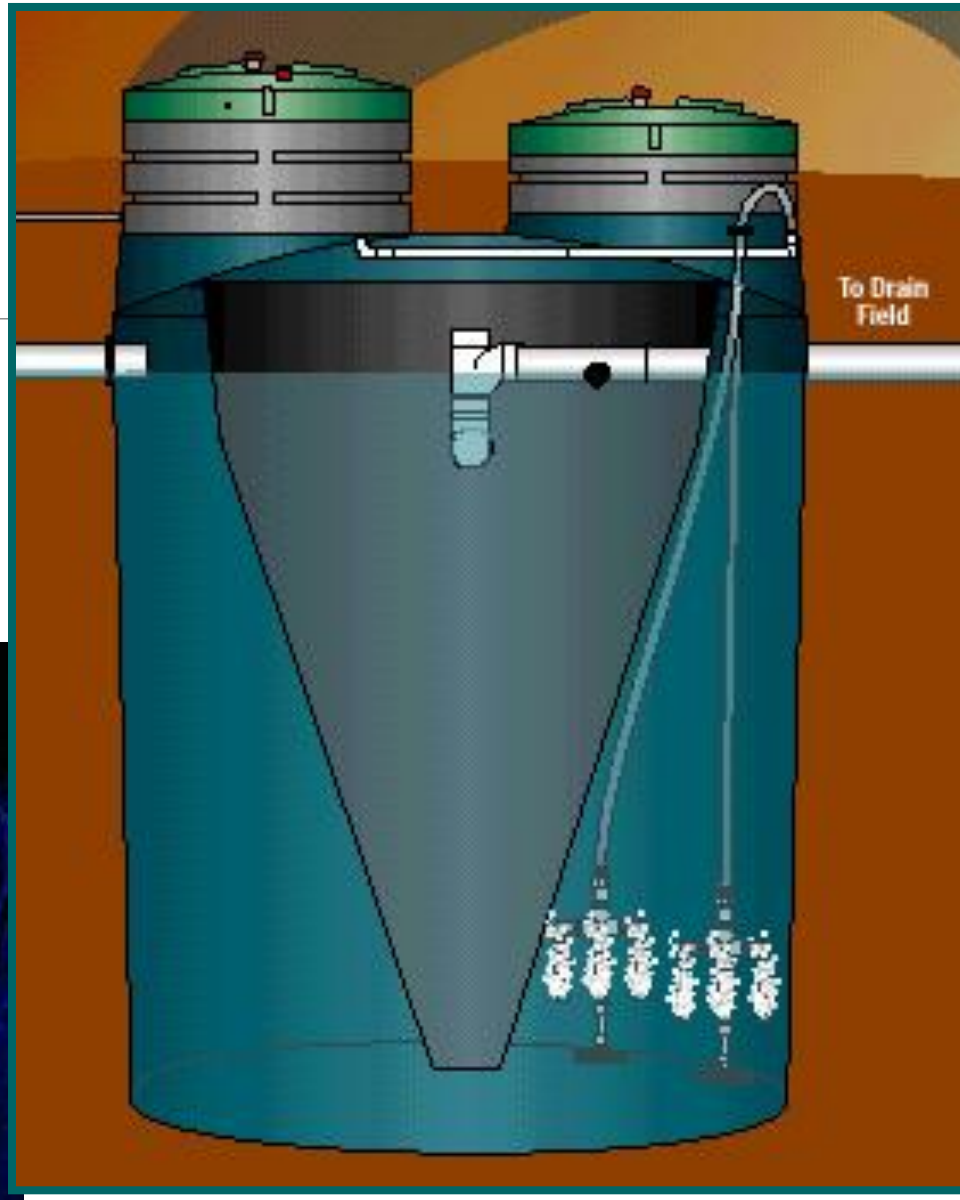
Air Supply



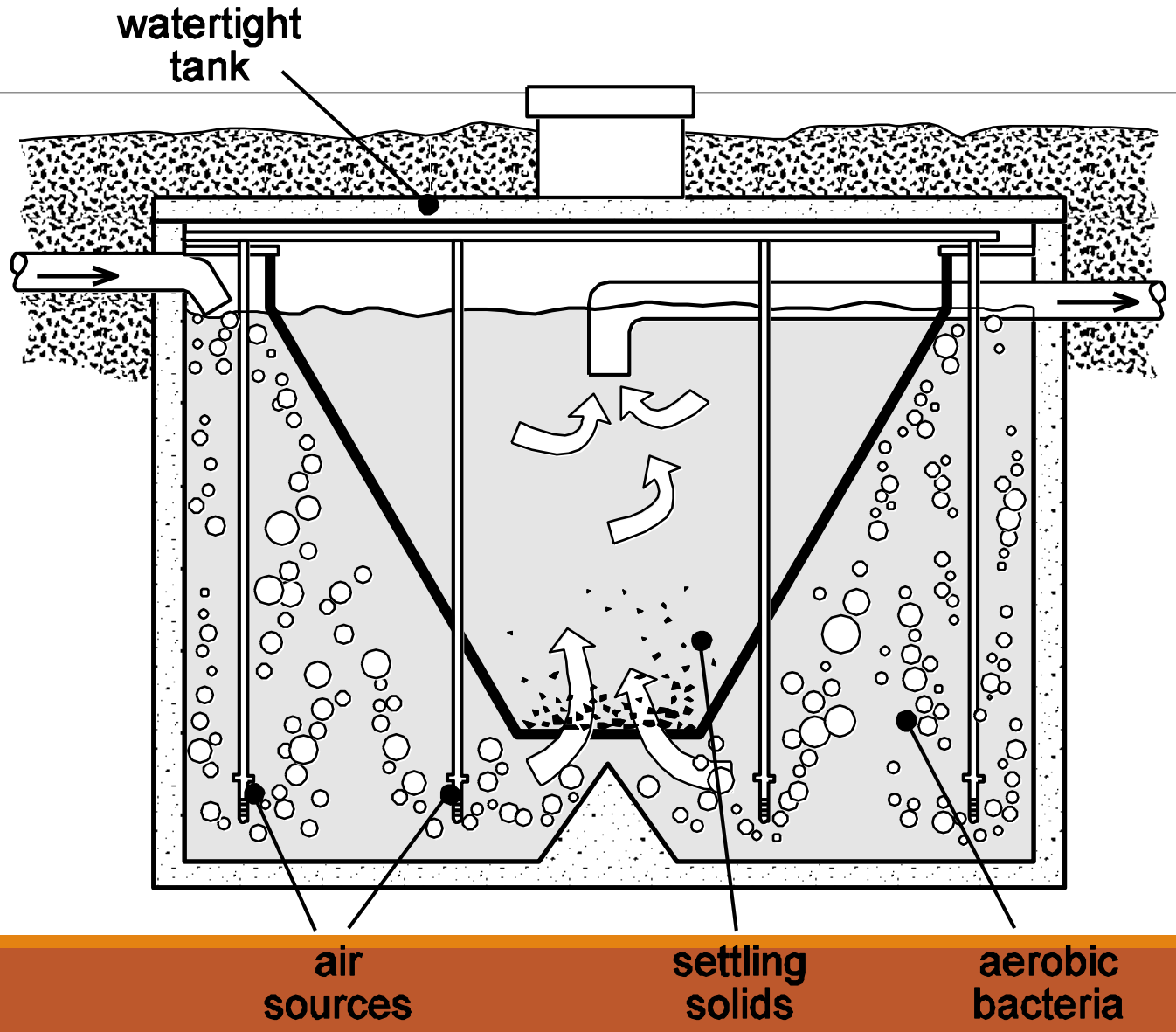
Types of Operation

Suspended growth

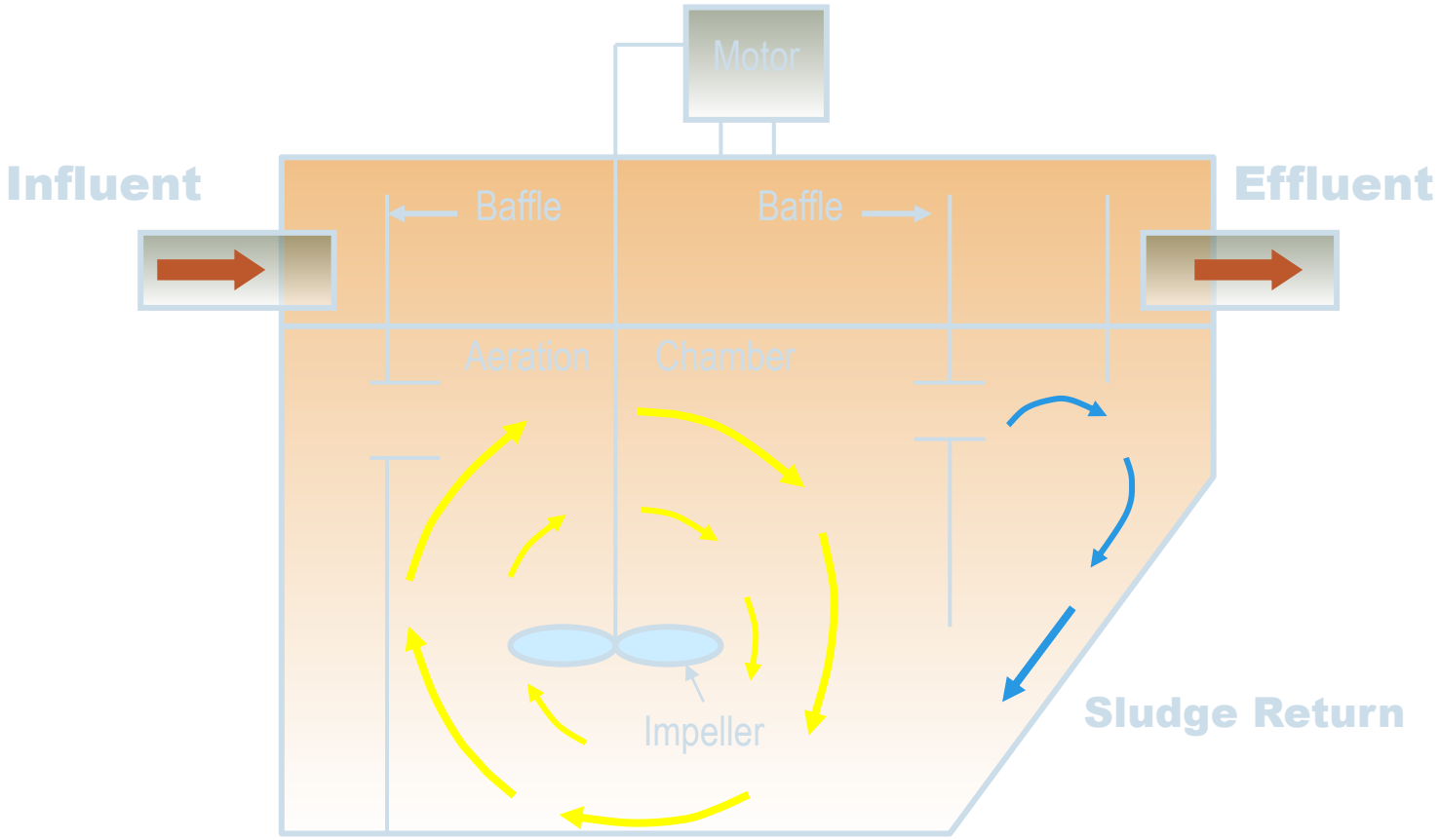
Attached growth



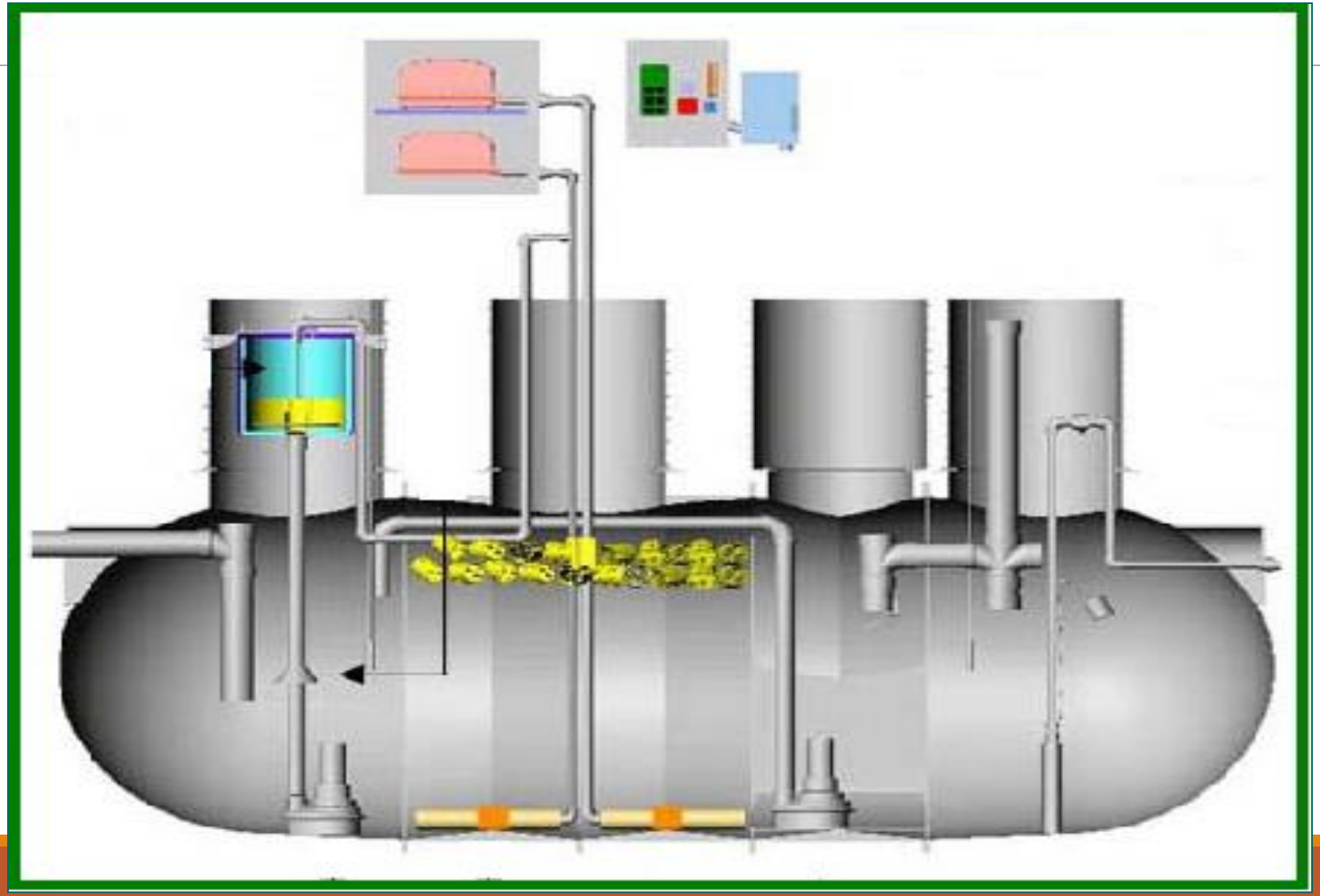
Typical Suspended Growth Reactor



Mechanical - Aspirator

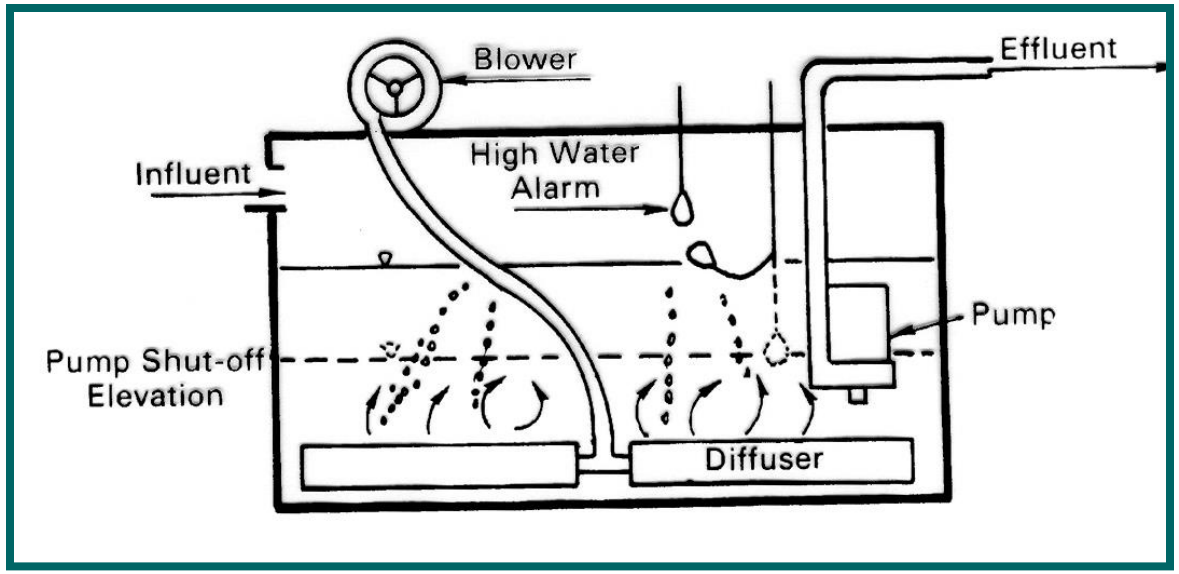


Suspended growth ATU



Suspended growth ATU

Sequencing batch reactors



USEPA Manual, 1980

ON & OFF CYCLE

What should it look like?

Air operating

DO > 1.0 mg/l out of ATU

Brown color- Chocolate

- Black
- Clear

Musty odor

- Rotten eggs

Settling

- 50% in 30 min.

Effluent quality

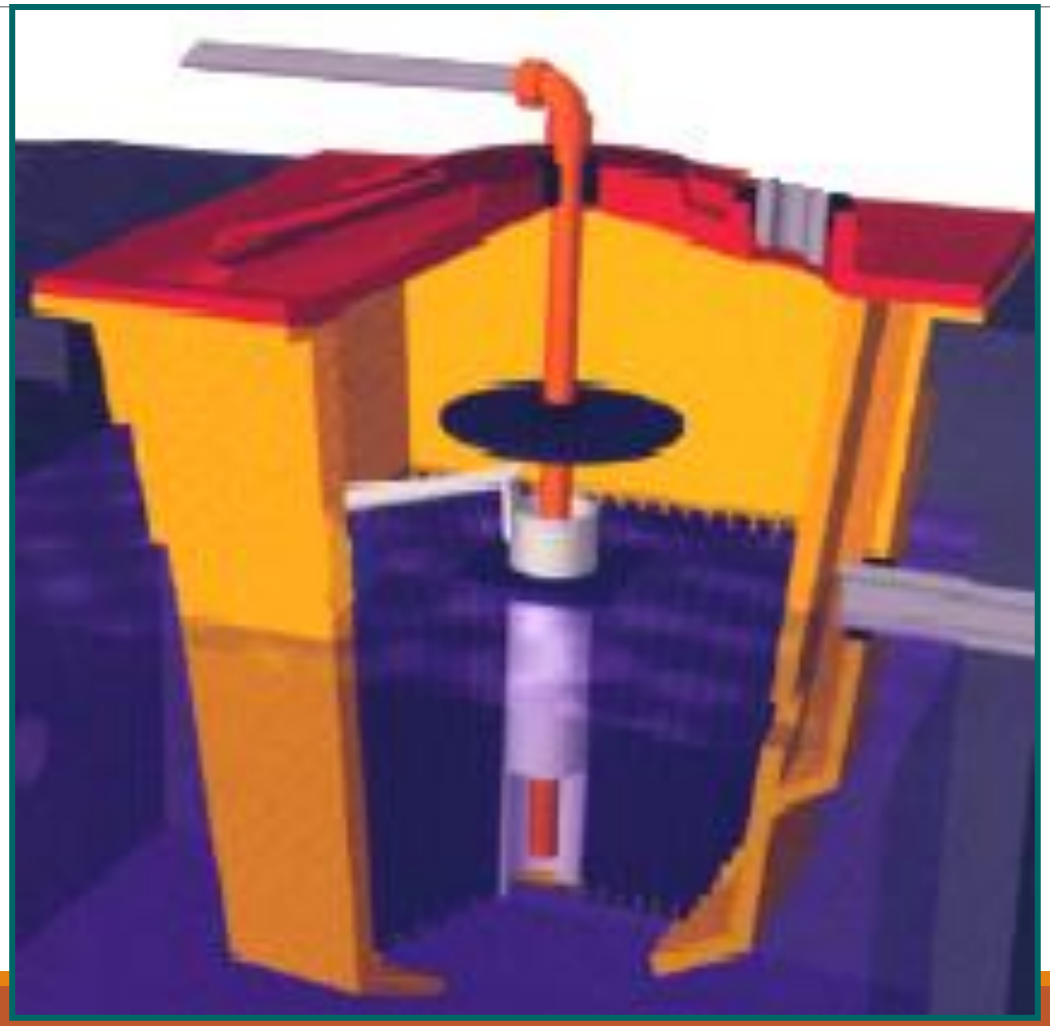
30 Minute Settleability Test

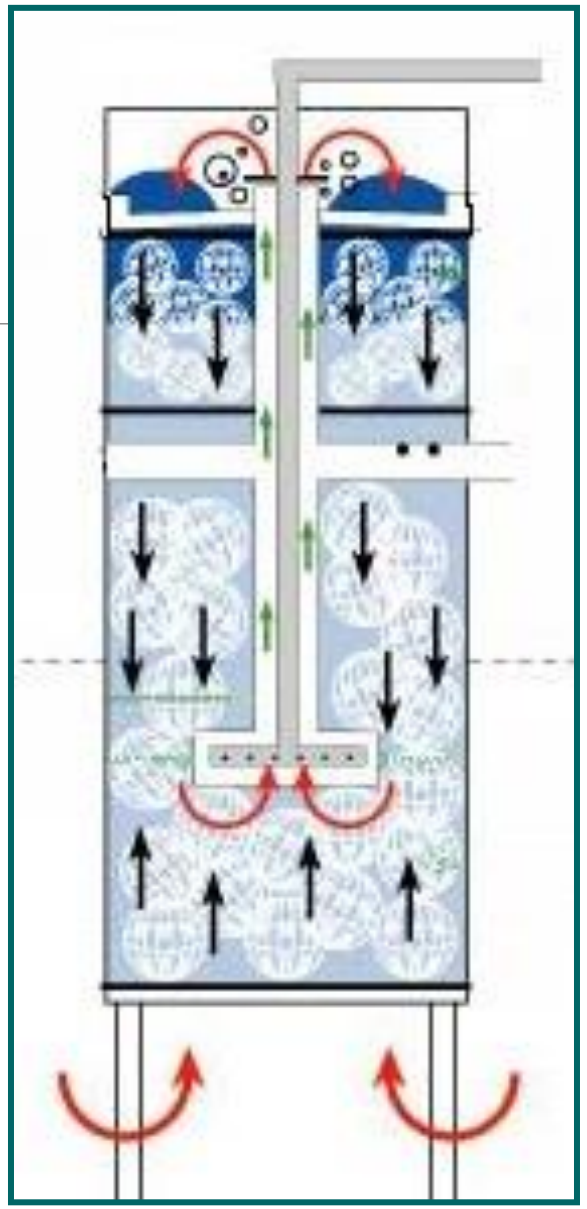
- Beaker with 10 even gradations
- Fill beaker with sample from aeration chamber.
- Let stand for 30 minutes and read level of clear zone.
- 20 to 60% is ok.


% of Settling

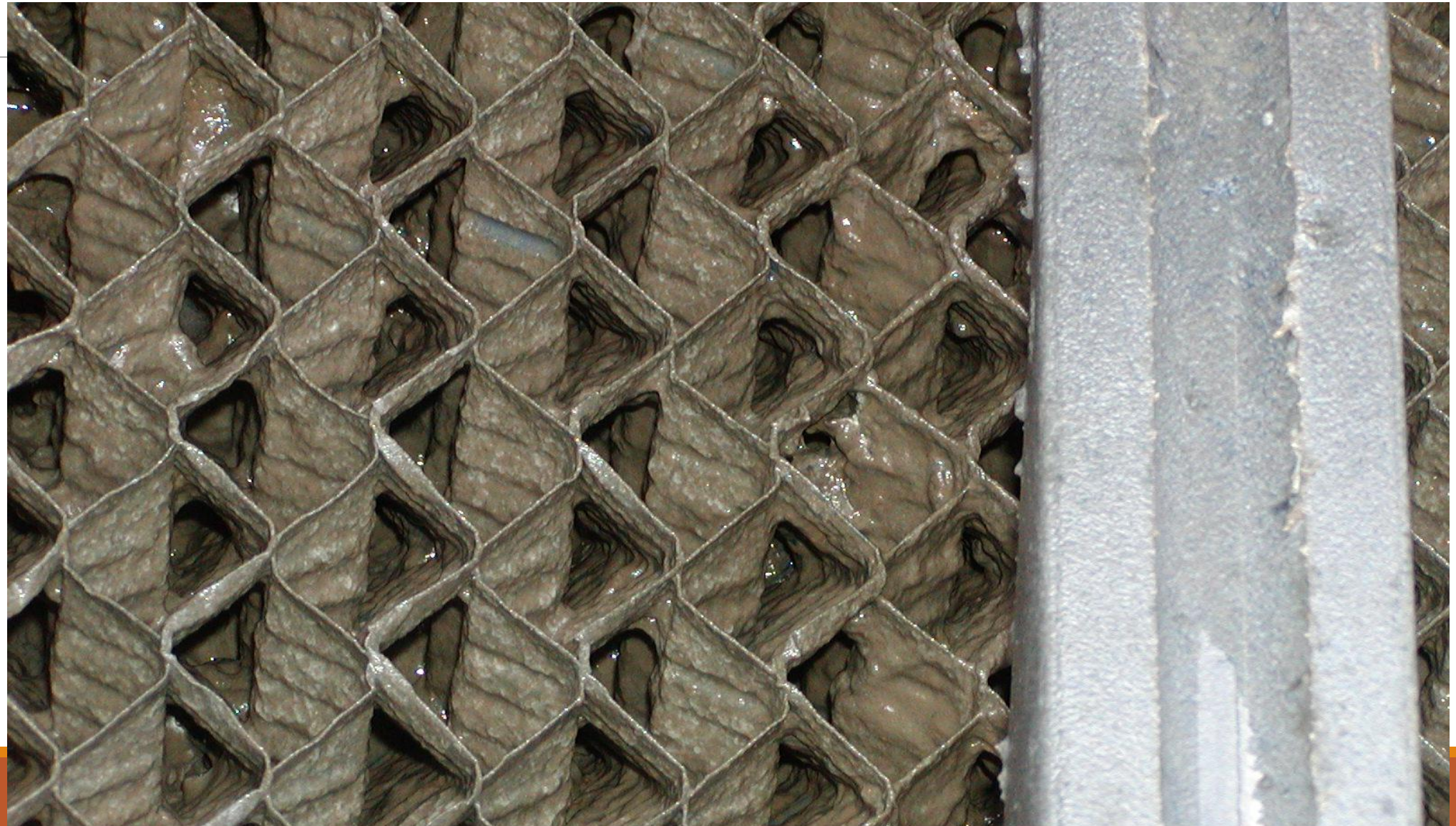
Attached Growth ATU

Fixed film

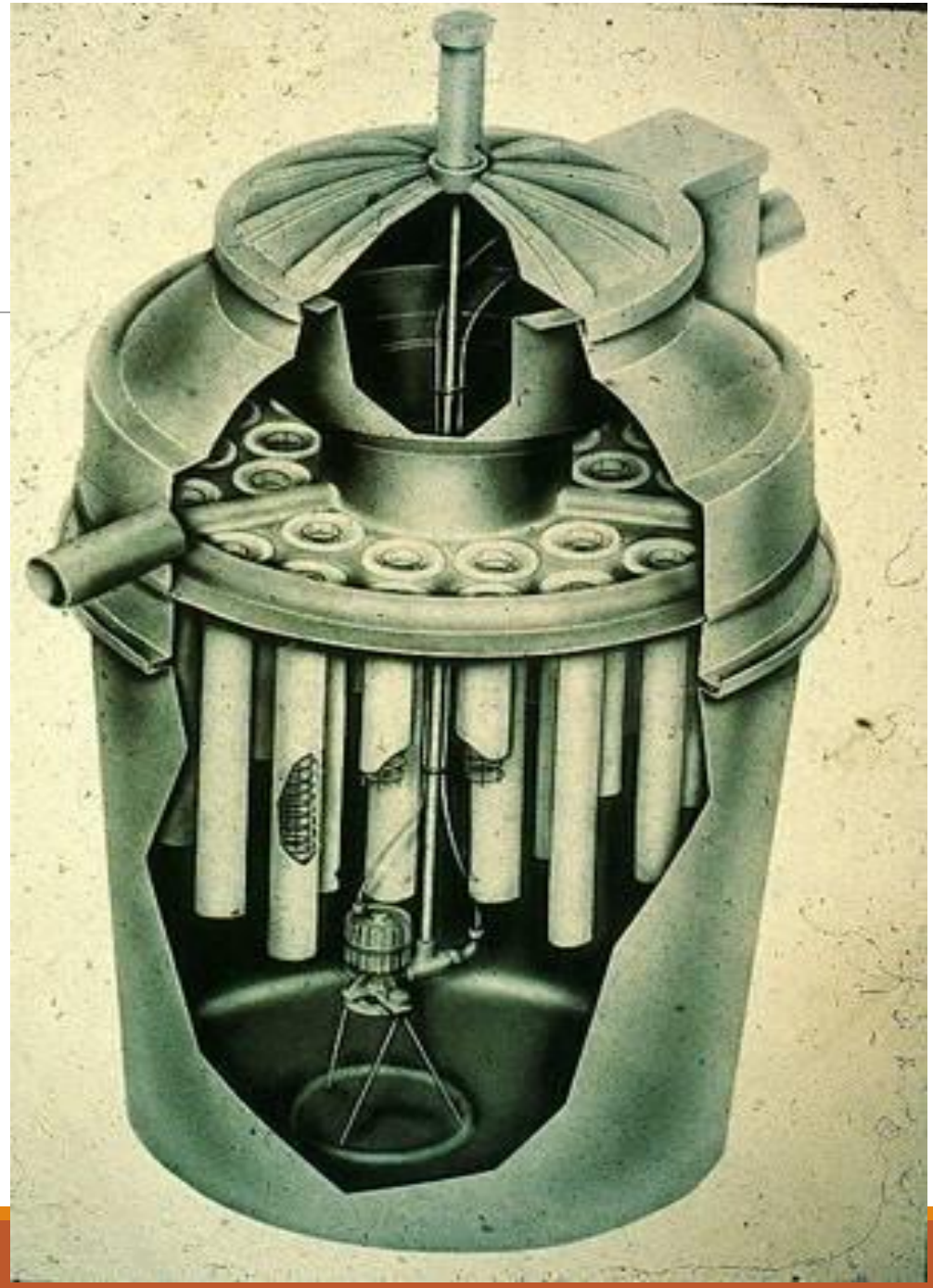




BIOLOGICAL GROWTH (AVERAGE)



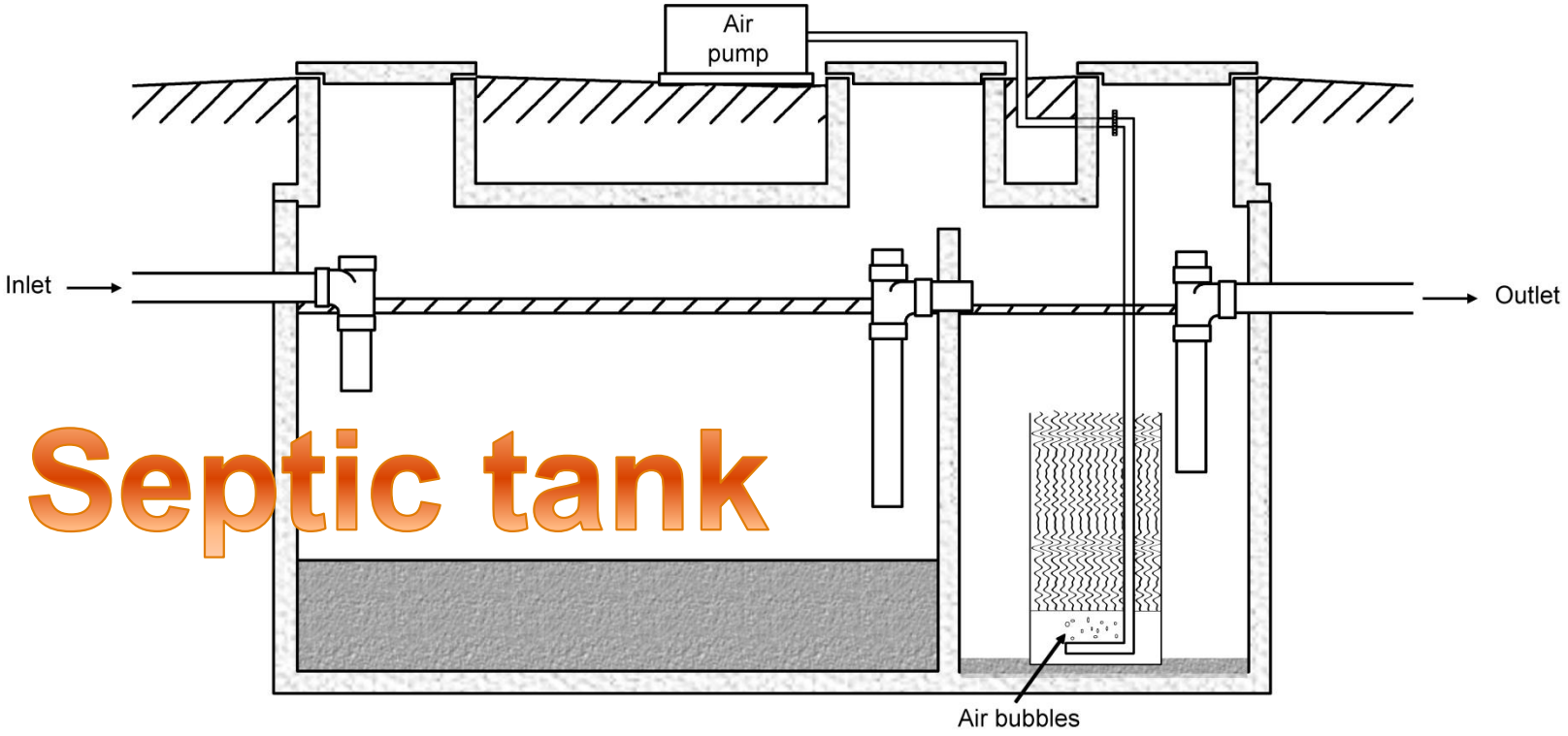
Mix of Design



Adaptive Mechanical Aerator

Introduces air mechanically into a treatment component

Typically used for remediation



Attached Growth {Fixed film}

Air operating

DO > 1.0 mg/l out of ATU

Brown color- Chocolate

- Black
- Clear

Musty odor

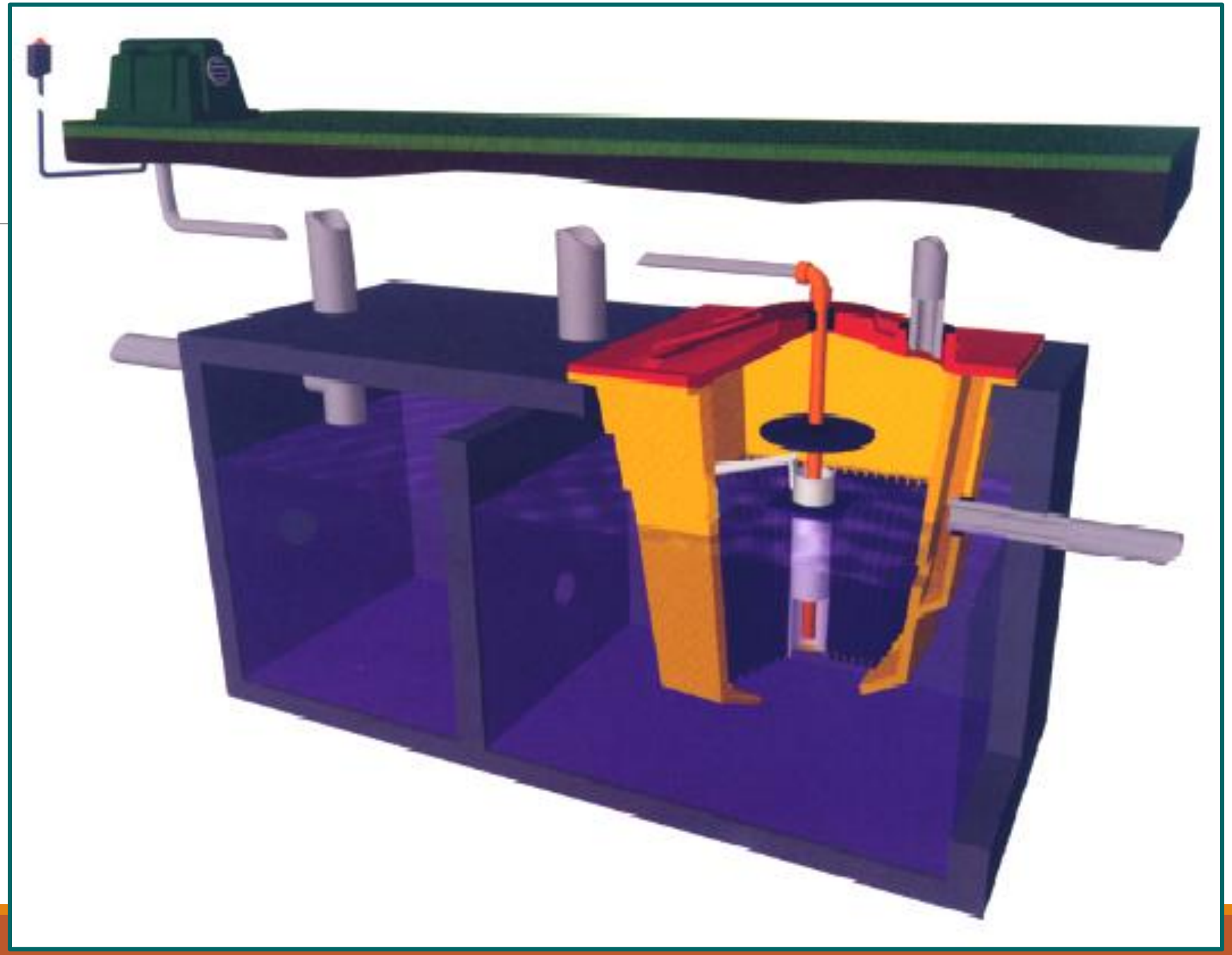
- Rotten eggs

No Media Clogging

- Bridging

Effluent quality

FAST

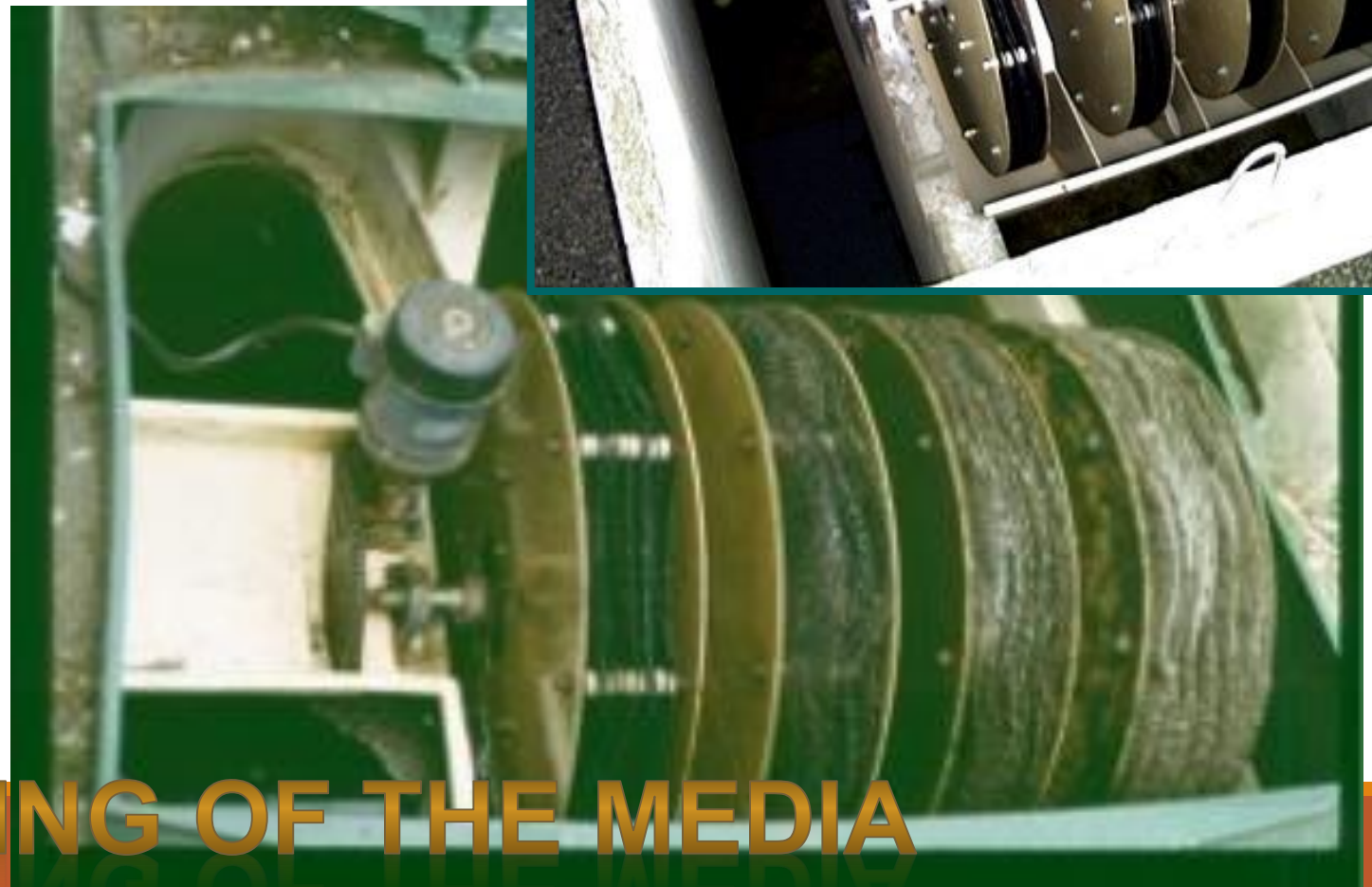


Attached Growth ATU

Rotating Biological

Contactor

RBC



BRIDGING OF THE MEDIA

Review: True or False

- All ATUs use aeration to treat the wastewater.
- To inspect an ATU the DO should be > 1 mg/L coming out of the ATU.
- The effluent leaving an ATU should have a gray tinge and smell to identify healthy bacteria.

Filter types

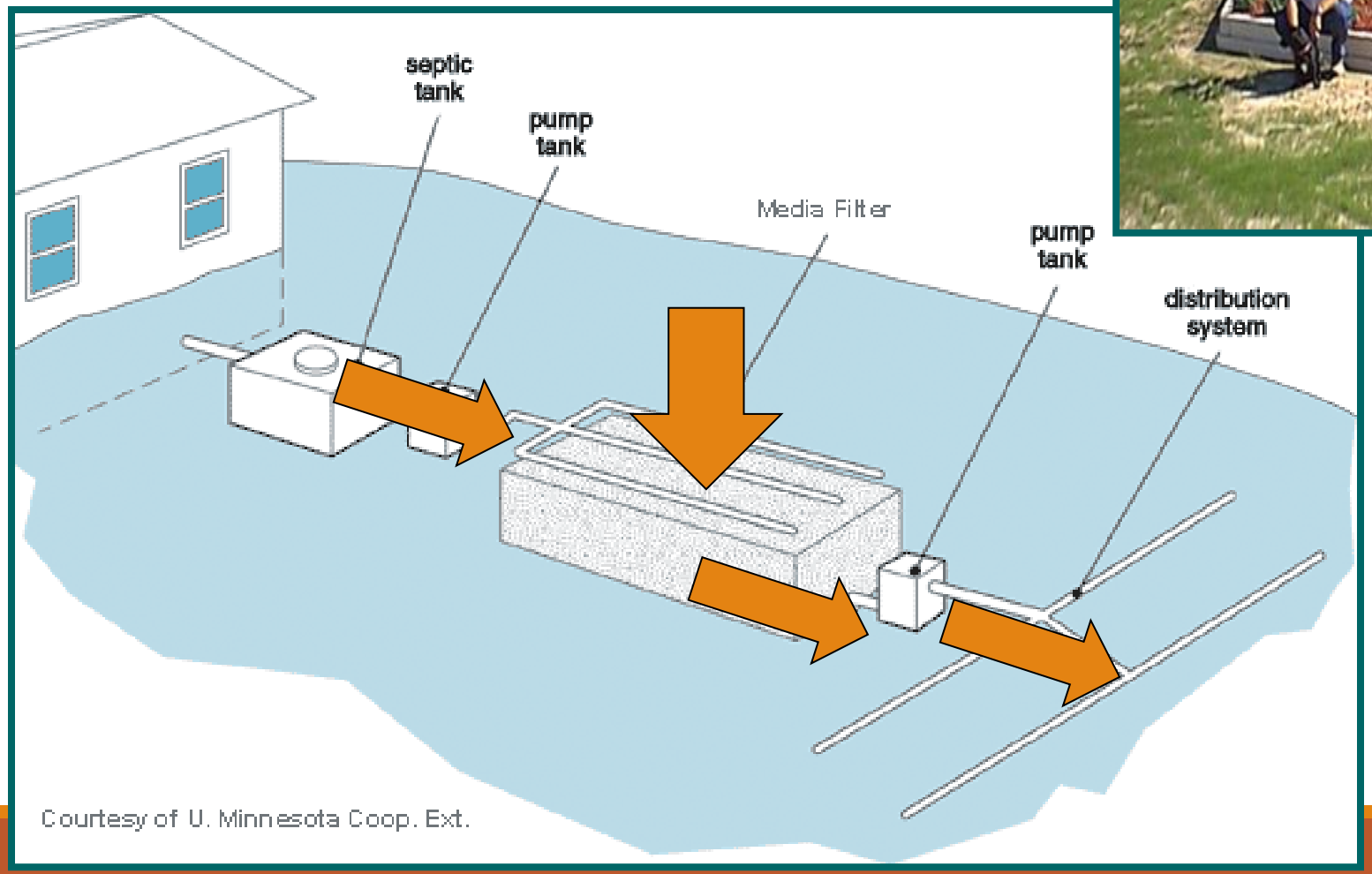
Design

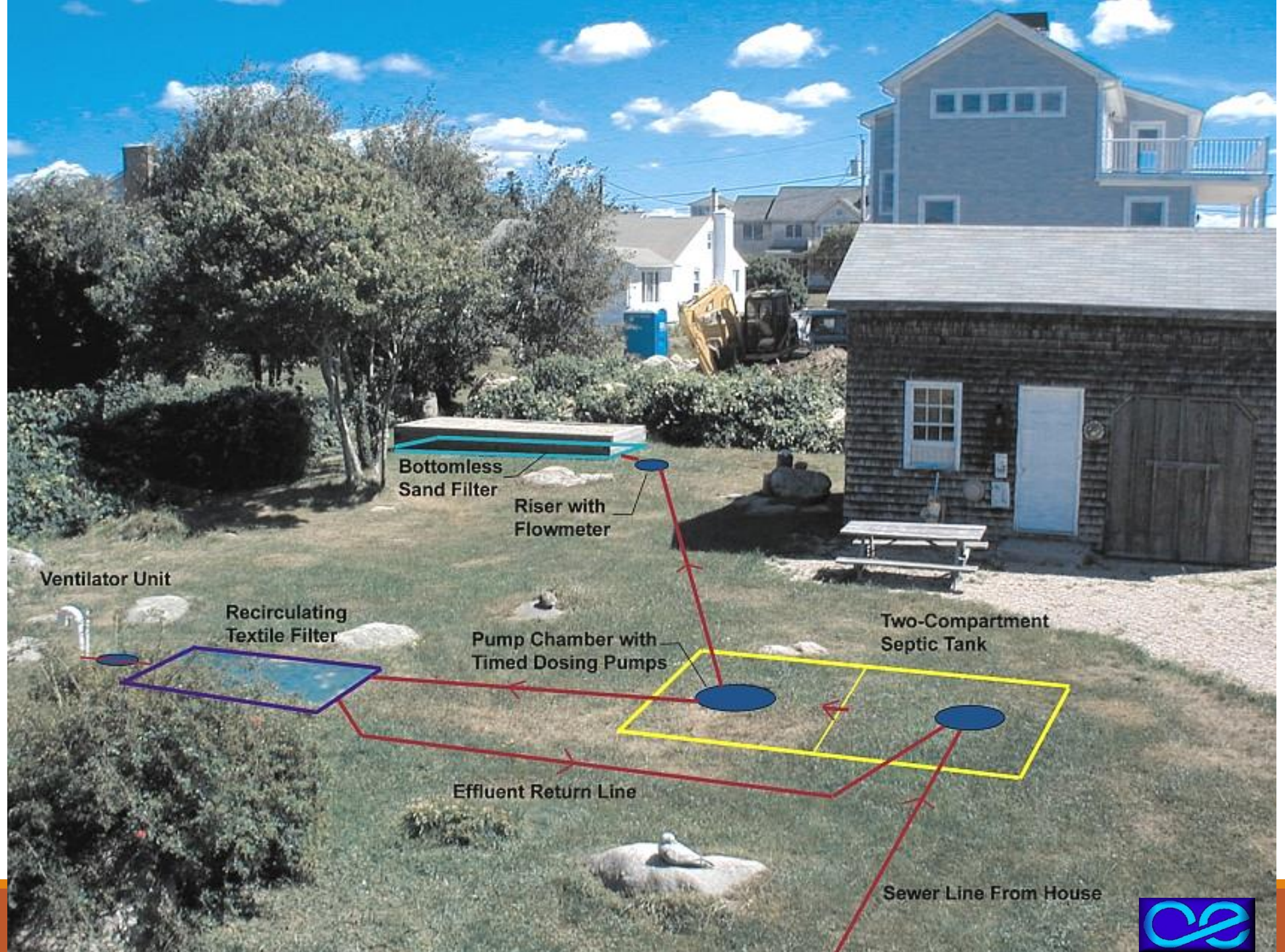
- Single pass
- Recirculating

Media

- Sand
- Peat
- Constructed Wetlands
- Synthetic

Media filters




Bottomless
Sand Filter
Riser with
Flowmeter
Ventilator Unit
Recirculating
Textile Filter
Pump Chamber with
Timed Dosing Pumps
Two-Compartment
Septic Tank
Effluent Return Line
Sewer Line From House

Filter Checks

Other pieces

Dosing

Ponding

Media Present

- Settling
- Plantings

Drainage

- Saturation

Other pieces

Use

Pretreatment

- Tank
- Effluent screen

Dosing

Dosing

Does the pump operate

Pressure

- Plugging

Dosing size

- Maximum
- Minimum

Pressure Distribution

Lateral access

Peat filters- Commercial

Media Filter

Sand

Ponding

Ponding is a problem

- Single pass
- CWS

Media selection

- Peat
  - Depth
- Textile
  - Compaction
- Wetlands
  - Plants


Rolling Thunder

Constructed Wetland

Natural system

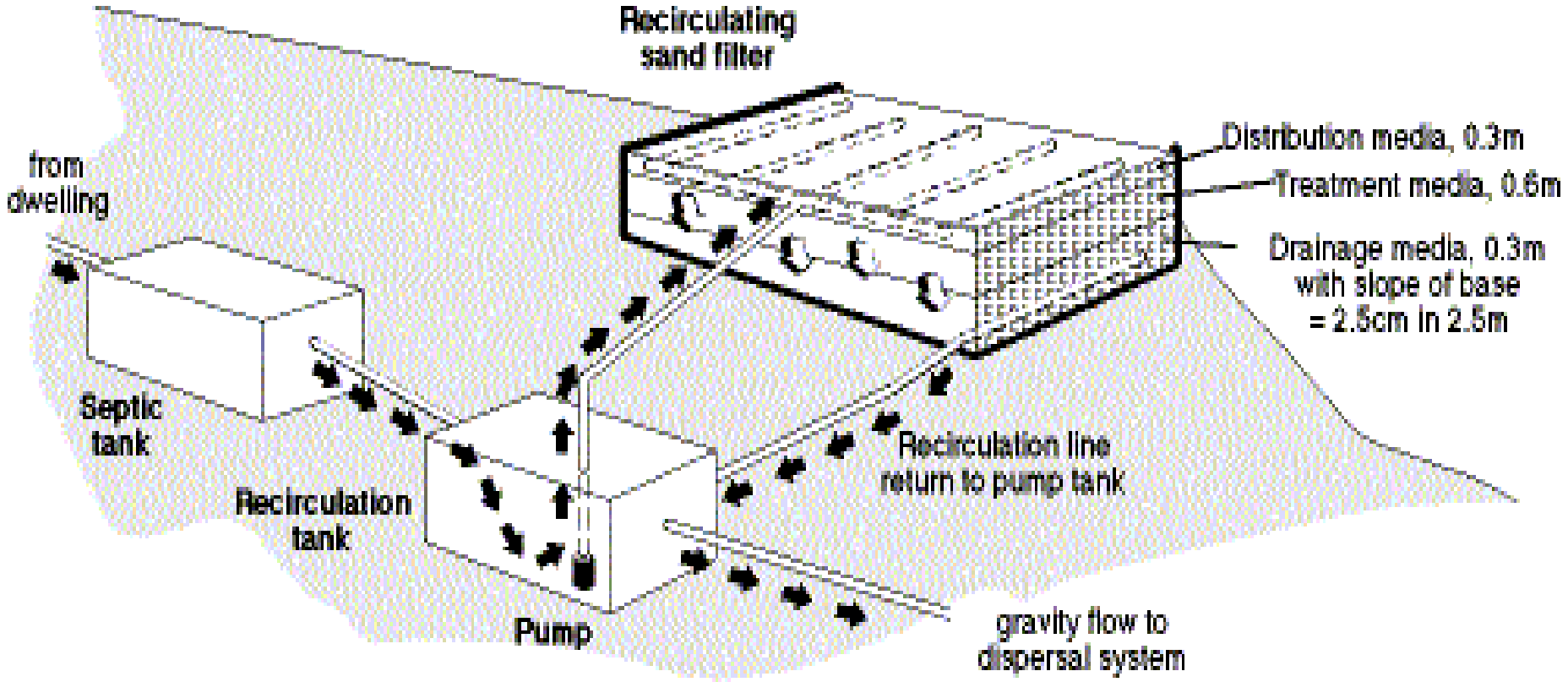
Seasonal performance

- BOD/TSS/Fecal
- N and P

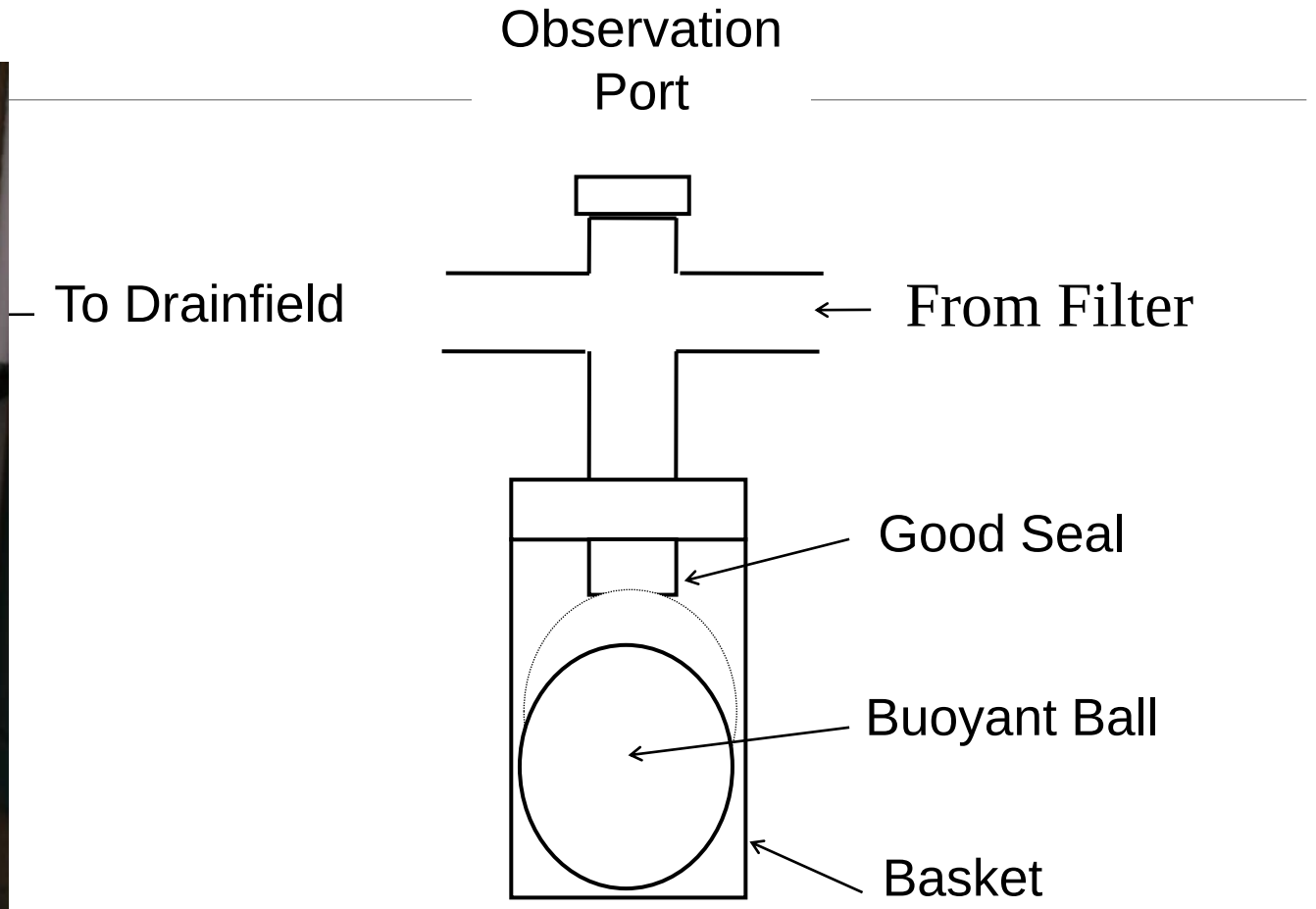
Vegetation

- If part of Design
- **No** trees
- **No** Noxious weeds

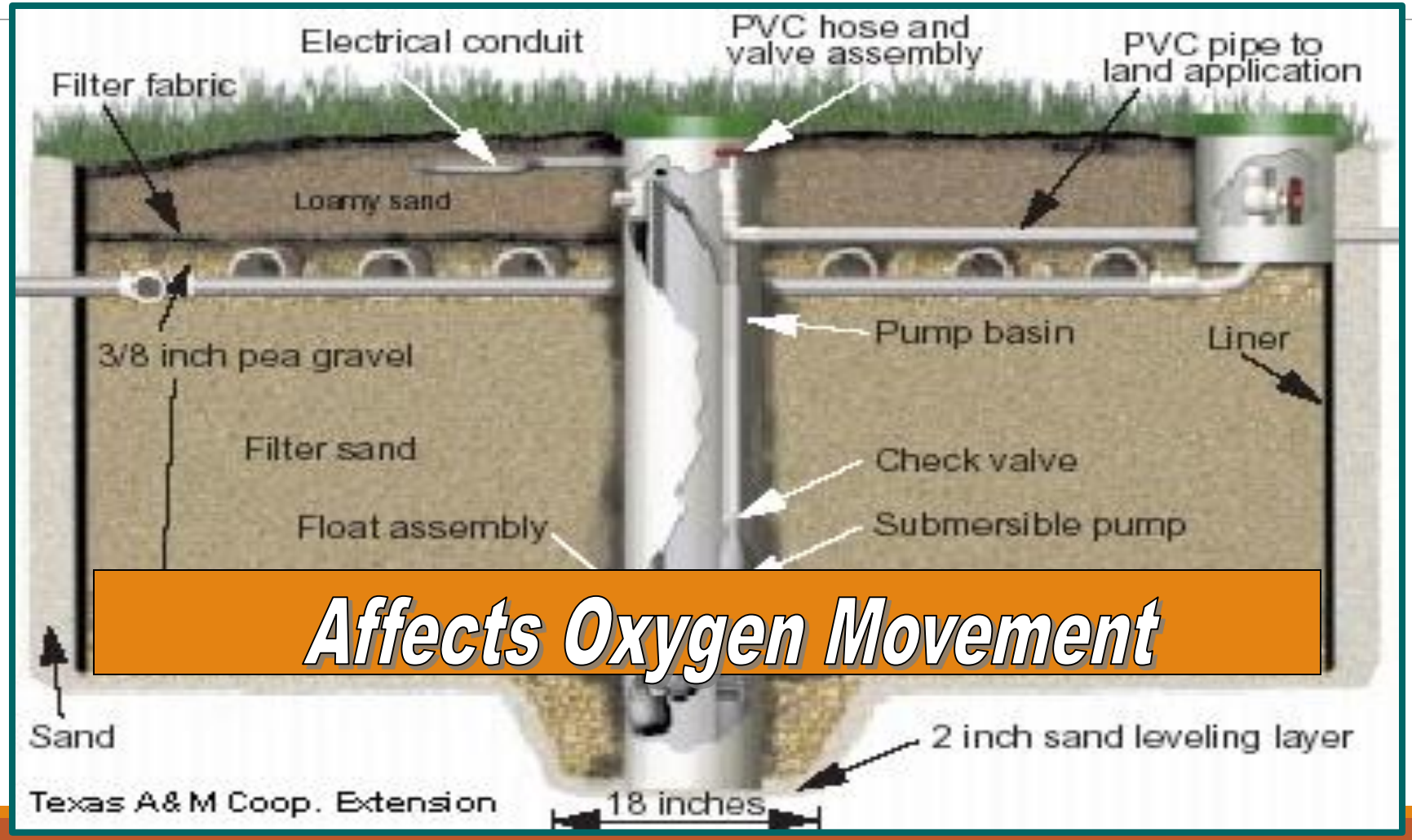
Flow Path in RMF



Recirculating Valve Diagram



Media Filter- Drainage



Finished system

Access

Appearance

Operational

- All the pieces working

Performance evaluation

Performance

Taste is NOT

Media Filters

Distribution operating

- Uniform
- Sound
- Pressure check

Media present

No ponding on Media

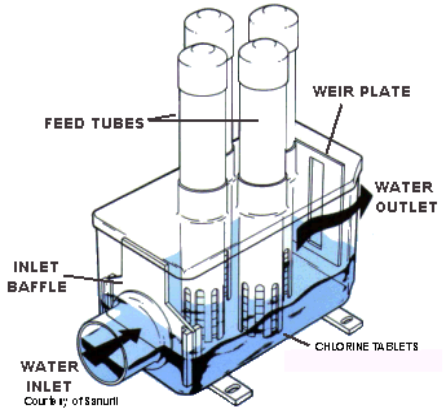
Proper drainage

Clear effluent

Review: True or False

- Recirculating filters have a component to allow for removing flow from the process.
- Sand filters and Peat filters effluent will look the same in a glass .
- Media filters should be ponded for best performance.

Disinfection

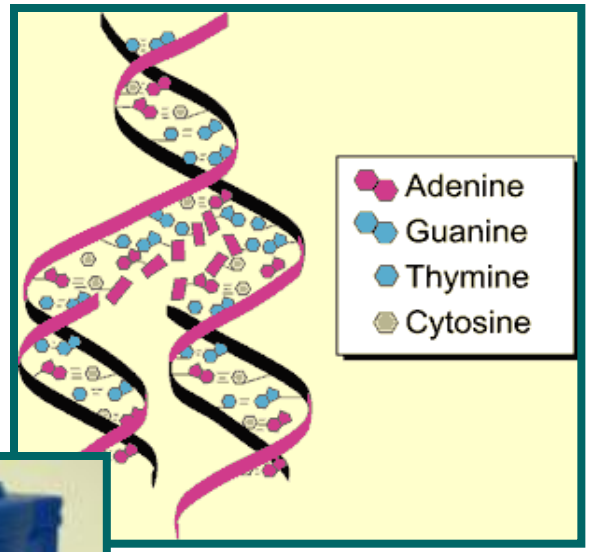


Chlorination

- Is the tank in good condition?
- Is there chlorine?

De-Chlorination

- Is the tank in good condition?
- Is there _____?



Disinfection

Ultraviolet radiation

- Is the tube available?
- Is it working?
- Has it been maintained?
- **Safe** Electrical

Ozone

- Delivery system

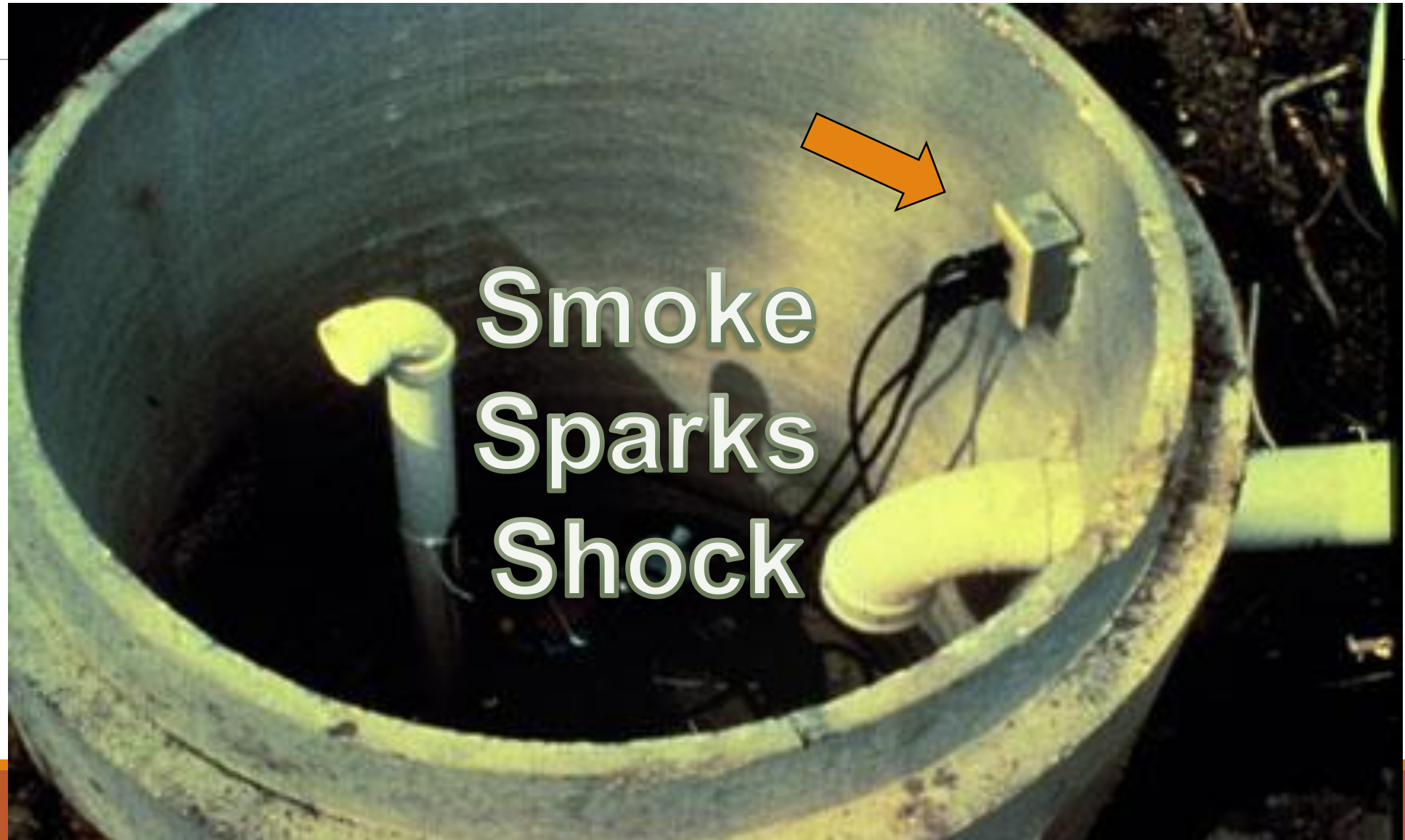
Dummi Accessible and Elevated 2

Does the pump work?

- On/ Off
- TDH
  - Complete dose
- GPM
  - Calibrate

Run a Dose

Safe Electrical?



Drainback

- *Check valve*
- *Purge hole*

Is there a Alarm?

- High water
- Low water

Does the alarm work?

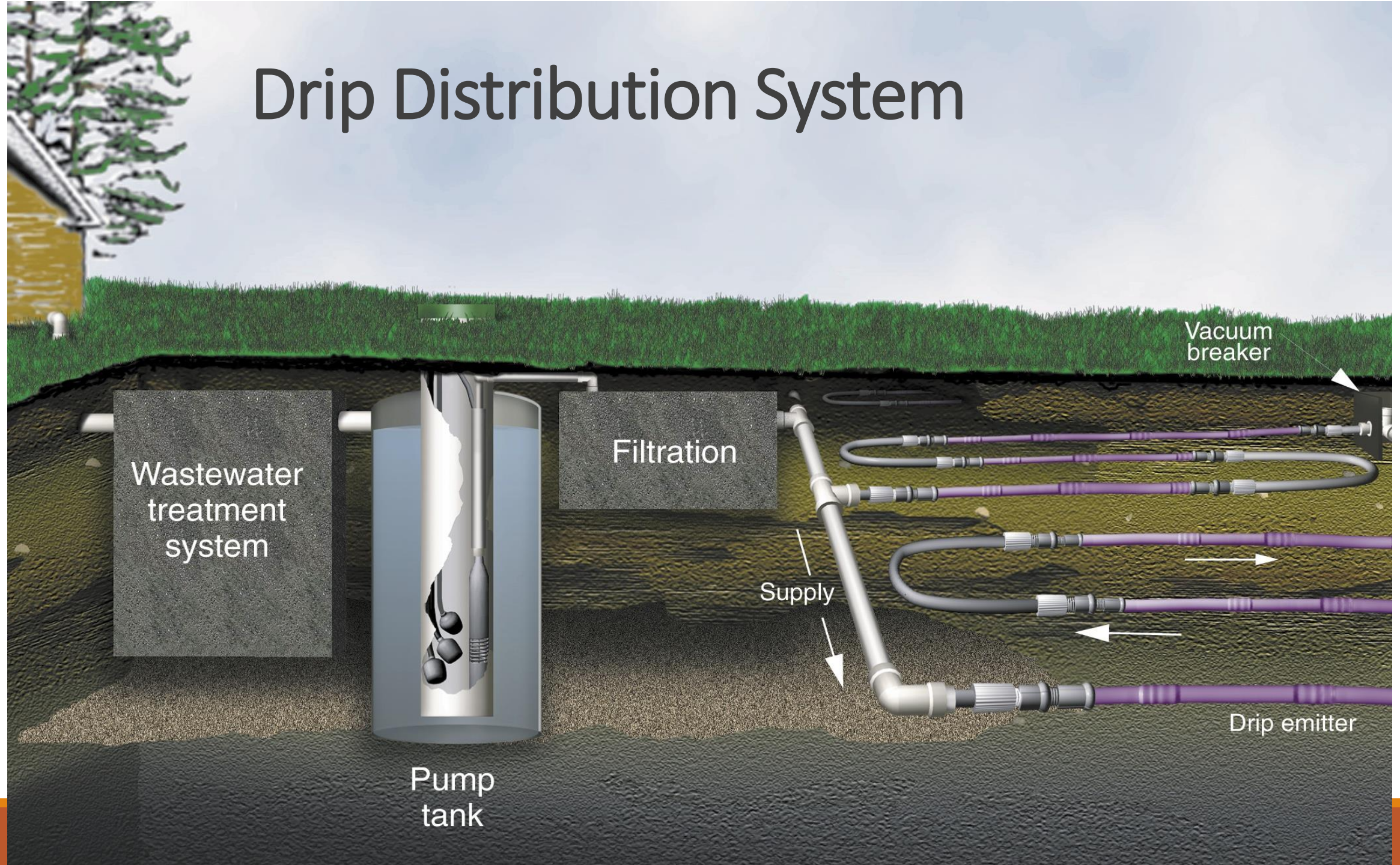
- Reset?
- Second circuit

Soil dispersal

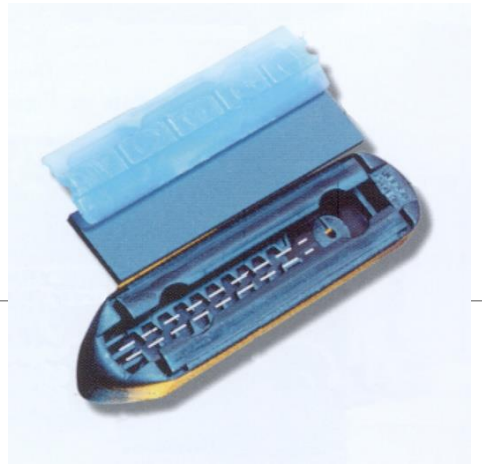
Loading rates
- Sizing
- Treatment

Application methods
- Gravity
  - Biomat?
- Pressure
- Drip

Drip Distribution System



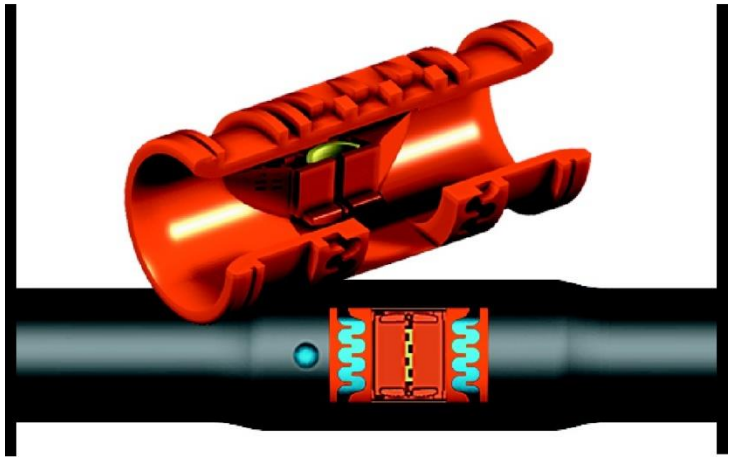
Drip Emitters



Pressure Compensating or Non-Pressure Compensating emitters.

Controlled flow rate for emitters - Friction used to control flow

The operating pressure is typically 15-25 psi for non-pressure compensating and 15-45 psi for pressure compensating emitter systems, with water exiting the emitter at 0 psi.



Drip Filters

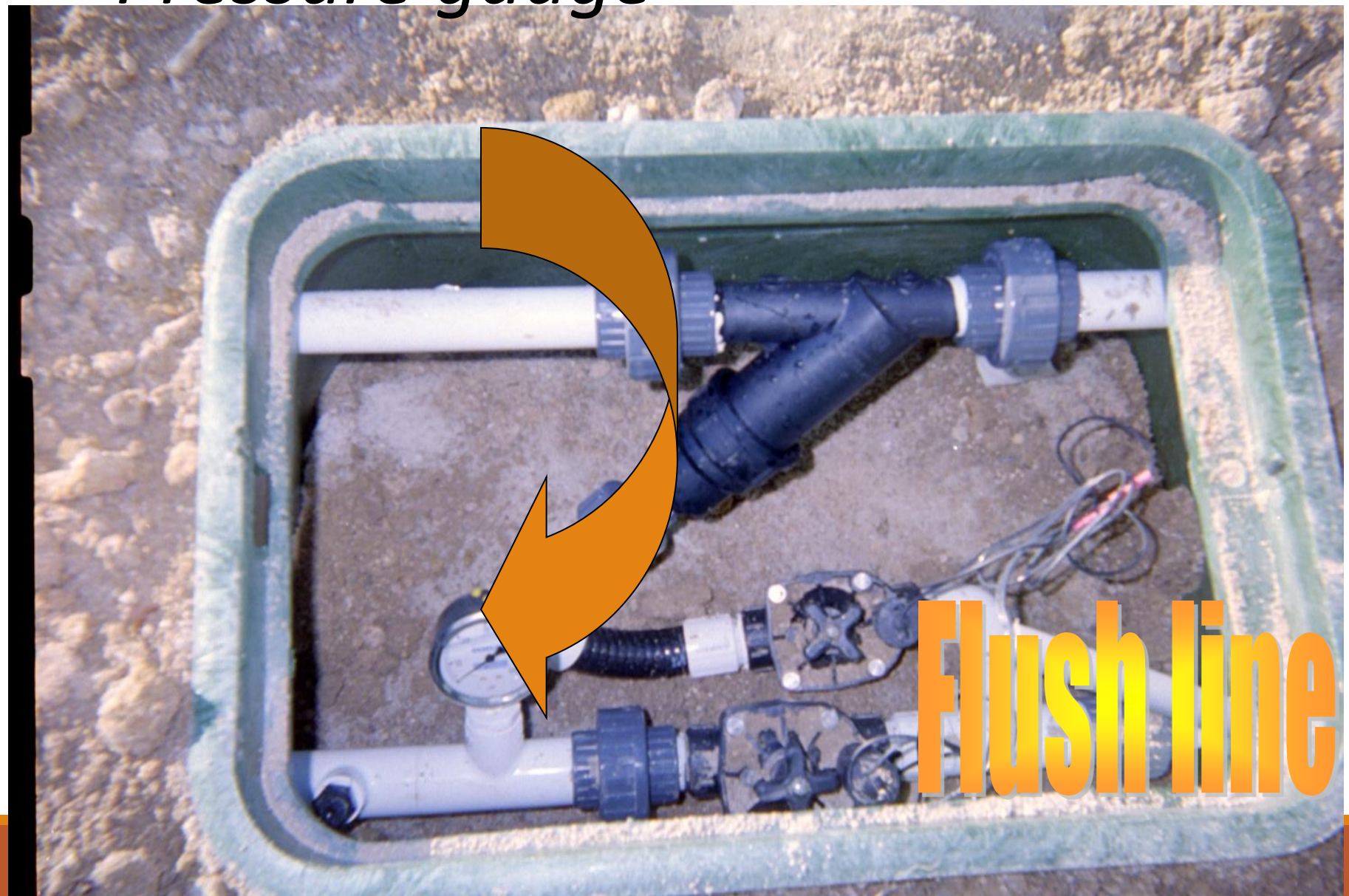
Types

- Screen
- Disc
- Sand

Remove particles greater than 100 microns

Protects emitters from plugging by particles in the effluent

Pressure gauge



Vacuum Breaker -

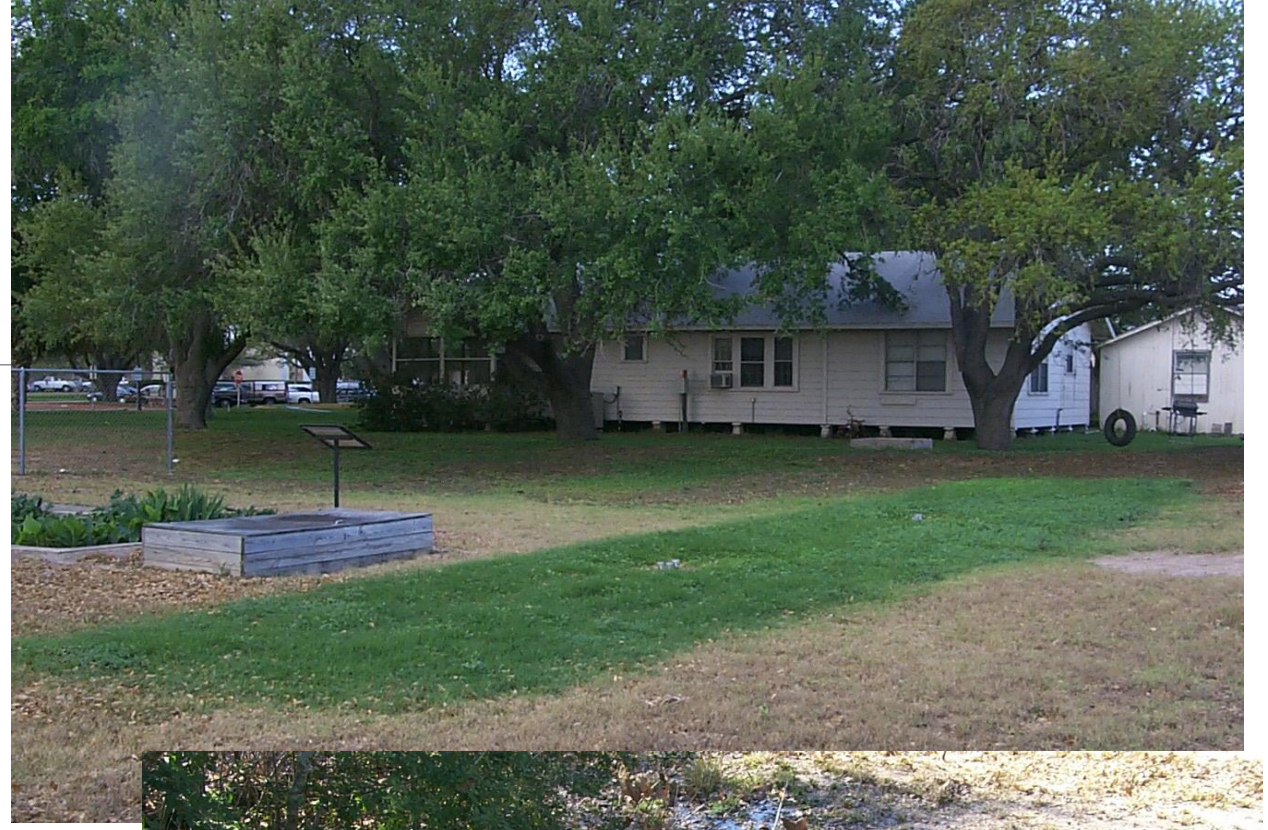
Clean the ball valve component

- Be careful of scaring ball

Make sure air can flow around valve

Drip Zone

- Visual evaluation
- Uniformity of water distribution
- Vegetation uniformity
  - Type
  - Color



Inspection

- Flow
- Filters
  - Clean
  - Present
- Flushing
- Air relief
  - Operating
- Distribution
  - Even

Review: True or False

- Disinfection in typical systems takes place in the soil.
- UV disinfection needs an ATU or Media filter to operate properly.
- Drip systems operate with 100 micron filters to allow for long-term performance.

Questions