



# Point of Entry Systems

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# The Water Quality Association

## The Mission, Vision and Core Values of the **Water Quality Association**

### **Mission**

We aspire to be the recognized resource and advocate for the betterment of water quality.

### **Vision**

We can make the world a better place by improving water quality to enhance quality of life through sustainable technologies and services.

### **Core Values**

We fundamentally believe in

- Having ethics and integrity in all that we do
- Having a shared passion for Improving water quality and increasing awareness
- Influential leadership through advocacy and education
- Science-based decision making
- Collaboratively seeking out all stakeholders' view points and perspectives
- Utilizing of performance-based standards and certification



The Water Quality Association (WQA) is a not-for-profit international trade association representing the residential, commercial and industrial water treatment industry.

## WQA Membership:

- Manufacturers
- Dealers
- Allied Industries



# Mission of WQRF

- To conduct and fund scientific research on subjects relating to the water quality improvement industry
- To advance the science of water to improve the quality of life
- To ensure that water treatment industry interests are presented in a cogent, competent manner

# Recent Studies

- **Battelle Study**
  - Demonstrate residential water softeners to be energy savers in households and increase longevity for household appliances/fixtures
- **Detergent Study**
  - Evaluate detergent and energy savings for laundry and dishwashing with the use of water softeners
- **Environmental Impact Study: Water softener effects on septic system performance**
  - This study was undertaken to investigate the effect home ion-exchange water softeners may have on the performance of onsite septic tanks.



# Drinking Water (Residential) – Potential Problems

- Health hazard
- Objectionable taste
- Objectionable odor
- Objectionable color

# Contaminants of Concern

- 1. Sand, Silt, Clay, Turbidity
- 2. Bacterial Contamination
- 3. Insoluble iron, manganese particles
- 4. Dissolved iron and manganese
- 5. Hydrogen sulfide/undesirable odor
- 6. Hardness
- 7. Acidity (excess)
- 8. Organic chemicals (e.g. pesticides)
- 9. Minerals (e.g. Arsenic, Fluoride, Nitrates)
- 10. Excessive Salts

# Drinking Water: Contaminants

Problem	Contaminant
Health hazard	Pathogens Nitrites/Nitrates ( $\text{NO}_2^-$ , $\text{NO}_3^-$ ) Lead/Copper (Pb/Cu) Arsenic ( $\text{H}_3\text{AsO}_3$ , $\text{H}_2\text{AsO}_4^-$ ) DBPs (THMs, HAAs, other??) Radionuclides ( $\text{Ra}^{2+}$ , $\text{UO}_4^-$ )
Objectionable color, appearance	Tannins, iron, turbidity
Objectionable taste	Dissolved metallic compounds, chlorine, bacteria
Objectionable odor	Chlorine, hydrogen sulfide
Laxative effect	Hydrogen sulfide



# Working Water (Residential) – Potential Problems

- Loss of heating efficiency
- Stained fixtures & appliances
- Stained laundry
- Increased soap/detergent use
- Inhalation hazards
- Objectionable smell
- Insufficient flow for waste removal
- Insufficient flow/pressure for plumbing fixture operation

# Working water: Contaminants

Problem	Contaminant
Loss of heating efficiency Increased soap/detergent use	Hardness minerals Dissolved calcium ( $\text{Ca}^{2+}$ ) & magnesium ( $\text{Mg}^{2+}$ ) compounds
Stained fixtures & appliances Stained laundry	Iron ( $\text{Fe}^{2+/3+}$ ), Manganese ( $\text{Mn}^{2+/3+/4+}$ ), Hydrogen sulfide ( $\text{H}_2\text{S}$ ), Tannins
Inhalation hazards Objectionable smell	Disinfection by-products Chlorine, hydrogen sulfide Bacteria
Corroded pipes/pinhole leaks	Acidic pH



# Processes

- Water Softener or Cation Exchange
- Anion Exchange
- Mechanical or Sedimentation Filtration
- Activated Carbon Filtration
- Oxidation Filtration
- Neutralizing Filtration
- Reverse Osmosis or Membrane Filtration
- Ultraviolet Treatment \*
- Chlorination Disinfection- Filtration



## What is a water softener?

- Cation exchange resin
- Removes hardness ions ( $\text{Ca}^{++}$ ,  $\text{Mg}^{++}$ , etc)
- Also removes most metallic ions such as Iron, Lead, Barium, Radium, Mercury, etc
- Whole house installation, regenerates by demand or time

# Water Softener Efficiency – Summary

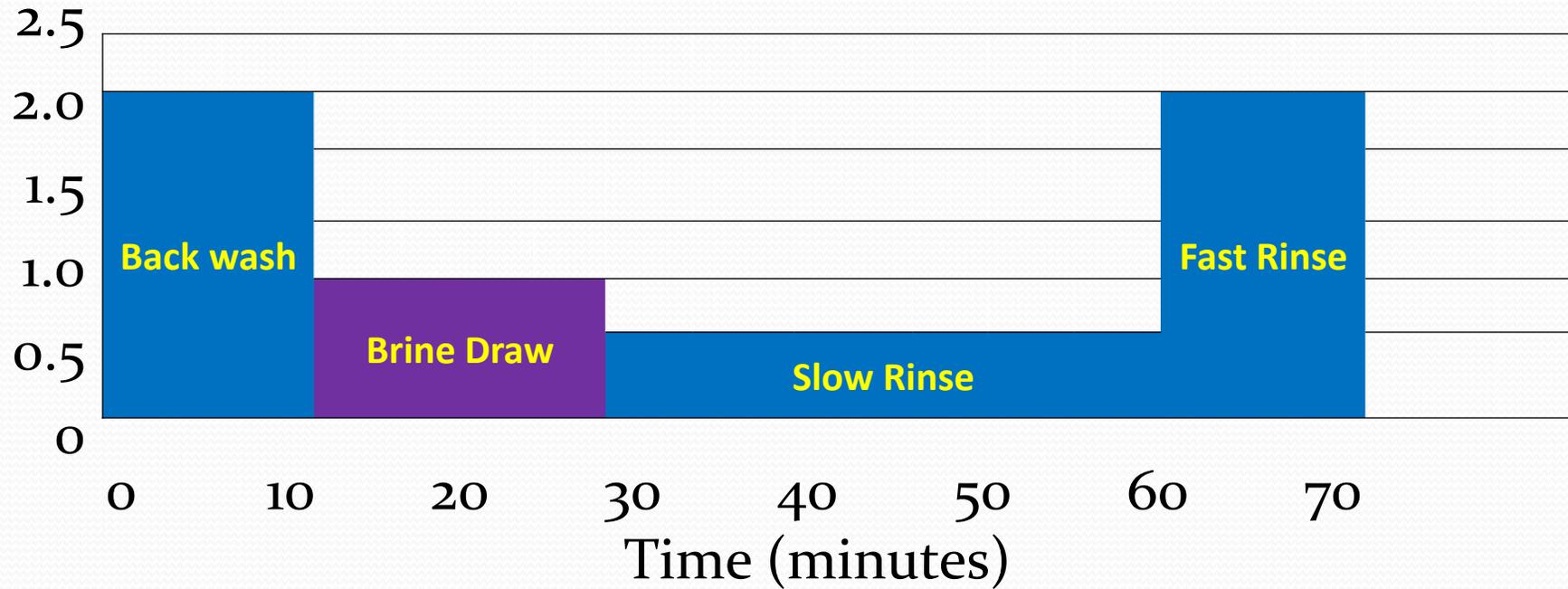
Control Set-Up	Saves Water	Saves Salt	High Efficiency
Time Clock/Mechanical	No	No	No
DIR	Yes	Yes	Yes
Counter-Flow Brining	Yes	Yes	Potentially

## Time Clock vs DIR

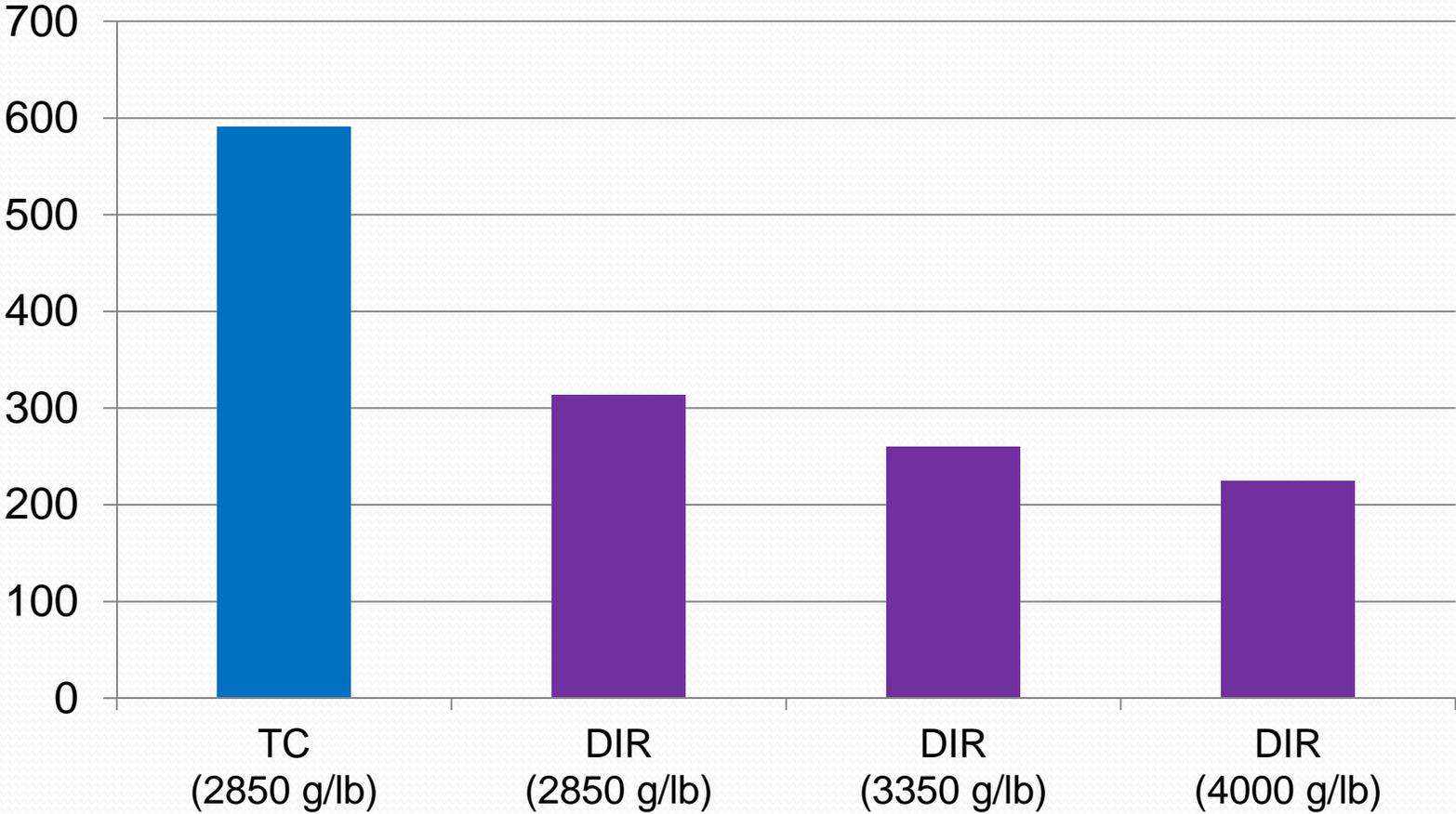
- Time Clock – regenerates based on time
- DIR – regenerates based on demand
- Regeneration spans 1-2 hrs
- Regenerations occurs <1 - 2 times per week

# Regeneration Process

$$20 \text{ gal} + 7.5 \text{ gal} + 7.5 \text{ gal} + 15 \text{ gal} = 50 \text{ gal}$$



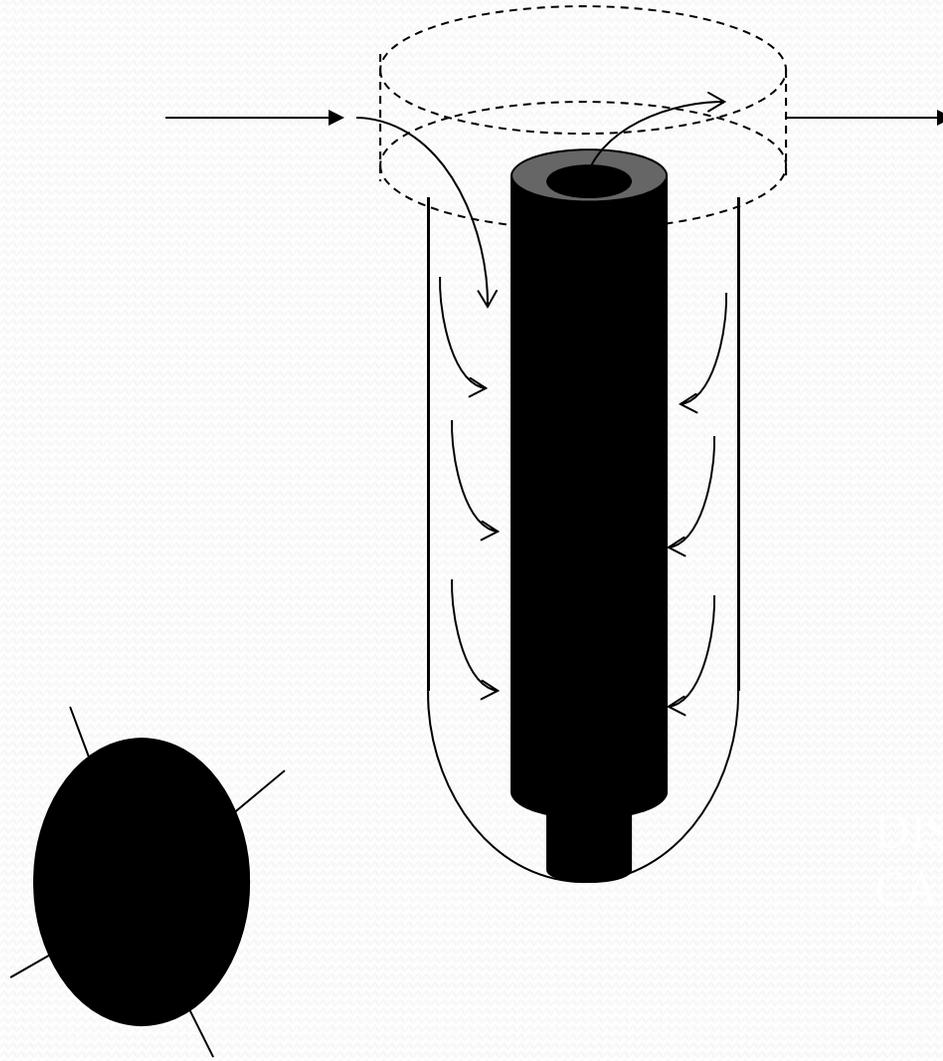
# Salt Usage Per Year



# WATER FILTERS



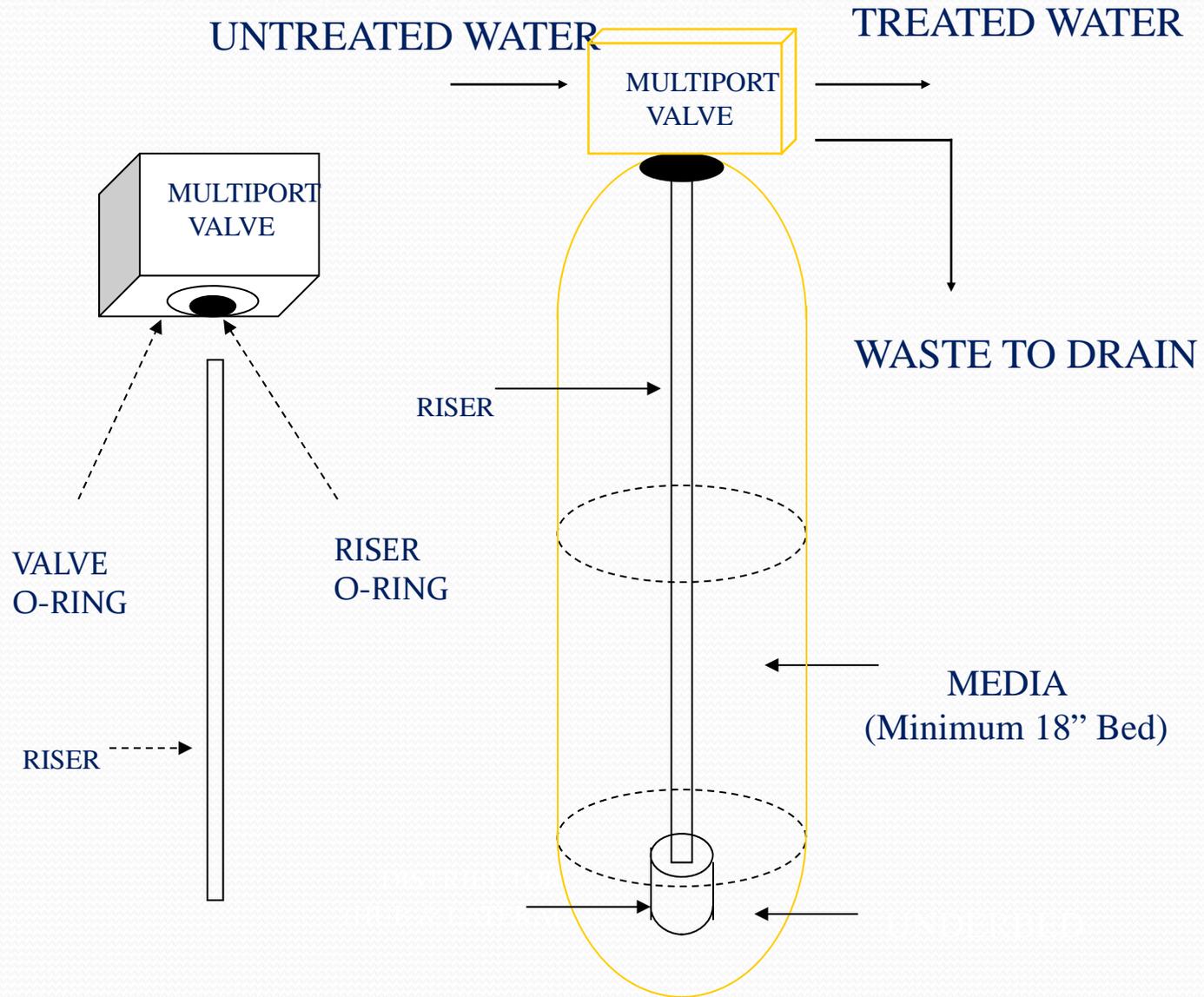
# CARTRIDGE FILTER



# MULTI-PORT CONTROL VALVE



# MEDIA TANK FILTER



# MEDIA



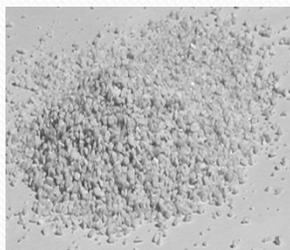
CALCITE



GARNET



MANGANESE GREENSAND



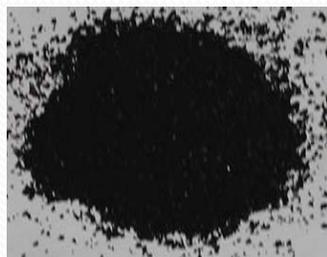
FILTER AG



KDF (BI-METAL)



MAGNESITE (pH)



CARBON

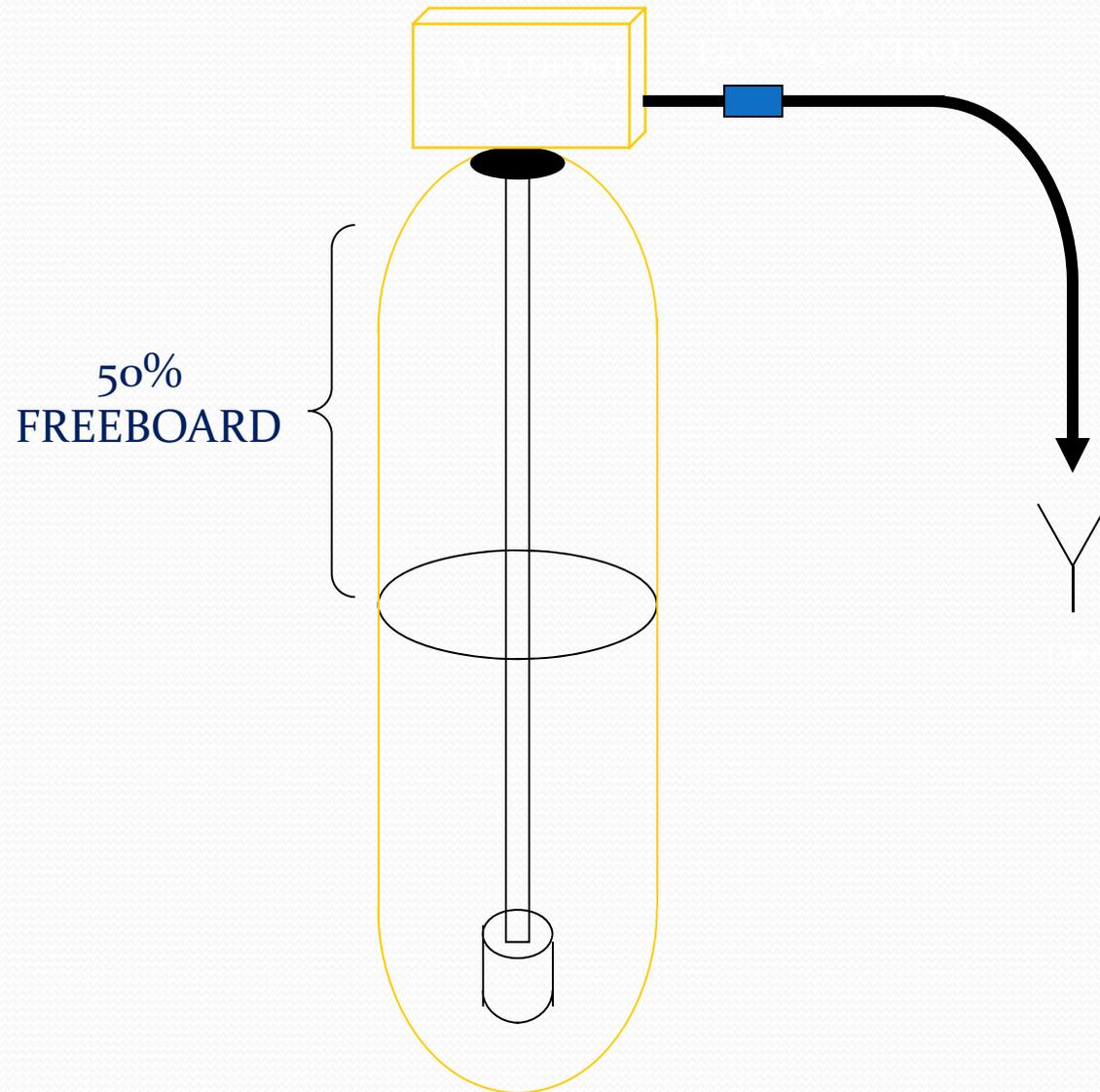


PYROLUCITE



BIRM

# FILTERS BACKWASHING





# Backwash Duration

- Generally 10 min.
- Range is 10 to 15 min.

# MINERAL BACKWASH RATES

**TARGET  
BED EXPANSION**

**VARIABLES  
MEDIA DENSITY  
TANK DIAMETER  
WATER TEMPERATURE**

**BACKWASH  
GPM per SQ FT**

<b>ACTIVATED CARBON</b>	<b>10</b>
<b>FILTER AG (Pumice)</b>	<b>9</b>
<b>CALCITE</b>	<b>11</b>
<b>SAND</b>	<b>15</b>
<b>KDF</b>	<b>30</b>

# Factors in Filtration

	Model No	Service Flow GPM	Backwash Flow GPM	Media Cubic Feet	Drain Pipe Size	Inlet/Outlet Size	Floor Space		Shipping Weight LBS
							Height	Diameter	
AC (Carbon) Series	AC-10	5.0	3.2	1.5	3/4"	1"	62"	10"	75
	AC-13	7.0	4.2	2.0	3/4"	1"	62"	13"	115
	AC-1665	10.0	5.3	4.0	3/4"	1"	75"	16"	268
AN (Calcite) Series	AN-10	5.0	5.3	1.5	3/4"	1"	62"	10"	170
	AN-13	7.0	7.5	2.0	3/4"	1"	62"	13"	215
	AN-1665	10.0	10.0	4.0	3/4"	1"	75"	16"	520
FE (Birm™) Series	FE-10	5.0	5.3	1.5	3/4"	1"	62"	10"	105
	FE-13	7.0	6.5	2.0	3/4"	1"	62"	13"	145
	FE-1665	10.0	10.0	4.0	3/4"	1"	75"	16"	304
MM (Multimedia) Series	MM-10	6.0	6.5	1.5	3/4"	1"	62"	10"	156
	MM-13	8.0	10.0	2.0	3/4"	1"	62"	13"	205
	MM-1665	10.0	15.0	4.0	1"	1"	75"	16"	500