Kube Engineering
Industry Guide

Potable Water

REFERENCE ONLY OLD INFO

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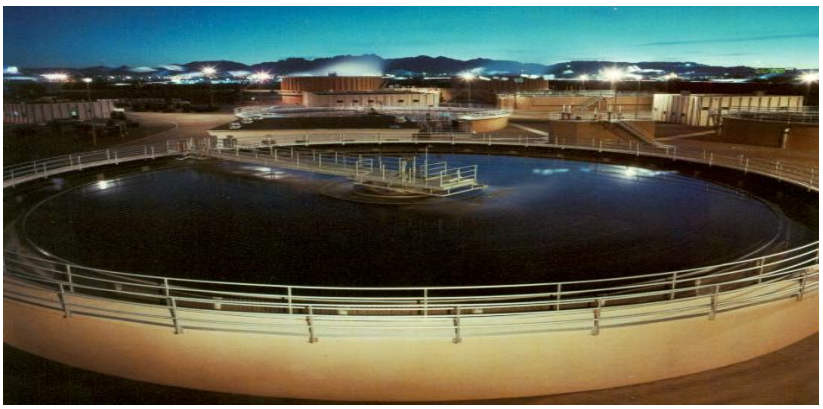


Ground and Well Water:

1. Level:

- Hydrostatic Well level , pump controller (OAP), Displays (Precision Digital)

2. **Flow**:

- Electromagnetic: Raw water, full pipe, measurement with simple measuring tasks
- Electromagnetic: Raw Water, full pipe, bidirectional measurement with (2) totalizers
- Ultrasonic: Clamp-on for use with large existing pipe

3. **Pressure:**

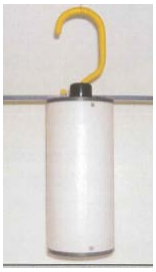
- Pressure Transducer (Wika/Dwyer)
- Pressure Transmitters
- Pressure Switches for pump control (Ashcroft)

4. Analytical:

- Turbidity
- Nitrate
- Conductivity (BAT)
- Organic Load as SAC
- Iron
- Manganese

5. Gas Detection

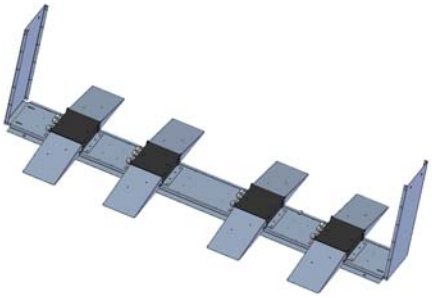
- Wet wells, Dry Wells



6. Data logging

Surface Water:

1. **Level:**
- Differential Pressure Transmitter for control of filters and pumps
2. **Flow**:
- Electromagnetic: Raw water, full pipe, measurement with simple measuring tasks
- Electromagnetic: Raw Water, full pipe, bidirectional measurement with (2) totalizers
- Electromagnetic: Open Channel Flow



- Ultrasonic: Clamp-on for use with large existing pipe
- Ultrasonic Open Channel for use with Venturi, Weir and Flumes

3. **Pressure:**
- Pressure Transducer (Wika/Dwyer)
- Pressure Transmitters
- Pressure Switches for pump control (Ashcroft)

4. Temperature
- RTD with Transmitter and Displays

5. Analytical:
- pH
- Turbidity
- Organic Load as SAC
- Dissolved Oxygen
- Conductivity

6. Data Logging

Surface Water with Infiltration

1. Flow, Pressure and Turbidity: Going in to the ground

Lift Station Order Remediation

1. VOC destruction via Ozone

SPRING WATER:

1. **Level in Spring tapping basin**
- Ultrasonic with Controller
- Hydrostatic Pressure

2. **Flow**:
- Electromagnetic: Raw water, full pipe, measurement with simple measuring tasks
- Electromagnetic: Raw Water, full pipe, bidirectional measurement with (2) totalizers
- Ultrasonic: Clamp-on for use with large existing pipe
- Ultrasonic Open Channel for use with Venturi, Weir and Flumes

3. **Analytical:**
- Turbidity
- Conductivity
- Water Sampler (Southwell)

4. **Data Logging**

MECHANICAL SCREEN

In both applications across the screens of course and fine screens, use two transducers with a controller to determine the differential level height.

1. Ultrasonic
2. Hydrostatic

INITIAL CLAIRIFICATION

1. Turbidity
2. Magmeter for Sludge Removal

DISSOLVED AIR FLOATATION

1. Air Injection

- Flow:
    - Thermal Mass
    - Vortex
    - Air

Emco Vortex

2. Water Injection

- Flow:
    - Electromagnetic: Raw water, full pipe, measurement with simple measuring tasks
    - Electromagnetic: Raw Water, full pipe, bidirectional measurement with (2) totalizers

3. Outlet of Clarifier

- Turbidity

4. Sludge Storage

- Ultrasonic Free Space with Controller

SAND REMOVAL

1. Aeration

- Flow:
    - Thermal Mass
    - Vortex (J-tec)

2. Flow Measurement from Basin

- **Flow**:
    - Electromagnetic: Raw water, full pipe, measurement with simple measuring tasks
    - Electromagnetic: Raw Water, full pipe, bidirectional measurement with (2) totalizers
    - Ultrasonic: Clamp-on for use with large existing pipe

PLANT INLET

1. **Flow**:

- Electromagnetic: Raw water, full pipe, measurement with simple measuring tasks
- Electromagnetic: Raw Water, full pipe, bidirectional measurement with (2) totalizers
- Ultrasonic: Clamp-on for use with large existing pipe
- Ultrasonic Open Channel for use with Venturi, Weir and Flumes

2. **Pressure:**

- Pressure Transducer (Wika/Dwyer)
- Pressure Transmitters
- Pressure Switches for pump control (Ashcroft)

4. Temperature

- RTD with Transmitter and Displays

5. Analytical:

- pH
- Turbidity
- Organic Load as SAC
- Conductivity
- Dissolved Oxygen

ATOMIZING

Pressure Measurement Inlet Spray Nozzel

Pressure:

- Pressure Transducer (Wika/Dwyer)
- Pressure Transmitters
- Pressure Switches for pump control (Ashcroft)

Analytical

Monitoring Oxygen after aeration

- Dissolved Oxygen

OXIDATOR

Analytical

- Dissolved Oxygen

OXIDATOR AS A TANK

Air

- Pressure– Differential at compressor across air filter
- Flow:
    - Thermal Mass
    - Vortex (J-tec)

Tank Level

- Ultrasonic freespace

Analytical

- Dissolved Oxygen
- pH

OXIDATIOR WITH PACKED COLUMN

Air:

- Pressure– Differential of air filters
- Flow:
    - Thermal Mass
    - Vortex (J-tec)

Analytical

- Dissolved Oxygen
- pH

1. Flow inlet to oxidation raw water
- Electromagnetic: Raw water, full pipe, measurement with simple measuring tasks
- Electromagnetic: Raw Water, full pipe, bidirectional measurement with (2) totalizers
- Ultrasonic: Clamp-on for use with large existing pipe
- Valves: Mixed Water Control

2. Level of Gas Chamber
- Ultrasonic free space
- Pressure Transmitters
- Gas Injection Control Valves

3. Level of Reaction Chamber
- Ultrasonic free space
- Pressure Transmitters

4. Analytical
- Manganese
- Aluminum
- Ferro

CHEMICAL INJECTION/Precipitation with separate sedimentation

1. Flow
- Inlet Raw Water
    - Bidirectional Magmeter
    - Ultrasonic– Clamp-on


- Polymer, Alkali, Al2SO4
    - Chemical Mag
- Recirculation sludge
    - Bidirectional Magmeter


2. Analytical
- pH, Turbidity
3. Sedimentation
- pH, Sludge Level Ultrasonic, Turbidity
4. Chemical Injection
- Ferric Chloride
- Polymer
- Sodium Hypochlorite
- Alum
- Sulfuric Acid
- Aluminum Sulfite



CHEMICAL STORAGE TANKS

1. Level– Ultrasonic and guided Radar
2. Chemical Storage Rooms
3. Chlorine Transport Tunnels






COMPACT VERSION/Closed Filter

1. Flocculent Addition
- Bidirectional Magmeter, pH, Turbidity and Chemical Mag
2. Filter output
- Turbidity
3. Differential Pressure across filter
4. Air Measurement
- Flow:
    - Thermal Mass
    - Vortex (J-tec)
5. Water Injection
- Bidirectional Magmeter

BACK WASH

1. Filter Outlet and Backwash Control

COMPACT VERSION/Open Filter

Same as Closed filter except use Ultrasonic Level rather than Pressure Differential

CHLORINATION

1. Chlorine Tank vessel injection
- Pressure Transmitter
2. Reaction Chamber Level
- Capacitance Probe
- Hydrostatic Pressure
3. Disinfected Pure Water
- Magmeters
4. Reactor Outlet
- Residual Chlorine, pH
5. Pure Water Basin Level Measurement
- Ultrasonic

CHLORINE DIOXIDE

1. Leakage detection
- Vibration switch
2. Chlorodioxide Level
- Vibration Switch
- Capacitance Switch
3. Flow from tank
- Chemical Mag for Chlorodioxide
4. Reactor Outlet
- Residual Chlorine, pH
5. Reactor Inlet Flow
- Bidirectional Magmeter

CHLORAMINATION

1. Inlet Flow
- Bidirectional Magmeter
2. Ammonia Dosing Flow
- Bidrectional Mag
3. Chlorine Dosing Flow
- Chemical Mag
- Coriolis
4. Basin Level
- Gap switch
- Capacitance Swith
5. Analytical
- Ammonia Analyzer
- Total Chlorine Analyzer

OUTLET CONTROL

Analytical

- Ph, Turbidity, Total Chlorine, Conductivity, Aluminum, Ferro, SAC (Organic Content)

Pressure, Temperature and Flow

- Effluent Flow Sampling

Flow

- Valves– Treated water outlet control with Electrohydraulic

EMCO Effluent Mag Delta-kit

EMCO Insertion Mag

Southwell Effluent Water Sampler

NEUTRALIZATION/Caustic Soda

1. Tank Leakage
- Vibration switch or Conductive switch
2. Min/Max limit detection-Gap Switch
3. Alkali Flow– Chemical Mag
4. Raw Water Flow– Magmeter
5. Analytical: pH control out of Neutralization tank

INHIBITOR

1. Raw water flow in to phosphate/silicate solution tank– Magmeter
2. Dissolving tank– Level Measurement– Gap or capacitance switches, Ultrasonic

Dosage Tank

- Continuous Level in tank– Ultrasonic
- Limit Level in tank– Gap Switch

Dosage Tank Flow

- Chemical Mag

End Control Analytical

- pH, Phosphate and Silicate meters

STORAGE

Level– Ultrasonic, Chlorine analyzer, Temperature, Flow-Mag, Pressure

TRANSPORT

Pressure, Temperature, Flow

NETWORK DISINFECTION

Chlorine Dioxide Solution

- Tank leakage: Gap Switch
- Tank Level: Capacitance and gap switch
- Flow: Chemical Mag

Out of Disinfection Chamber

THICKENER

Inlet Flow Sludge Line: Magmeter
Inlet Flow Flocculent: Chemical Mag
Thickener Tank Level: Ultrasonic
Sludge Tank Level: Ultrasonic
Outlet: Turbidity in Brackish Water
Outlet: Suspended Solids– Turbidity and Magmeter

Sludge Liquor Tank Level: Ultrasonic
Sludge Storage Tank Level: Ultrasonic

CENTRIFUGE

Inlet Flow Sludge Line: Magmeter
Inlet Flow Flocculent: Chemical Mag
Dewatering Centrifuge Outlet: Turbidity in Brackish Water
Outlet to Sludge Tank: Suspended Solids
Sludge Tank Level: Ultrasonic

FILTERPRESS

Inlet:

- Sludge Flow, magmeter
- Suspended Solids
- Flocculent Flow: Chemical Mag

Filterpress– Turbidity
Tank Level Acid and Filtrate-Ultrasonic

BELTFILTER

Inlet:

- Sludge Flow, magmeter
- Suspended Solids
- Flocculent Flow: Chemical Mag

Brackish Water – Turbidity
Sludge Liquor Tank Level -Ultrasonic

SLUDGE PRESS HOUSE

Gas Detection: Methane, Carbon Dioxide, Sulfuric Acid

DEMINERALIZATION with Ion Exchange

Cation Exchanger

- Flow Raw Water-Mag
- Flow HCL for regeneration– Chemical Mag
- Differential pressure across exchanger

Anion Exchanger

- Flow NaOH for regeneration– Chemical Mag
- Differential Pressure across exhnager

Mixed Bed Exchange

- Flow of Reagents– Chemical Mag

Demineralized Water Flow Effluent– Coriolis or Vortex

PARTIAL DEMINERALIZATION with Ion Exchange

Collection Container Level $CaCO_3$ Suspension– Ultrasonic
Lime Milk Flow– Chemical Mag
Demineralized Water Flow Effluent– Coriolis or Vortex
Raw Water Flow– Magmeter

DECARBONIZATION

HARDENING/limestone

NITRIFICATION

DENITRIFICATION

WATER PURIFICATION