

# Grade 1 Water Treatment Operator Need-To-Know Criteria (Subject Areas)

The following list of categories suggests topics of information that are important to know in order to be a successful and proficient Grade 4 Water Treatment Operator. The list may not be all-inclusive, and knowledge of additional topics may be of benefit to the operator.

## ***Category of Information: Processes***

- Pre-Treatment
  - Screens (Wells; Intake)
- Aeration
  - Slat tray
- Disinfection
  - Gas Chlorinators
  - Hypochlorinators
  - Chlorine Dioxide
  - Mixed Oxidants
  - Ultra-violet
- Fluoridation
  - Fluorosilicic Acid
  - Sodium fluoride
  - Sodium Fluorosilicate
- Corrosion Control
  - Corrosion Inhibitors
  - Aeration
- Iron/Manganese Removal
  - Chemical Oxidation Precipitation
    - Potassium Permanganate
    - Sodium Permanganate
    - Chlorine Dioxide
  - Aeration
  - Filters
- Storage
  - Ground Storage
  - Elevated Tanks
  - Standpipes
  - Hydropneumatic Tanks
- Cross Connections
  - Air Gap
  - Vacuum Breakers
  - Backflow
  - Backpressure
  - Backsiphonage
  - Cross Connection

## ***Category of Information: Support Systems***

- Motors
  - Single Phase
  - Three Phase
- Pumps
  - Centrifugal
  - Positive Displacement (Diaphragm)
  - Turbine
  - Metering
- Pipes
  - Ductile Iron
  - PVC
  - Asbestos Cement
- Joints
  - Flanged
- Valves
  - Ball
  - Check
  - Globe
  - Gate
  - Pressure Control
  - Vacuum Relief
  - Butterfly
  - Air Release
  - Foot
  - Altitude
- Fittings
  - Coupling
  - Union
  - Plug/Caps
  - Corporation
  - Curb Stop
- Cathodic Protection Devices
  - Anode Rod/Bags
  - Cathode Rod/Bags
  - Rectifiers
  - Dissimilar metals – Galvanic Corrosion
- Chemical Feeders
  - Solids
  - Liquids
  - Evaporators
  - Gas
  - Slurry
- Safety
  - Personal Protection Equipment
  - Self Contained Breathing Apparatus
  - Confined Space
  - MSDS Information
  - Traffic Control (Warning Devices; Barricades)
  - Hazard Detection
  - First Aid/Hygiene

## **Category of Information: Support Systems (continued)**

### Measuring/Control

- Signal Generators
  - Magnetic Flowmeter
  - Parshall Flume
  - Rectangular Weir
  - Venturi
  - Propeller Meter
  - Ultrasonic
  - Pitot tube
- Signal Transmitters
  - Electric
  - Pneumatic
  - Hydraulic
- Meters
  - Electrical - Multi – VOM
  - Electrical - Multi – MA
- Alarms
- Controls
  - Pneumatic
  - Hydraulic
  - Timers

### Security

- Attack
  - Prevention
  - Detection
  - Recovery

## **Category of Information: Lab Tests**

### Lab Tests

- Alkalinity
- Calcium
- Disinfectant residual
- Disinfectant demand
- Fluoride
- Orthophosphate
- pH
- Temperature
- Total Coliform
- Total Hardness
- THM
- HAA5
- Turbidity
- Specific Gravity

## **Category of Information: General Information**

### Units of Expression

- Definition
- Conversion

### Sources and Characteristics

- Characterization
- Quality/quantity
- Physical/chemical/biological characteristics

### Electrical Concepts (Basic)

- 

### Maps/Plans