OPERATOR NEED-TO-KNOW
WATER DISTRIBUTION
CLASS 1

SKILL LEVEL REQUIREMENTS

A. Know the hydrologic cycle, the sources of water, and their physical, chemical, and biological characteristics.
B. Know the potable water requirements as to quantity and chemical and bacteriological quality.
C. Know the names, uses, and operation of appurtenances used in systems of this size class.
D. Know the materials, construction methods, and installation procedures for distribution systems in this class.
E. Know the materials, procedures, and testing methods for disinfection.
F. Know the purposes, methods, and testing procedure for residual chlorination and know safe handling of chlorine and other chemicals used in water distribution.
G. Know the types of pumps used and the relationship of capacity to head.
H. Know the purpose of metering, reading, and simple field checking.
I. Know the safety aspects of water distribution and rules and regulations.
J. Know how to collect water samples.
K. Know the purposes and procedures for flushing.
L. Understand basic principles of mechanical and electrical principles as they apply to this class facility.
M. Know the definition of cross-connection and the hazards of them.
N. Know and understand drinking water quality standards as formulated by EPA, Health Department or other governmental agencies.

MATH NEED TO KNOW

Converting of Standards
Area Calculations

OPERATOR NEED-TO-KNOW
WATER DISTRIBUTION
CLASS 2

SKILL LEVEL REQUIREMENTS

A. Know and understand basic capacity and flow calculations as applies to water distribution.
B. Know all skills required in lower class plus.
C. Know the advantages and disadvantages of various construction materials used in water distribution systems.
D. Be able to identify common cross-connections and how to correct them.
E. Know how to select sampling points in a distribution system, what bacteriological tests are commonly run, and the meaning of the results.
F. Know the common nuisance organisms are, what problems they cause, how they might affect consumers and basic control methods.
G. Know how to operate a residual chlorination system including computation of material requirements.
H. Know how to compute disinfection dosages.
I. Know the effect of metering errors.
J. Know how to compute volume calculations, velocity %, and flow rates.
K. Know how to compute tank capacities and convert flow rates and pressures.
L. Understand basic principles of distribution system hydraulics as related to pipe type, roughness, size, fittings length.
M. Know the advantages and disadvantages of various type of pumps and the basic parts of each.
N. Know the sanitary features, operation and maintenance procedures for storage tanks and appurtenances in this class.
O. Know how to perform simple friction loss computations in pipe lines.

MATH NEED TO KNOW

Converting of Standards
Area Calculations
Volume Calculations – Circle & Square
Converting of Flow Rates
Velocity
Percent Calculations
Chemical Dosage (Simple)
Detention, Retention

OPERATOR NEED-TO-KNOW
WATER DISTRIBUTION
CLASS 3

SKILL LEVEL REQUIREMENTS

A. Know how to compute horsepower and work in computing pumping requirements.
B. Know all skills required in lower classes.
C. Know how to determine adequacy of production and storage to meet needs with partial system failure.
D. Know how to plan a bacteriological sampling program and be familiar with test procedure.
E. Know how to plan a cross-connection program.
F. Know how to make emergency repairs or temporary replacement of equipment to provide continuous service.
G. Know how to set up and carry out a preventative maintenance program.
H. Know the causes of unaccounted for water, how to minimize it, and loss control techniques.
I. Know how to measure water flows, calculate pump rates from flows or fill or withdrawal volumes.
J. Understand basic principles of instrumentation and controls which would be common at systems of this class.
K. Know how to select a pump from a capacity head curve and interpret the pump performance curve.
L. Know the legal responsibilities of a water utility.
M. Know the causes of loss of main carrying capacity and know how it may be corrected.
N. Know distribution safety, i.e., traffic, trenching, first aid, and know the safety features of a chlorine storage building.

MATH NEED TO KNOW

Converting of Standards
Area Calculations
Volume Calculations – Circle & Square
Converting of Flow Rates
Velocity
Percent Calculations
Chemical Dosage (Simple)
Detention, Retention
Percent Strength of Solutions
Pump Capacity (Curves)
Horsepower and Cost
Pump and Motor Efficiency
Water Loss
Pumping Equipment Capacity Calculations

OPERATOR NEED-TO-KNOW
WATER DISTRIBUTION
CLASS 4

SKILL LEVEL REQUIREMENTS

A. Know all skills required in lower classes.
B. Know how to prepare and interpret pump performance curves from given test data.
C. Know how to determine economical pump replacement schedules.
D. Know how to determine costs and make cost reports.
E. Know how a meter shop is set up, its functions and operations.
F. Know how to plan, carry out, and report a plant safety program.
G. Understand the principles of the application of flow formulas for orifices, weirs, etc.
H. Know how to plan and carry out a public relations program.
I. Know how to perform complex friction loss calculations in pipe lines.

MATH NEED TO KNOW

Converting of Standards
Area Calculations
Volume Calculations – Circle & Square
Converting of Flow Rates
Velocity
Percent Calculations
Chemical Dosage (Simple)
Detention, Retention
Percent Strength of Solutions
Pump Capacity (Curves)
Horsepower and Cost
Pump and Motor Efficiency
Water Loss
Pumping Equipment Capacity Calculations