

Kansas Class II Water Operator Need to Know

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The Kansas Department of Health and Environment (KDHE) has compiled the following minimum knowledge expectations for water operators. The intent of this document is to identify those items which individuals are expected to comprehend in order to serve as water operators. This document is not intended to serve solely as a study guide for operator certification examinations. In order to pass a certification examination, an operator must possess knowledge gained through formal education and training as well as on-the-job experience.

Kansas Class II Water Operator Need to Know - Ranked by Priority Within Each Knowledge Area

I. Chlorination

- Knowledge of disinfection concepts and procedures (e.g., chlorine contact time, residual, demand, dosage)
- Skill to replace chlorine cylinders and adjust gas chlorinators
- Knowledge of water-borne diseases
- Knowledge of the pH/temperature relationship in the chlorine disinfection process
- Knowledge of the difference between disinfection and sterilization
- Knowledge of chlorine dioxide
- Knowledge of ozone generation and treatment practices
- Knowledge of ultraviolet treatment processes

II. Distribution and Pumping

- Knowledge of Kansas One Call (e.g., 1-800-DIG-SAFE)
- Knowledge of pipe disinfection and de-chlorination procedures for new installations and repairs
- Skill to detect water leaks
- Skill to locate buried utilities and pipes
- Skill to install and repair buried pipe
- Skill to inspect and/or replace pumps
- Knowledge of the different types of pumps (e.g., centrifugal, submersible, vertical turbines, positive displacement) and motor/pump combinations
- Knowledge of different types of pipe joints and restraint systems
- Knowledge of pipe fittings and joining methods
- Knowledge of piping materials (e.g., type and size)
- Knowledge of engineering drawings and maps
- Knowledge of cathodic protection and corrosion control processes
- Skill to perform hydrant flow testing

III. Laboratory

- Knowledge of the proper application of chemicals
- Skill to prepare chemicals
- Skill to recognize abnormal analytical results
- Knowledge of measuring instruments
- Knowledge of testing instruments
- Knowledge of normal chemical range
- Knowledge of chemistry as it applies to water treatment
- Knowledge of biological science as it applies to water treatment
- Knowledge of laboratory equipment
- Knowledge of laboratory techniques
- Knowledge of Standard methods (e.g., laboratory standards and procedures)
- Knowledge of carbonate and non-carbonate hardness and other hardness-causing compounds

IV. Management and Cross Connection

- Knowledge of cross-connection control and approved backflow methods and devices
- Skill to demonstrate safe work habits
- Knowledge of emergency plans
- Skill to select safety equipment
- Knowledge of safety regulations (e.g., OSHA, KDHR)
- Knowledge of potential causes and impact of system disasters
- Knowledge of potential causes and impacts of disasters in a facility
- Skill to assess the likelihood of a disaster occurring
- Skill to coordinate emergency response with other organizations
- Knowledge of quality control/quality assurance practices
- Knowledge of local codes and ordinances
- Knowledge of customer service and public participation process
- Skill to communicate in writing
- Knowledge of fire flow requirements needed by your local fire department
- Knowledge of the principles of public relations
- Knowledge of risk management
- Knowledge of the principles of supervision
- Knowledge of the principles of management
- Knowledge of technical, financial, and managerial practices
- Skill to conduct trainings
- Skill to generate a written safety program
- Skill to evaluate employee performance
- Skill to evaluate proposals
- Skill to write policies and procedures
- Skill to conduct meetings

IV. Math

- Skill to perform math functions (e.g., addition, subtraction, multiplication, division, fractions, percentages, formulas, volume, area, detention time)
- Skill to calculate dosage rates
- Knowledge of the principles of measurement (e.g., flow, volume, area, velocity, performance, analytical)
- Skill to measure chemical weight/volume
- Skill to perform process control calculations
- Skill to perform laboratory calculations

V. Operation and Maintenance

- Skill to adjust chemical feed rates
- Knowledge of system operation and maintenance
- Knowledge of start-up and shut-down procedures
- Skill to discriminate between normal and abnormal conditions
- Skill to diagnose, troubleshoot, evaluate, and adjust system components
- Skill to interpret Material Safety Data Sheets

- Skill to record information and data
- Knowledge of function of tools
- Skill to follow written procedures
- Knowledge of operation and maintenance practices
- Skill to discriminate between normal and abnormal equipment conditions
- Skill to maintain processes in normal operating condition
- Knowledge of mechanical equipment
- Skill to perform general maintenance and repairs
- Skill to communicate verbally
- Skill to interpret data
- Knowledge of normal characteristics of water
- Knowledge of water aesthetics such as color, taste and odor, staining, and scale formation
- Skill to adjust equipment
- Skill to review reports
- Skill to evaluate and troubleshoot processes
- Knowledge of source and finish water characteristics
- Skill to evaluate operation of equipment
- Knowledge of monitoring instruments
- Skill to monitor mechanical equipment
- Skill to monitor electrical equipment
- Skill to calibrate instruments
- Skill to evaluate facility performance
- Skill to use hand tools
- Skill to perform physical measurements
- Skill to perform impact assessments (i.e., consequences of actions)
- Skill to differentiate between preventative and corrective maintenance
- Skill to diagnose/troubleshoot process components
- Skill to order necessary spare parts
- Knowledge of flow measurement devices (e.g., Venturi, Pitot, flow meter)
- Skill to translate technical language into common terminology
- Knowledge of electrical principles
- Skill to organize information
- Knowledge of hydrology as it applies to water supply
- Knowledge of lubricant and fluid characteristics
- Knowledge of pneumatics
- Knowledge of hydraulic principles

VI. Operation and Maintenance/Groundwater

- Knowledge of watershed or well-head protection
- Knowledge of well construction and maintenance
- Operation and Maintenance/Surface Water
- Knowledge of facility operation and maintenance
- Knowledge of water treatment processes
- Knowledge of the “point of entry”

- Knowledge of proper chemical handling and storage
- Knowledge of water-related carcinogens
- Knowledge of process control instrumentation
- Skill to adjust flow patterns
- Skill to adjust process components
- Knowledge of water treatment design parameters
- Knowledge of off-gas equipment and procedures

VIII. Safety

- Skill to recognize unsafe work conditions
- Skill to identify fire and safety hazards (e.g., electrical, chemical, traffic)
- Skill to identify potential safety hazards
- Skill to operate safety equipment
- Knowledge of proper safety procedures
- Knowledge of personal protective equipment

IX. Sampling, Recordkeeping, Reporting and Regulatory

- Knowledge of proper sampling procedures
- Knowledge of water-related professional ethics (e.g., reporting honest and accurate test results)
- Knowledge of monitoring requirements
- Knowledge of the Safe Drinking Water Act
- Knowledge of federal, state, and local regulations pertaining to water systems
- Knowledge of primary and secondary drinking water standards
- Skill to report findings
- Skill to determine what information needs to be recorded
- Skill to apply regulations
- Knowledge of reporting requirements
- Knowledge of public notification requirements
- Knowledge of recordkeeping policies
- Knowledge of the function of a recordkeeping system
- Knowledge of the regulatory inspection process