

State of Nevada Expected Range of Knowledge Water Distribution Operators

To the left of each subject area all grades will be an expected skill range as follows:

N/A = Not Applicable

A = Apprentice A person who generally works under the supervision of a more skilled person. Has a general understanding of all concepts listed below and functions at the novice level.

J = Journey Person An experienced, competent worker. Has a high level of understanding of all concepts listed below and performs with minimal supervision.

M = Master A highly skilled person who has a complete understanding of all concepts listed below and performs with no supervision.

Water Distribution Mathematics	Grade Level	1	2	3	4
Water measurements		A	J	M	M
Formulas (area and volume)		A	J	M	M
Units and conversion factors		A	J	M	M
Water pressure		A	J	M	M
Calculation of dosage, feed rates, and flow rates		N/A	A	M	M
Calculation of horsepower requirements		N/A	N/A	A	M
Calculation of electrical costs for pumping		N/A	N/A	A	M
SCADA signal calculations, i.e., 4-20 mA		N/A	N/A	A	M

Distribution System Operation	Grade Level	1	2	3	4
Purpose, configuration, operation		A	J	M	M
Pipe materials		A	A	J	M
Static head -- meaning and significance		A	J	M	M
Water storage facilities -- types and purpose		A	J	J	M
Valve types and uses		A	J	M	M
Meters		A	J	J	M
Hydrants		A	J	J	M
Leak detection and repair		N/A	A	J	M
Corrosion -- causes, effects, control		N/A	A	J	M
Flushing and cleaning		A	J	J	M
Cross-connection and backflow devices use and maintenance		A	A	J	M
Water meter testing, maintenance and repair		A	A	J	M
Maintenance of pumps and electric motors		A	J	J	M

Piping	Grade Level	1	2	3	4
Effect of pipe size, type and C factor		A	J	J	M
Standard installation, operating capacities and pressures		A	J	M	M
Head loss in pipes -- causes, significance		A	J	M	M
Tuberculation -- causes and effects		A	J	M	M
Joints and fittings		A	J	M	M

Sources of Supply	Grade Level	1	2	3	4
Chemical, physical, and bacteriological characteristics; variability		A	J	J	M
Groundwater and surface water supplies		A	J	M	M
Hydrologic cycle		A	J	M	M
Well location, construction, and yield		A	J	M	M
Sanitary surveys		N/A	A	J	M
Watershed management		N/A	A	J	M

Water Quality	Grade Level	1	2	3	4
Elements, compounds, hardness, pH		A	J	J	M
Significance of organics and inorganics		A	J	J	M
Sampling requirements, techniques		A	J	M	M
Coliform group -- occurrence, significance		A	J	M	M
Heterotrophic bacteria		A	J	J	M
Potential waterborne diseases		A	J	M	M
Cross connection significance and prevention		A	J	J	M
Disinfection by-products, i.e., THM's		A	J	J	M

Disinfection	Grade Level	1	2	3	4
Purpose of disinfection		J	M	M	M
Disinfectant types		A	J	J	M
Characteristics of chlorine and chlorine compounds (gas/liquid)		A	J	M	M
Chlorine demand -- significance, and relationship to dose		A	J	J	M
Residual measurement methods and reagents used		A	J	J	M
Chlorine storage, feeding and measurements		A	J	J	M
Chlorine containers		A	J	J	M
Detection of leaks		A	J	J	M
Hazards and safety requirements		A	J	M	M
Disinfection by-products; THMs		A	J	J	M
Breakpoint chlorination -- meaning, significance, determination		A	J	M	M
Effects of pH, turbidity and temperature on chlorination		A	J	M	M
Free Vs combined chlorine		A	J	M	M
Standard disinfection methods for new/repared mains and storage facilities		A	J	M	M

Pumps and Motors	Grade Level	1	2	3	4
Types of pumps		A	A	J	M
Operational principles		A	J	J	M
Mechanical components of centrifugal and positive displacement pumps		A	J	J	M
Static, dynamic, suction and discharge head		A	J	M	M
Motors/Drives		A	J	M	M
Chemical feeders		A	J	M	M
Causes of water hammer and cavitation		A	J	M	M
Routine preventative maintenance (packing, bearings, alignment, priming)		A	J	J	M

Electricity (Water Related)	Grade Level	1	2	3	4
Units (amps, ohms, watts, volts)		A	A	J	J
Current flow; AC/DC		A	A	J	M
Circuits		A	A	J	J
Lock-out/tag-out		A	J	M	M
Horsepower		N/A	A	J	M
Electrical controls		A	A	J	M
Generators		A	J	J	M
Transformers		A	J	J	M
SCADA Systems		A	J	J	M

Safety	Grade Level	1	2	3	4
General		J	J	M	M
Basic first aid		A	J	M	M
Traffic Control		A	J	J	M
Trenching and shoring		A	J	J	M
Confined spaces		A	J	J	M
Respiratory protection		A	J	J	M
OSHA Compliance		N/A	A	J	M

Utility Management	Grade Level	1	2	3	4
Planning		N/A	A	J	M
Personnel		N/A	A	J	M
Maintenance management		N/A	A	J	M
Information management		N/A	A	J	M
Public relations		N/A	A	J	M
Emergency response		N/A	A	J	M
Finance		N/A	A	J	M
Water rates		N/A	A	J	M
Safety administration		N/A	A	J	M
Security		N/A	A	J	M