

Study Guide of Typical Exam Content for Wastewater Treatment Operator: Class L1 and L2 Certification Examination

General Exam Makeup

The L1 and L2 examinations consist of 50 one-point multiple choice questions and 25 two-point multiple choice questions. The style of questions and number of questions may change without notice. Examinees have five (5) hours to complete the exam.

Please contact EGLE-WRD-OpCert@Michigan.gov if you have any questions.

Exam Content

Examinees are expected to know the basics of operation, control, and troubleshooting the lagoon wastewater treatment process. Examinees are expected to know and be able to apply the principles of supervision that would be required of a superintendent of a Class L1 or L2 facility.

Examinees for Class L2 may also be expected to know the principles and practices of aeration, phosphorus removal, nitrification, and disinfection as these relate to lagoon wastewater treatment systems.

Subject areas to be covered under each area may include, but are not limited to:

General Knowledge, Safety, and Regulations

- Understanding the purpose of monitoring wells around a lagoon system
- Understanding the purpose of [Occupational Safety and Health Administration \(OSHA\)](#) regulations
- Manhole safety: confined space entry, odors and toxic gas, personal protective equipment (PPE)
- State of Michigan discharge permit reporting methods
- [Workers Right to Know Law](#)
- Cross connection

Lagoon Treatment and Operations

- Managing the sludge layer of a typical lagoon (aerated and non-aerated)
- [Proper influent and discharge operations and procedures](#)
- Detention time
- Managing toxic materials discharged into a lagoon system
- Infiltration and inflow
- Common conditions of a well-maintained lagoon system
- Maximum organic loading

Laboratory Analysis, Water Quality, and Sampling

Proper sampling procedures and analysis for:

- Biochemical Oxygen Demand (BOD)
- Composite sampling
- Determining the effectiveness of disinfection
- [Dissolved oxygen](#)
- Fecal coliform
- Grab samples
- [Phosphorus removal](#)
- Suspended solids

Laboratory Analysis, Water Quality, and Sampling Definitions

- | | | | |
|------------------------------------|------------------------------------|------------------|------------------------------------|
| • Aerobic and anerobic | • Facultative | • Pathogens | • Shock load |
| • BOD | • Fecal | • Photosynthesis | • Suspended solids |
| • Chlorine residual | • Inorganic solids | • pH scale | • Total solids |
| • Dissolved solids | • Nitrification | • Respiration | • Volatile solids |

Maintenance and Troubleshooting

- Understanding and maintaining an electrical motor with voltage and amp, electrical leads
- Proper maintenance of the various pumps and how they operate
- Preventative maintenance program
- Lift station operation and maintenance
- Maintaining vegetation in and around a lagoon system

Maintenance and Troubleshooting Definitions

- Centrifugal pumps
- Electrical: Ampere, Volt, Ohm, Watt
- Flumes and weirs
- Pump Parts and Terms:
 - Head
 - Air-bound
 - Impeller
 - Volute
 - Suction line
 - Discharge line
 - Casing
 - Backplate
 - Bearing
 - Lantern ring

Math Calculations

[The training materials for both municipal and industrial wastewater](#) on our website are an excellent resource for math calculations.

- Detention time
- Discharge volume
- Gallons per day
- Number of gallons
- Number of inches
- Organic loading in pounds/BOD/acre
- Pounds of suspended solids discharged from a lagoon system
- Pounds of Ferric Chloride per gallon
- Pump output
- Surface area
- Volume in gallons
- Weight of alum solution

Additional Training Resources and Materials

- [California State University, Sacramento wastewater courses and manuals](#)
- [Michigan Rural Water Association \(MRWA\) training and prep courses](#)
- [Michigan Water Environment Association \(MWEA\) training and prep courses](#)
- [Water Environment Federation \(WEF\) books and study guides](#)

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