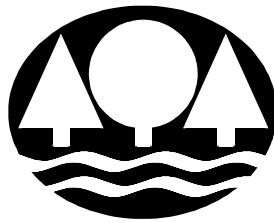


Wastewater Treatment Facilities

**Suggested Study Material
Need to Know Topics**



**Minnesota
Pollution
Control
Agency**

Minnesota Pollution Control Agency
Program & Training Coordination Unit
Customer, Employee & Agency Development Section
Technology, Education & Assistance Division
520 Lafayette Road North
St. Paul, Minnesota 55155

Website: www.pca.state.mn.us

Contact: Dianne Navratil
(651) 296-9269 or (800) 657-3864

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SUGGESTED STUDY MATERIAL FOR WASTEWATER TREATMENT FACILITIES

Advanced Waste Treatment - Office of Water Programs, California State University, Sacramento, 6000 J Street, Sacramento, CA, 95819-6025 - (916)278-6412

Basic Wastewater Collection Systems Manual - Rick Arbour & Associates, 4467 Oak Chase Lane, Eagan, MN, 55123 - (612)686-5516

Manual of Practice No. 11, Operation of Wastewater Treatment Plants - Water Environmental Federation, 601 Wythe Street, Alexandria, VA, 22314-1994 - 1(800)666-0206

Operation and Maintenance of Wastewater Collection Systems - Office of Water Programs, California State University, Sacramento, 6000 J Street, Sacramento, CA, 95819-6025 - (916)278-6142

Operation of Wastewater Treatment Plants - Office of Water Programs, California State University, Sacramento, 6000 J Street, Sacramento, CA, 95819-6025 - (916)278-6142

Recommended Standards for Wastewater Facilities - Health Education Services, P.O. Box 7126, Albany, NY, 12224 - (518)439-7286

Stabilization Pond Operation and Maintenance Manual - Minnesota Pollution Control Agency, Training Unit, Water Quality Division, 520 Lafayette Road North, St. Paul, MN, 55155-4194 - (612)296-7251

Temporary Traffic Control Zone Layouts Manual - Mn/DOT Map Sales Office, Room G-19 Transportation Building, 395 John Ireland Boulevard, St. Paul, MN, 55155 - (612)296-2216

Wastewater Math Workbook - Minnesota Pollution Control Agency, Training Unit, Water Quality Division, 520 Lafayette Road, St. Paul, MN, 55155-4194 - (612) 296-7251

Wastewater Treatment Technology Manual - Minnesota Pollution Control Agency, Training Unit, Water Quality Division, 520 Lafayette Road, St. Paul, MN, 55155-4194 - (612) 296-7251

Note: Specific study materials for each class of examination are listed with the need-to-know criteria.

CLASS A

- 1. Math**
 - 1.1 Pounds loading
 - 1.2 Percent removal
 - 1.3 Detention time
 - 1.4 Unit loading
 - 1.5 Activated sludge
 - 1.6 Budget
- 2. Basic knowledge**
 - 2.1 Basic wastewater theory
 - 2.2 Safety
 - 2.3 Hydraulic concepts
 - 2.4 Maps and plans
 - 2.5 Pumps, motors and controls
 - 2.6 Measuring and control systems
 - 2.7 Wastewater sources and characteristics
 - 2.8 Public Health
 - 2.9 Flow measurement
 - 2.10 Laboratory - dissolved oxygen, pH, chlorine residual
 - 2.11 Electricity
 - 2.12 Chemical feeders
- 3. Preliminary treatment**
 - 3.1 Flow equalization
 - 3.2 Screening, grinding, grit
 - 3.3 Chemical pretreatment
- 4. Secondary treatment**
 - 4.1 Septic tank/mound and drainfield
 - 4.2 Clarifiers
 - 4.3 Trickling filter
 - 4.4 Activated sludge
 - 4.5 Rotating biological contactor
- 5. Disinfection**
 - 5.1 Chlorination
 - 5.2 Dechlorination
 - 5.3 Ultraviolet disinfection
 - 5.4 Ozone disinfection
- 6. Advanced treatment**
 - 6.1 Coagulation/flocculation
 - 6.2 Nitrogen removal
 - 6.3 Phosphorus removal
 - 6.4 Filtration
 - 6.5 Biological advanced treatment
 - 6.6 Effluent disposal
- 7. Solids handling**
 - 7.1 Sludge conditioning
 - 7.2 Sludge thickening
 - 7.3 Aerobic digestion
 - 7.4 Anaerobic digestion
 - 7.5 Vacuum filter, filter press, belt press, centrifuge
 - 7.6 Sludge incineration
 - 7.7 Sludge composting
- 8. Management**
 - 8.1 Compliance
 - 8.2 Planning
 - 8.3 Maintenance management
 - 8.4 Emergency response
 - 8.5 Public relations
 - 8.6 Security
 - 8.7 Personnel
 - 8.8 Budgets

Suggested study materials include:

- Advanced Waste Treatment
- Manual of Practice No. 11, Operation of Wastewater Treatment Plants
- Operation of Wastewater Treatment Plants, Volumes 1 and 2
- Recommended Standards for Wastewater Facilities (10-State Standards)
- Wastewater Math Workbook
- Wastewater Treatment Technology Manual

CLASS B

- 1. Math**
 - 1.1 Pounds loading
 - 1.2 Percent removal
 - 1.3 Detention time
 - 1.4 Unit loading
 - 1.5 Activated sludge
 - 1.6 Budget
- 2. Basic knowledge**
 - 2.1 Basic wastewater theory
 - 2.2 Safety
 - 2.3 Hydraulic concepts
 - 2.4 Maps and plans
 - 2.5 Pumps, motors and controls
 - 2.6 Pipes, joints, valves, fittings
 - 2.7 Measuring and control systems
 - 2.8 Wastewater sources and characteristics
 - 2.9 Public Health
 - 2.10 Flow measurement
 - 2.11 Laboratory - dissolved oxygen, pH, chlorine residual
 - 2.12 Electricity
 - 2.13 Chemical feeders
- 3. Preliminary treatment**
 - 3.1 Flow equalization
 - 3.2 Screening, grinding, grit
 - 3.3 Preaeration
 - 3.4 Chemical pretreatment
- 4. Secondary treatment**
 - 4.1 Septic tank/mound and drainfield
 - 4.2 Tertiary ponds
 - 4.3 Clarifiers
 - 4.4 Trickling filter
 - 4.5 Activated sludge
 - 4.6 Rotating biological contactor
- 5. Disinfection**
 - 5.1 Chlorination
 - 5.2 Dechlorination
 - 5.3 Ultraviolet disinfection
 - 5.4 Ozone disinfection
- 6. Advanced treatment**
 - 6.1 Coagulation/flocculation
 - 6.2 Nitrogen removal
 - 6.3 Phosphorus removal
 - 6.4 Filtration
 - 6.5 Biological advanced treatment
 - 6.6 Effluent disposal
- 7. Solids handling**
 - 7.1 Sludge conditioning
 - 7.2 Sludge thickening
 - 7.3 Aerobic digestion
 - 7.4 Anaerobic digestion
 - 7.5 Sludge drying beds
 - 7.6 Vacuum filter, filter press, belt press, centrifuge
 - 7.7 Sludge incineration
 - 7.8 Sludge composting
- 8. Management**
 - 8.1 Compliance
 - 8.2 Planning
 - 8.3 Maintenance management
 - 8.4 Emergency response
 - 8.5 Public relations
 - 8.6 Security
 - 8.7 Personnel
 - 8.8 Budgets

Suggested study materials include:

- Advanced Waste Treatment
- Manual of Practice No. 11, Operation of Wastewater Treatment Plants
- Operation of Wastewater Treatment Plants, Volumes 1 and 2
- Recommended Standards for Wastewater Facilities (10-State Standards)
- Wastewater Math Workbook
- Wastewater Treatment Technology Manual

CLASS C

- 1. Math**
 - 1.1 Pounds loading
 - 1.2 Percent removal
 - 1.3 Detention time
 - 1.4 Unit loading
 - 1.5 Activated sludge
 - 1.6 Pumping rate
- 2. Basic knowledge**
 - 2.1 Basic wastewater theory
 - 2.2 Safety
 - 2.3 Hydraulic concepts
 - 2.4 Maps and plans
 - 2.5 Pumps, motors and controls
 - 2.6 Pipes, joints, valves, fittings
 - 2.7 Measuring and control systems
 - 2.8 Wastewater sources and characteristics
 - 2.9 Public Health
 - 2.10 Flow measurement
 - 2.11 Laboratory - dissolved oxygen, pH, chlorine residual
 - 2.12 Electricity
- 3. Preliminary treatment**
 - 3.1 Flow equalization
 - 3.2 Screening, grinding, grit
 - 3.3 Preaeration
- 4. Secondary treatment**
 - 4.1 Septic tank/mound and drainfield
 - 4.2 Stabilization and aerated ponds
 - 4.3 Clarifiers
 - 4.4 Trickling filter
 - 4.5 Activated sludge
 - 4.6 Rotating biological contactor
- 5. Disinfection**
 - 5.1 Chlorination
 - 5.2 Dechlorination
 - 5.3 Ultraviolet disinfection
 - 5.4 Ozone disinfection
- 6. Advanced treatment**
 - 6.1 Coagulation/flocculation
 - 6.2 Nitrogen removal
 - 6.3 Phosphorus removal
 - 6.4 Filtration
- 7. Solids handling**
 - 7.1 Sludge conditioning
 - 7.2 Sludge thickening
 - 7.3 Aerobic digestion
 - 7.4 Anaerobic digestion
 - 7.5 Sludge drying beds
 - 7.6 Vacuum filter, filter press, belt press, centrifuge
 - 7.7 Sludge incineration
 - 7.8 Sludge composting
- 8. Management**
 - 8.1 Compliance
 - 8.2 Planning
 - 8.3 Maintenance management
 - 8.4 Emergency response
 - 8.5 Public relations
 - 8.6 Security
 - 8.7 Personnel
 - 8.8 Budgets

Suggested study materials include:

- Advanced Waste Treatment
- Operation of Wastewater Treatment Plants, Volumes 1 and 2
- Wastewater Math Workbook
- Wastewater Treatment Technology Manual

CLASS D

1. Math

- 1.1 Pumping rate
- 1.2 Volume
- 1.3 Pond discharge
- 1.4 Percent removal
- 1.5 Detention time
- 1.6 Pounds loading
- 1.7 Geometric mean

2. Basic knowledge

- 2.1 Basic wastewater theory
- 2.2 Safety
- 2.3 Units of expression
- 2.4 Hydraulic concepts
- 2.5 Maps and plans
- 2.6 Pumps, motors and controls
- 2.7 Pipes, joints, valves, fittings
- 2.8 Collection system
- 2.9 Wastewater sources and characteristics
- 2.10 Public Health
- 2.11 Flow measurement

2.12 Laboratory - dissolved oxygen, pH, chlorine residual

2.13 Sampling principals

3. Preliminary treatment

- 3.1 Flow equalization
- 3.2 Screening, grinding, grit

4. Secondary treatment

- 4.1 Septic tank/mound and drainfield
- 4.2 Stabilization and aerated ponds
- 4.3 Spray irrigation

5. Disinfection

- 5.1 Chlorination
- 5.2 Dechlorination

6. Management

- 6.1 Compliance
- 6.2 Planning
- 6.3 Maintenance management
- 6.4 Emergency response
- 6.5 Public relations
- 6.6 Security

Suggested study materials include:

- Operation of Wastewater Treatment Plants, Volumes 1 and 2
- Stabilization Pond Operation and Maintenance Manual
- Wastewater Math Workbook
- Wastewater Treatment Technology Manual