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

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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


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

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