TCEQ REGULATORY GUIDANCE
Compliance Support Division
RG-002 (Revised)
October 2002

Process Control Tests for Domestic Wastewater Treatment Facilities

Who Should Read This Guide?

If you are an owner or an operator of a domestic wastewater treatment facility, you should consult this guide for a list of recommended process control tests that should be performed to effectively operate your system.

The Texas Commission on Environmental Quality (TCEQ) issues licenses to operators of domestic wastewater treatment facilities. In this publication, the words "you" and "I" refer to operators of domestic wastewater treatment facilities.

This publication will also be of interest to owners of domestic wastewater treatment facilities, who are ultimately responsible for the operation of their facilities.

What Rules Apply to Wastewater Operator Licensing?

The rules for wastewater operator licensing are contained in Title 30 of the Texas Administrative Code (TAC), Chapter 30, Subchapters A and J.

Licenses issued by the TCEQ under these rules direct wastewater treatment plant operators to at all times properly operate and maintain the facility, and to perform adequate process control.

You can find these rules from the "Rules, Policy & Legislation" navigation link on the TCEQ Web site, **www.tceq.state.tx.us**.

How Were the Recommended Process Control Tests Developed?

The purpose of the tables in this document is to describe what constitutes the minimum standard for process control testing at activated sludge wastewater treatment facilities (the most common type).

These recommendations for minimum process control tests were developed by the TCEQ's Licensing Program and the Advisory Committee for Water Utility Operator Licensing.

Why Are Process Control Tests Important?

Activated sludge wastewater treatment facilities are unstable systems which require regular monitoring and adjustments. This document provides information to help you to make sound operational decisions.

Performing the recommended process control tests will help ensure that your facility does not experience effluent quality violations. Such violations could lead to enforcement action against the permit holder, and possibly your own license.

How Should the Control Tests Be Implemented?

As an operator, you should perform *at least* these recommended control tests at your facility. The

process control tests listed in Tables 1 through 4 of this guide provide a set of minimum process control tests.

Each set of tests is based on the permitted daily average flow of wastewater from a facility, as measured in million gallons per day (MGD).

Operators should consult their training manuals to determine other procedures that should be performed in conjunction with the process control tests, including the following:

- recommended ranges of solids concentrations,
- amounts of dissolved oxygen, and
- performing microscopic evaluations of activated sludge.

Where Can I Find More Information?

For more information about the licensing of wastewater operators, contact the TCEQ's Operator Licensing Section in the following ways:

- By phone: 512/ 239-0170
- By mail: Operator Licensing Section, MC-178; Texas Commission on Environmental Quality; P.O. Box 13087; Austin, TX 78711-3087
- By fax: 512/239-6272
- By e-mail: operator@tceq.state.tx.us
- On the Web: Go to **www.tceq.state.tx.us**. From the "Permits, Licenses & Registration" navigation link, look for "Wastewater Operator Licensing," "Wastewater Licensing Program," and "Wastewater Companies and Operators." Also see the "Forms & Publications" link.

TABLE 1
PROCESS CONTROL TESTS FOR DOMESTIC WASTEWATER TREATMENT FACILITIES

Activated Sludge Facility: Conventional, Complete Mix, Step Feed, or Extended Air
Greater than 10 MGD (Page 1 of 2)

SAMPLE PARAMETER	SAMPLE LOCATION	SAMPLE TYPE	1/SHIFT	DAILY	WEEKLY
Raw Influent					
NH_3-N	Influent	Wt. composite		X	
BOD_5 & TSS	Influent	Wt. composite		X	
COD	Influent	Wt. composite		X	
pH	Influent	Wt. composite		X	
Flow	Influent	Wt. composite		X	
Alkalinity ($CaCO_3$)	Influent	Wt. composite			X
Primary Clarifier*					
BOD_5 & COD	Effluent	Composite		X	
pH	Effluent	Composite		X	
TSS	Effluent	Composite		X	
* Separate flow monitoring for raw influent and primary effluent location is only necessary when flow equalization or other recycled streams would cause volume and/or quality to differ.					
Aeration Basin					
Dissolved oxygen	In situ	Grab	X		
Temperature	In situ	Grab		X	
Return sludge TSS	RAS line	Composite		X	
Return sludge flow	RAS line	Grab		X	

TABLE 1
PROCESS CONTROL TESTS FOR DOMESTIC WASTEWATER TREATMENT FACILITIES

Activated Sludge Facility: Conventional, Complete Mix, Step Feed, or Extended Air
Greater than 10 MGD (Page 2 of 2)

SAMPLE PARAMETER	SAMPLE LOCATION	SAMPLE TYPE	1/SHIFT	DAILY	WEEKLY
Aeration Basin, cont.					
Waste sludge flow	WAS line	Grab		X	
DO uptake rate	Effluent	Grab		X	
Mixed liquor TSS/VSS	Effluent	Composite		X	
pH	Effluent	Composite		X	
Microscopic examination	Effluent	Grab		X	
Settleability (SV30)	Effluent	Grab	X		
Secondary Clarifier					
pH	Effluent	Composite		X	
TSS	Effluent	Composite		X	
BOD_5	Effluent	Composite		X	
COD	Effluent	Composite		X	
NH_3-N	Effluent	Composite		X	
Dissolved oxygen	Effluent	Composite		X	
Sludge blanket depth	As appropriate	—	X		
Final Effluent					
Parameters, sample types, and frequencies as required by permits.					

TABLE 2
PROCESS CONTROL TESTS FOR DOMESTIC WASTEWATER TREATMENT FACILITIES

Activated Sludge Facility: Conventional, Complete Mix, Step Feed, or Extended Air
Greater than 5.0 to 10 MGD (Page 1 of 2)

SAMPLE PARAMETER	SAMPLE LOCATION	SAMPLE TYPE	DAILY	2/WEEK	WEEKLY
Raw Influent					
BOD_5 and TSS	Influent	Wt. composite	X		
COD	Influent	Wt. composite			X
pH	Influent	Grab	X		
Flow	Influent	Totalizer	X		
Primary Clarifier*					
BOD_5, COD, and TSS	Effluent	Composite	X		
pH	Effluent	Grab		X	
Flow	Effluent	Totalizer	X		
* Separate flow monitoring for raw influent and primary effluent location is only necessary when flow equalization or other recycled streams would cause volume and/or quality to differ.					
Aeration Basin					
NH_3-N	Influent	Composite		X	
DO & temperature	In situ	Grab	X		
Return sludge TSS	RAS line	Composite	X		
RS centrifuge solids	RAS line	Composite	X		
RS dissolved oxygen	RAS line	Grab	X		
Return sludge flow	RAS line	Totalizer	X		

TABLE 2
PROCESS CONTROL TESTS FOR DOMESTIC WASTEWATER TREATMENT FACILITIES

Activated Sludge Facility: Conventional, Complete Mix, Step Feed, or Extended Air
Greater than 5.0 to 10 MGD (Page 2 of 2)

SAMPLE PARAMETER	SAMPLE LOCATION	SAMPLE TYPE	DAILY	2/WEEK	WEEKLY
Aeration Basin, cont.					
Waste sludge flow	WAS line	Totalizer	X		
Mixed liquor TSS/VSS	Effluent	Composite	X		
MLSS centrifuge solids	Effluent	Composite	X		
pH	Effluent	Grab	X		
Settleability (SV30)	Effluent	Grab	X		
Microscopic examination	Effluent	Grab			X
Computation of SVI, F/M, sludge age, and/or MCRT	—	—		X	
Secondary Clarifier					
Dissolved oxygen	Effluent	Grab	X		
Sludge blanket depth	As appropriate	—	X		
Final Effluent					
Parameters, sample type, and frequencies as required by permits.					

TABLE 3
PROCESS CONTROL TESTS FOR DOMESTIC WASTEWATER TREATMENT FACILITIES

Activated Sludge Facility: Conventional, Complete Mix, Step Feed, or Extended Air
Greater than 1.0 to 5.0 MGD (Page 1 of 2)

SAMPLE PARAMETER	SAMPLE LOCATION	SAMPLE TYPE	DAILY	2/WEEK	WEEKLY
Raw Influent					
BOD_5 & TSS	Influent	Composite		X	
COD	Influent	Composite			X
pH	Influent	Grab		X	
Flow	Influent	Totalizer	X		
Primary Clarifier*					
BOD_5, COD, and TSS	Effluent	Composite		X	
pH	Effluent	Grab		X	
NH_3-N	Effluent	Composite		X	
Flow	Effluent	Totalizer	X		
* Separate monitoring for raw influent and primary effluent location is only necessary when flow equalization or other recycled streams would cause volume and/or quality to differ.					
Aeration Basin					
DO & temperature	In situ	Grab	X		
Return sludge TSS	RAS line	Composite		X	
RS centrifuge solids	RAS line	Composite	X		
RS dissolved oxygen	RAS line	Grab	X		
Return sludge flow	RAS line	Totalizer	X		

TABLE 3
PROCESS CONTROL TESTS FOR DOMESTIC WASTEWATER TREATMENT FACILITIES

Activated Sludge Facility: Conventional, Complete Mix, Step Feed, or Extended Air
Greater than 1.0 to 5.0 MGD (Page 2 of 2)

SAMPLE PARAMETER	SAMPLE LOCATION	SAMPLE TYPE	DAILY	2/WEEK	WEEKLY
Aeration Basin, cont.					
Waste sludge flow	WAS line	Totalizer	X		
Mixed liquor TSS/VSS	Effluent	Composite		X	
MLSS centrifuge solids	Effluent	Composite	X		
pH	Effluent	Grab		X	
Settleability (SV30)	Effluent	Grab	X		
Microscopic examination	Effluent	Grab			X
Computation of SVI, F/M, sludge age, and/or MCRT	—	—			X
Secondary Clarifier					
Dissolved oxygen	Effluent	Grab	X		
Sludge blanket depth	As appropriate	—	X		
Final Effluent					
Parameters, sample types, and frequencies as required by permits.					

TABLE 4
PROCESS CONTROL TESTS FOR DOMESTIC WASTEWATER TREATMENT FACILITIES

Activated Sludge Facility: Conventional, Complete Mix, Step Feed, or Extended Air
Less than and including 1.0 MGD (Page1 of 1)

SAMPLE PARAMETER	SAMPLE LOCATION	SAMPLE TYPE	3/WEEK	1/WEEK	2/MONTH
Raw Influent*					
BOD_5 and/or COD	Influent	Grab			X
TSS/VSS, NH_3-N, and pH	Influent	Grab			X
* Frequency of sampling may need to be increased or decreased depending on plant size or conditions.					
Aeration Basin					
MLSS/MLVSS (or centrifuge, with correlated data from periodic MLVSS values)	RAS line and effluent	Grab			X
Dissolved oxygen	Effluent	In situ		X	
Settleability (SV30)	Effluent	Grab	X		
pH	Effluent	Grab		X	
Microscopic examination	Effluent	Grab			X
Computation of SVI, F/M ratio, sludge age, and/or MCRT, as desired	Effluent	—	As data collected		
Secondary Clarifier					
Sludge blanket depth	As appropriate	In situ		X	
Final Effluent					
Parameters, sample types, and frequencies as required by permits.					