

Sequencing Batch Reactor (SBR) Wastewater Treatment Plant
Workshop Problem No. 8
Calculate the F/M Ratio, Sludge Age, and SVI for a SBR Basin

Final Workshop Problem for 1 or 2 students:

Use the following data and attached worksheets to calculate F/M Ratio, Sludge Age (SA), and SVI_(60 min) for a single SBR basin (Basin #2). The plant consists of two (in service) SBR basins. There are no primary clarifiers.

Influent Data

Total Influent flow to WWTP is 0.800 MGD.
Influent BOD concentration is 302 mg/L.
Influent TSS concentration is 220 mg/L.
Assume flow, BOD, and TSS loadings are split evenly between both SBR basins.

Basin #2 Data

Basin #2 is 106' in diameter
End of Decant Level or Low Water Level (LWL) is 10.5'
Basin Depth at MLSS/MLVSS sampling is 12.5'
MLSS concentration @ LWL is 1,800 mg/L
MLVSS concentration @ LWL is 1,512 mg/L
60 minutes settling test 440 ml/L

Required Worksheets:

- (Task 1) Worksheet #10 "Calculate Pounds Under Aeration for a Circular SBR Basin"
- (Task 2) Worksheet #11 "SBR Activated Sludge Process F/M Ratio, Sludge Age, and SVI"

For Extra Credit, you may complete the following:

Based on the information provided, would you recommend any testing and/or operational changes?

Student Name: _____

Worksheet #10 demo for Workgroup Problem No. 8

Input required
 _____ Calculate Value

**Calculate Pounds Under Aeration for
 Circular SBR Basin**

Comments: _____
 Student Name: _____

Use this worksheet for a single SBR Basin.

Basin Information

Basin Diameter, feet

MLSS, mg/L at sample depth

MLVSS, mg/L at sample depth

Depth of basin at sampling, feet

Low Water Level (LWL), feet

Conversion Factor (CF) = _____ (Sample Depth / LWL)

Square Footage (Surface Area)

Diameter Diameter 1/4 pi Sq. Ft.
 _____ x _____ x 0.785 = _____

Volume in Gallons at Low Water Level (LWL) Depth

Sq. Ft. LWL, Ft. gallons per cubic foot Capacity in gallons at, LWL MG Capacity at LWL
 _____ x _____ x 7.48 = _____ or _____

Pounds of (MLSS) Mixed Liquor Suspended Solids at LWL

MLSS # per gal MG Capacity pounds
 in mg/L CF water at LWL MLSS
 _____ x _____ x 8.34 x _____ = _____

Pounds of (MLVSS) Mixed Liquor Suspended Solids at LWL

MLVSS # per gal MG Capacity pounds
 in mg/L CF water at LWL MLVSS
 _____ x _____ x 8.34 x _____ = _____

Input Required
 Calculate Value

SBR Activated Sludge Process

F/M Ratio, Sludge Age (SA), and SVI

Use this Worksheet for a single in service basin. Calculate/ estimate flow entering basin.

Basin No. 2 Information

Comments:

Student Name: _____

F/M Ratio, Sludge Age (SA), and SVI

12,380 MLSS pounds at LWL	10,399 MLVSS pounds at LWL
302 Influent or P.E. BOD, mg/L	220 Influent or P.E. TSS, mg/L
0.400 Flow to Basin, MGD	440 Settling test, ml/L
1,800 MLSS, mg/L at sampling depth	60 Minutes (settling test)

Pounds of BOD entering basin(s)

BOD in mg/L	x	# per gal water	x	Flow in MGD	=	pounds of BOD/Day
_____		8.34		_____		_____

Pounds of TSS entering basin(s)

TSS in mg/L	x	# per gal water	x	Flow in MGD	=	pounds of TSS/Day
_____		8.34		_____		_____

F/M Ratio

BOD _____ ,ppd	/	MLVSS at LWL _____ , pounds	=	_____ F/M
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Sludge Ave (SA) Days (using MLSS)

MLSS Pounds at LWL _____	/	pounds of TSS/Day _____	=	_____ SA Days
increase wasting to lower SA				or decrease wasting to raise SA

Sludge Volume Index (SVI), ml/gm

settling, ml/L _____	/	MLSS, mg/L _____	x	1,000	=	_____ SVI
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