



**Minnesota Pollution
Control Agency**

520 Lafayette Road North
St. Paul, MN 55155-4194

Water Quality Salty Discharge Mass Balance Calculations Form

Water Quality Point Source Program

Doc Type: Standards Review Calculations

Note: Complete both the Mass Balance tab and the Sodium % tab

Mass Balance Calculations for Salty Discharge

Parameter	River *	Discharge **
Flow: cfs		0.00
mgd		
Specific conductance, uS/cm		
Hardness, mg/L as CaCO ₃		
Chlorides, mg/L		
Total Dissolved Solids, mg/L		
Sulfates, mg/L as SO ₄		
Bicarbonates: mg/L		
milliequivalents/L (meq/L)	0.0	0.0
other		
other		
other		

Annual 7Q10 estimate

WWTF is ADW design, Industrial is max day design

meq/L = mg/L divided by 61.02

* River Monitoring data: upstream/representative monitoring data

** Discharge data: Effluent monitoring data

Results:

	WQ Std	Use Class	Estimated Concentration
Specific conductance, uS/cm	1000	4A	#DIV/0!
Hardness, mg/L as CaCO ₃	250	3B	#DIV/0!
Chlorides, mg/L	100	3B	#DIV/0!
Total Dissolved Solids, mg/L	500	1C	#DIV/0!
Sulfates, mg/L as SO ₄	250	1C	#DIV/0!
Bicarbonates: milliequiv/L	5.0	4A	#DIV/0!
other			#DIV/0!
other			#DIV/0!
other			#DIV/0!

Minn. R. 7050

Notes:

Sodium Percent Absorbtion Calculations

	Discharge
Calcium, Total (as Ca)	
Potassium, Total (as K)	
Magnesium, Total (as Mg)	
Sodium, Total (as Na)	

Results:

Sodium (% Total Cations)	#DIV/0!
4A Water Quality Standard	<60



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Instructions:

River 7Q10 (cfs): A 7Q10 low flow is defined as the lowest average discharge for seven consecutive days, having a recurrence interval of ten years. The year that a low flow will occur can't be predicted, but the probability of such flows occurring during a long time period may be estimated. For example, a low flow discharge of 3.5 cubic feet per second (cfs) having a recurrence interval of ten years indicates that a discharge at least as low as 3.5 cfs will occur as an annual minimum about ten times in one hundred years.

[Contact Carol Sinden, MPCA \(carol.sinden@state.mn.us or 651-757-2727\) to see if an annual \(Apr-Mar\) 7Q10 has been determined for your facility.](mailto:carol.sinden@state.mn.us)

If not a 7Q10 analysis may need to be done.

Discharge flow: WWTF will use average dry weather flow (ADW) and Industrial discharges will use max day design flow (MD). This information should be available in the Facility Description section of your current NPDES permit or in the Plans and Specifications for your plant.

River background data: If your facility collects upstream monitoring data, that data should be used here.

[Data can also be found in the Environmental Data Access \(EDA\) on the MPCA website http://www.pca.state.mn.us/index.php/data/eda-surface-water-searches/eda-surface-water-data.html](http://www.pca.state.mn.us/index.php/data/eda-surface-water-searches/eda-surface-water-data.html)

The data entered should be in the correct units and the median value shall be the value used.

If it is determined your facility has a 0 7Q10 then no data needs to be entered here since no dilution will be available.

Discharge data: This is the discharge data that is being collected based on the salty water monitoring guidance and your permit requirements. The data entered should be in the correct units and the maximum value sampled shall be the value used.

Results: The estimated concentrations, calculated in the results section, are meant to be compared to the water quality standards. The estimated concentrations allow facilities to see how a discharge at current concentrations might impact the river during low flow conditions. The estimated concentrations are meant to help facilities determine if they need to further reduce the concentration of particular parameters in the discharge or whether they should contact the MPCA for a reduction in monitoring frequency.

Definitions:

cfs - cubic feet per second
mgd - million gallons per day
uS/cm - microsiemens per centimeter
CaCO₃ - calcium carbonate

SO₄ - sulfate
meq/L - milliequivalents per liter
WWTF - wastewater treatment facility
ADW - Average dry weather

umhos/cm - micromhos per centimeter
1 uS/cm = 1 umhos/cm

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