

MCES Microbrewery Production-Based Strength Charge Development

MCES' Production-Based Strength Charge was developed in 2015 using both MCES analytical data and self-monitoring data from the two largest craft breweries in the Twin Cities Metro Area that are on Standard Industrial Discharge Permits. The analytical data used to develop this charge spans an 11-year period from 2004 – 2014 and includes 68 days of sampling, each representing a 24-hour period.

Average data was calculated for Chemical Oxygen Demand (COD) and Total Suspended Solids (TSS) for each respective brewery, along with average annual discharge volume for the 11-year period. The resulting average data for each brewery was then entered into MCES' 2015 Strength Charge formula (see strength charge formula table below) to determine a strength charge for each brewery.

The respective strength charges were then divided by the average annual production from the same time period, as measured in barrels (bbls), for each brewery (production data not shown below for privacy purposes). This resulted in two calculated production-based strength charges, namely \$0.58 per barrel and \$0.62 per barrel, which were then averaged to determine the final production-based rate of \$0.60 per barrel (\$0.60/bbls).

MCES Industrial Discharge Permittee data and Calculated Production-Based Strength Charge

MCES Permitted Brewery	A	B
Year(s) when samples were collected	2004-2014	2010-2014
Number of samples	53	15
Average COD of Permittee and MCES data (mg/l)	8,126	7,088
Average TSS of Permittee and MCES data (mg/l)	609	681
Average Annual Industrial Wastewater Volume (gallons)	10,190,771	2,472,322
Average Annual Production (Barrels of Beer)	114,489	23,753
2015 Production-Based Strength Charge (\$/barrel)	\$0.58	\$0.62

The Microbrewery Production-Based Strength Charge was implemented in 2016 and the rate for that year was \$0.64/bbls. This production-based strength charge is adjusted annually based on the percentage increase in MCES' Strength Charge formula. Below is a listing of the historical Production-Based Strength Charge Rates since 2015:

Annual Production-Based Strength Charge Rate

Year	Rate (\$/bbls)
2015	\$0.60
2016	\$0.64
2017	\$0.69
2018	\$0.737
2018	\$0.762
2020	\$0.797

In lieu of being assessed a production-based strength charge, Permittees with an approved monitoring point may conduct optional sampling, as specified in their MCES Industrial Discharge Permit, for Strength Charge determination. However, the number of required sampling days will be determined by MCES based on the brewery’s production schedule.

2015 MCES Strength Charge Formula

Formula	Strength Charge = $[V \times (TSS - 250) \times (8.34) \times (TSS \text{ Rate}) + V \times (COD - 500) \times (8.34) \times (COD \text{ Rate})]$
Strength Charge	= Strength Charge in dollars (\$)
V	= Volume in million gallons per reporting period
TSS	= Total Suspended Solids (TSS) >250 in mg/L; If TSS is <250 mg/L, use 250 mg/L
COD	= Chemical Oxygen Demand (COD) > 500 in mg/L; If COD is < 500 mg/L, use 500 mg/L
250	= TSS threshold value in mg/L
500	= COD threshold value in mg/L
8.34	= Conversion factor for converting mg/L to pounds (lbs) per gallon
TSS Rate	= \$0.190/lbs of excess TSS (2015)
COD Rate	= \$0.095/lbs of excess COD (2015)