

Calculating Total Toxic Organics (TTO)

When you receive your laboratory results from your lab, you'll need to report the results on your Self-Monitoring form as required. This document is provided to show how to calculate them. Many commercial laboratories do not see the need for this service when they issue a TTO Report Summary to you with your results; however they would need a copy of your Discharge Permit and may only provide this as a special service upon request.

Knowing your TTO result early is important in the event that you are in violation and have to re-sample, which is required of all IUs in the Henderson Water Utility's Pretreatment Program. *Always remember that there are three (3) areas that are violations by the State and federal standard and you must resample immediately if they are over your permit limit. They are the TTO result, the pH, and any metal (alloy) such as zinc, copper, etc.

The first thing you need to know is the Unit measurements used on your lab paperwork. Usually, the parameters in a TTO are done in ug/l (micrograms) or 'parts per billion'. Your Discharge Permit is written in mg/l or 'parts per million', therefore a conversion must occur somewhere to achieve the correct result for reporting it to the HWU.

It looks more intimidating than it is. A TTO result is the "**summation**" of values and the total of those will decide if you are within your permit limit or not.

Scan the result column on your lab sheets. When you see the BDL which means '**below detection limit**' or the Surrogate Recovery numbers, you just move on. The surrogates are NOT to be added in or used in the calculation in any way, so you will need to really watch for those! Always check your TTO results two or three times to make sure that you get the same result each time before you record it.

Example:

Parameter	Result	Detection Limit	Units
Phenanthrene	BDL	0.012	ug/l
Benzyl butyl phthalate	BDL	0.012	ug/l
Bis (2-ethylhexyl) phthalate	0.076	0.012	ug/l
Di-n-butyl phthalate	BDL	0.012	ug/l
Diethyl phthalate	0.022	0.012	ug/l
Dimethyl phthalate	BDL	0.012	ug/l

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Calculating your TTO result

You will notice that there are two (2) values in the results column. These are the levels ABOVE detection limit. If you had a BDL listed, nothing was detected in the sample, thus no numerical value appears.

You will also observe the units of measurement to the right. They are in ug/l or 'parts per billion', whichever terminology you prefer. Since your HWU Discharge Permit is written in mg/l, you will need to convert to 'parts per million.' Below is an example of how to convert this TTO value to milligrams per liter.

$$0.076 \text{ ug/l} + 0.022 \text{ ug/l} = \underline{0.098 \text{ ug/l}}$$

At this point, your result is still in micrograms per liter (ug/l). Your result must now be converted to milligrams per liter to match your Discharge Permit units. The microgram unit is smaller, so you will need to divide by 1,000 to achieve the milligrams per liter result for reporting purposes. So, we go back to the total of the TTO and do the division;

$$0.076 \text{ ug/l} + 0.022 \text{ ug/l} = \frac{0.098 \text{ ug/l}}{1,000} = \mathbf{0.000098 \text{ mg/l}}$$

Your final result, as you see, is 0.000098 mg/l. Your TTO limit is normally 2.13 mg/l which is the **summation** of all of the parameters tested for, so this result would be nowhere near your limit. *If your result is higher than the 2.13 mg/l limit on the TTO, you must re-sample the TTO parameters immediately and report that result as well.

If you have any questions or need further help, you can contact the Pretreatment Program at pretreatment@kywater.org or at (270) 826-2824.