

## GLI Method Summary

### **Total Halogens, Total Organic Halogens, or Total Halides by MCC-TOX-100 Analyzer**

**Governing SOP:** ME-13

**Analyte:** Cl, Br, I or Cl<sup>-</sup>, Br<sup>-</sup>, I<sup>-</sup>

**Range:** ppm

#### Summary

This method determines total halogens (including any halides), total halides, and total organic halogens, each expressed as chlorine or chloride. The halogens detected by this procedure are chlorine, bromine, and iodine. The sample is heated in a quartz combustion tube to 950°C in an oxygen atmosphere. The combustion process converts halogens to halide and oxyhalides, which are directed into a coulometric titration cell where they react quantitatively with silver ions. Halides can be determined separately by direct cell injection. Total organic halogens in aqueous sample are determined by first passing the sample through a carbon column then washing with nitrate solution to desorb the inorganic halide ions. The carbon is then combusted and titrated as described above.

<b>Instrument</b>	<b>MCC TOX-100</b>									
<b>Preparation</b>	Direct injection by microsyringe or difference weighing into quartz carrier boat									
<b>Decomposition</b>	For total halogens only – O <sub>2</sub> Combustion train at 900 to 950°C									
<b>Calibration</b>	Cell calibration by sodium chloride solution injection (into cell)									
<b>Determination</b>	For total halogens: microcoulometric cell trapping and titration of combustion gases. For total halides: direct microcoulometric cell injection.									
<b>Precision &amp; Accuracy</b>	<table><thead><tr><th></th><th><i>RSD</i></th><th><i>RE</i></th></tr></thead><tbody><tr><td><b>p-1702</b> Total Halogens</td><td>7.76%</td><td>0.64%</td></tr><tr><td><b>p-1703</b> Total Halides</td><td>5.80%</td><td>0.46%</td></tr></tbody></table>		<i>RSD</i>	<i>RE</i>	<b>p-1702</b> Total Halogens	7.76%	0.64%	<b>p-1703</b> Total Halides	5.80%	0.46%
	<i>RSD</i>	<i>RE</i>								
<b>p-1702</b> Total Halogens	7.76%	0.64%								
<b>p-1703</b> Total Halides	5.80%	0.46%								
<b>Interferences</b>	extremely high levels of S									
<b>Calculations</b>	R x 1000/mg sample - µg/g (ppm) Total Halogen as Cl or R x 1000/mL sample – mg/L Total Halogen as Cl (R = direct readout of µg Halogen as Cl from instrument)									

#### References

*Instruction Manual for Total Organic Halogen Analyzer, Model TOX-100, Mitsubishi Chemical Corporation.*

EPA Method 9076 – “*Test Method for Total Chlorine in New and Used Petroleum Products by Oxidative Combustion and Microcoulometry*”, Revision 0, September 1994.

ASTM Method D 58089-95 – “*Determining Organic Chlorine in Aromatic Hydrocarbons and Related Chemicals by Microcoulometry*”.