

Measurement of TOC in Chloroisocyanuric Acid using the TOC-Vcsh

By the amendment of the water quality standard of the drinking water regulations, from April 1, 2005, the potassium permanganate consumption quantity as the organic matter index will be changed to total organic carbon (TOC). in conjunction with this, there is a tendency that TOC is used as an index of organic matter concentration in not only drinking water but also pool water, spring water, bath water, etc. To sterilize pool water, etc., in place of conventionally used sodium hypochlorite solution, powdered chloroisocyanuric acid (dichloroisocyanuric acid,

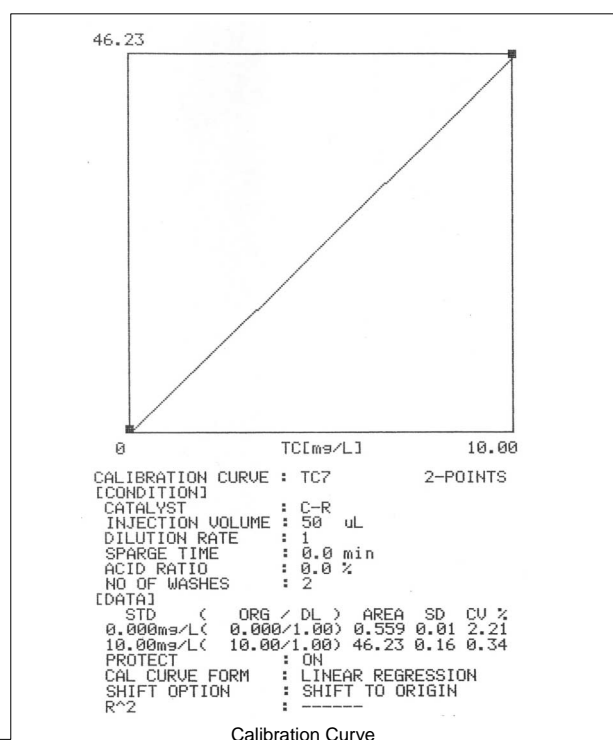
trichloroisocyanuric acid), with little chlorine deactivation, are now experiencing wider use. Because oxidative decomposition of this chloroisocyanuric acid does not progress well using the wet chemical oxidation type TOC analyzer, detection is difficult. However, using the combustion type TOC analyzer, measurement can be conducted with good sensitivity. Introduced here is an example of analysis of chloroisocyanuric acid using the Shimadzu combustion type total organic carbon analyzer TOC-Vcsh.

■ Analysis of TOC in Dichloroisocyanuric Acid using the TOC-Vcsh

Reagent grade dichloroisocyanuric acid was dissolved in pure water and diluted to obtain dichloroisocyanuric acid aqueous solutions of 10mgC/L (carbon concentration 10mg/L) and 5mgC/L. The results of the TOC measurements are shown in Fig. 1. The analyzer was calibrated using 0 and 10mgC/L of potassium hydrogen phthalate standard solutions. Both the 10mgC/L and 5mgC/L dichloroisocyanuric acid aqueous solutions were measured with good accuracy.

<Measurement Conditions>

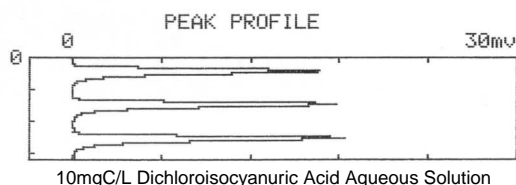
Analyzer : Shimadzu Combustion Type Total Organic Carbon Analyzer TOC-Vcsh
Analysis type : TOC (TOC by acidification and sparging method)



TYPE : NPOC
[INJ 50 μ L, C# TC7 ,DL 1,SP 1.5min,
ACID 1.5%, #WASH 2]

#	AREA	mg/L	C#	INJ	DL
1	43.23	9.466	TC7	50	1
2	43.44	9.512	TC7	50	1
3	43.72	9.573	TC7	50	1

MN 43.46 9.517
SD 0.25 0.05
CV 0.57 % 0.57 %



TYPE : NPOC
[INJ 50 μ L, C# TC7 ,DL 1,SP 1.5min,
ACID 1.5%, #WASH 2]

#	AREA	mg/L	C#	INJ	DL
1	21.84	4.782	TC7	50	1
2	22.59	4.946	TC7	50	1
3	22.34	4.892	TC7	50	1

MN 22.26 4.873
SD 0.38 0.08
CV 1.72 % 1.72 %

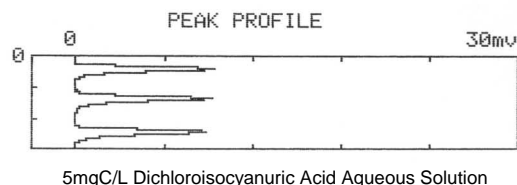


Fig. 1 Measurement of Dichloroisocyanuric Acid using TOC-Vcsh

■ Analysis of Trichloroisocyanuric Acid using TOC-Vcsh

Reagent grade trichloroisocyanuric acid was dissolved in pure water and diluted to obtain trichloroisocyanuric acid aqueous solutions of 10mgC/L and 5mgC/L, and TOC measurements were conducted using the same conditions as with the dichloroisocyanuric acid

measurement. The results are shown in Fig 2. Both the 10mgC/L and 5mgC/L trichloroisocyanuric acid aqueous solutions were measured with good accuracy.

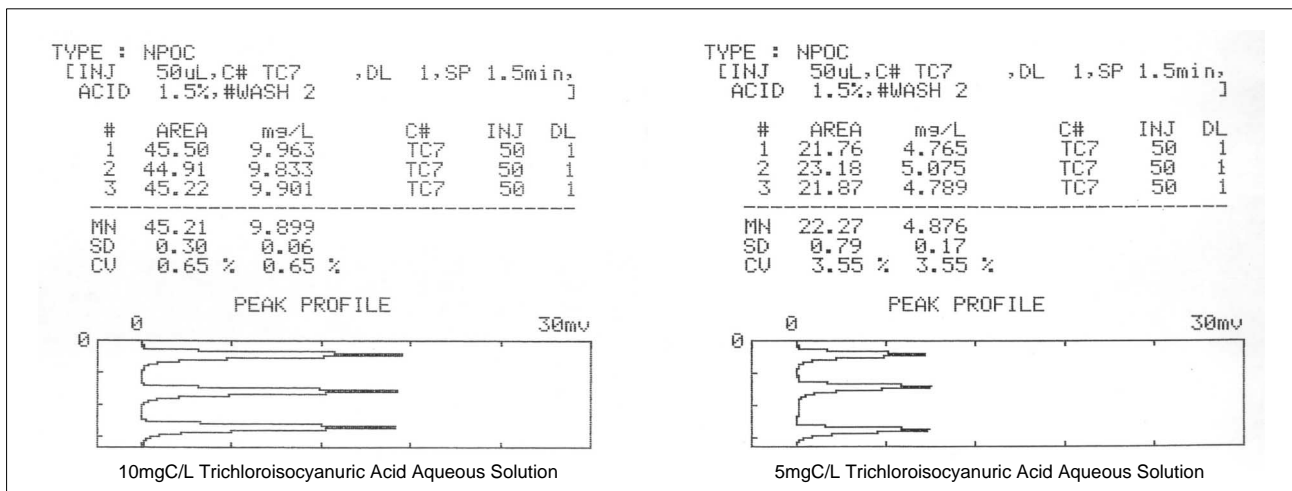


Fig. 2 Measurement of Trichloroisocyanuric Acid using TOC-Vcsh

■ Reference: Analysis of Chloroisocyanuric Acid using TOC-Vws (Wet Oxidation Type)

Fig. 3 shows the results of measurement of 10mgC/L dichloroisocyanuric acid and 10mgC/L trichloroisocyanuric acid using the Shimadzu wet oxidation type Total Organic Carbon Analyzer TOC-Vws. In the wet oxidation type TOC analyzer, it is clear that almost no chloroisocyanuric acid was detected (Table 1). This is because in the wet oxidation type TOC analyzer, oxidation is conducted using an oxidizing reagent, ultraviolet irradiation and heating, a system which provides weaker oxidation performance as compared with the combustion oxidation using high temperature catalyst in the combustion oxidation type TOC

analyzer. In cases such as chloroisocyanuric acid and samples containing insoluble organic material, it is clear that the combustion oxidation type TOC analyzer is suitable because of its oxidation dissociation performance regardless of the type or state of the organic material.

<Measurement Conditions>

Analyzer : Shimadzu Wet Oxidation Type Total Organic Carbon Analyzer TOC-Vws
Analysis type : TOC (TOC by acidification and sparging method)

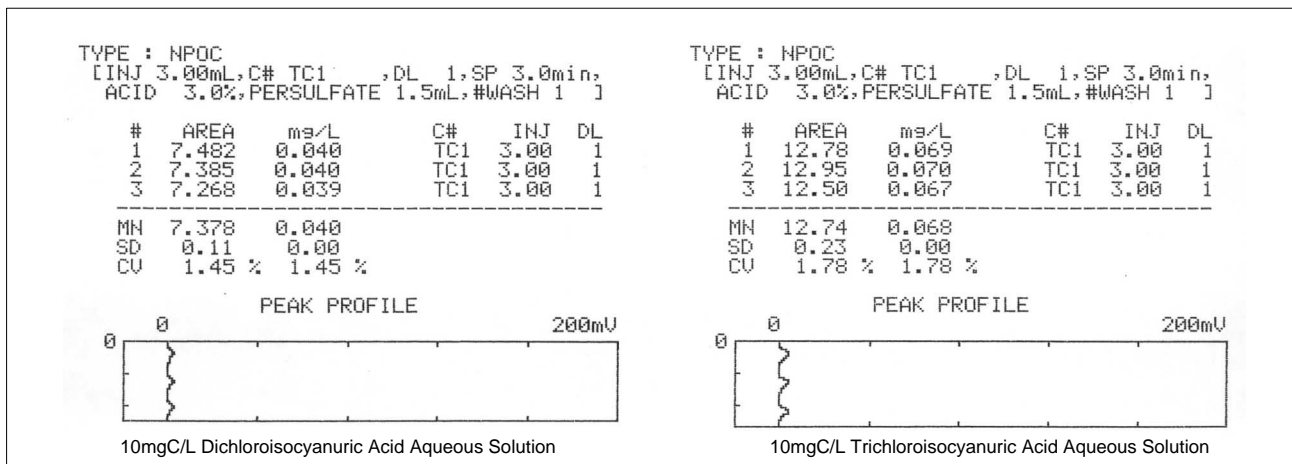


Fig. 3 Measurement of Chloroisocyanuric Acid using TOC-Vws

Table 1. TOC Measurement Values using TOC-Vcsh and TOC-Vws

Sample	Combustion Oxidation Type TOC-Vcsh TOC Value (mgC/L)	Wet Oxidation Type TOC-Vws TOC Value (mgC/L)
10mgC/L Dichloroisocyanuric Acid Aqueous Solution	9.517	0.040
10mgC/L Trichloroisocyanuric Acid Aqueous Solution	9.899	0.068



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