

## Measurement of TOC in Ammonia Solution by TOC-V<sub>CSH</sub>

Ammonia is widely used as a raw material in basic chemical products such as nitric acid (nitrates), and in ammonium sulfate, other nitrogen fertilizers, and various ammonium salts.

Since high-purity ammonia solution is required for use as a raw material in various manufactured products, measurement of organic impurities in ammonia solution is often necessary. Use of the Shimadzu TOC

analyzer for analysis of such high-purity ammonia solutions enables determination of the TOC concentrations, providing an easy and effective means of managing organic impurities.

This Application News introduces an analysis of TOC in 5% ammonia solution using the Shimadzu TOC-V<sub>CSH</sub> Total Organic Carbon Analyzer.

### ■ Measurement of TOC in Ammonia Solution

A 5% ammonia solution was prepared by diluting reagent-grade 25% ammonia solution to 5 times with ultra-pure water. First, to measure the TOC content in the 5% ammonia solution, TC and IC measurements were conducted, and the IC value was subtracted from the TC value to obtain the TOC value. Next, to prepare solutions with TOC concentrations of 5 mgC/L (5 mg/L carbon concentration) and 10 mgC/L, potassium hydrogen phthalate was added as an organic substance to the 5% ammonia solution, and TOC measurements were conducted as described above. These results are shown in Fig.1 and Table 1. The instrument was calibrated using 0 mgC/L and 20 mgC/L standard solutions for both the TC measurement and IC measurement and the calibration curve was created. To eliminate the influence of the carbon component in the pure water used to prepare the standard solutions, the calibration curves were corrected by shifting them so as they passed through the zero point.

All of the measurements were conducted with the 5% ammonia solution as is, and good accuracy was

confirmed. Moreover, the ammonia solution samples with added TOC were also measured with good accuracy.

#### Analytical Conditions

Instrument	: Shimadzu TOC-V <sub>CSH</sub> Total Organic Carbon Analyzer
Analysis type	: TOC (TOC by TC – IC)
Calibration Curves	: TC; 0 - 20 mgC/L, using potassium hydrogen phthalate aqueous solution : IC; 0 - 20 mgC/L, using sodium carbonate / sodium hydrogen carbonate aqueous solution
Sample	: 5% ammonia solution (prepared using 5 times dilution of 25% reagent-grade ammonia solution using ultra-pure water) Spiked with potassium hydrogen phthalate as TOC substance

Table 1 Ammonia Solution TOC Measurement Results

Sample Name	TC Value (mgC/L)	IC Value (mgC/L)	TOC Value (mgC/L)
5% ammonia solution	1.449	1.071	0.378
5% ammonia solution + TOC 5 mgC/L	6.726	1.165	5.561
5% ammonia solution + TOC 10 mgC/L	11.74	1.330	10.41

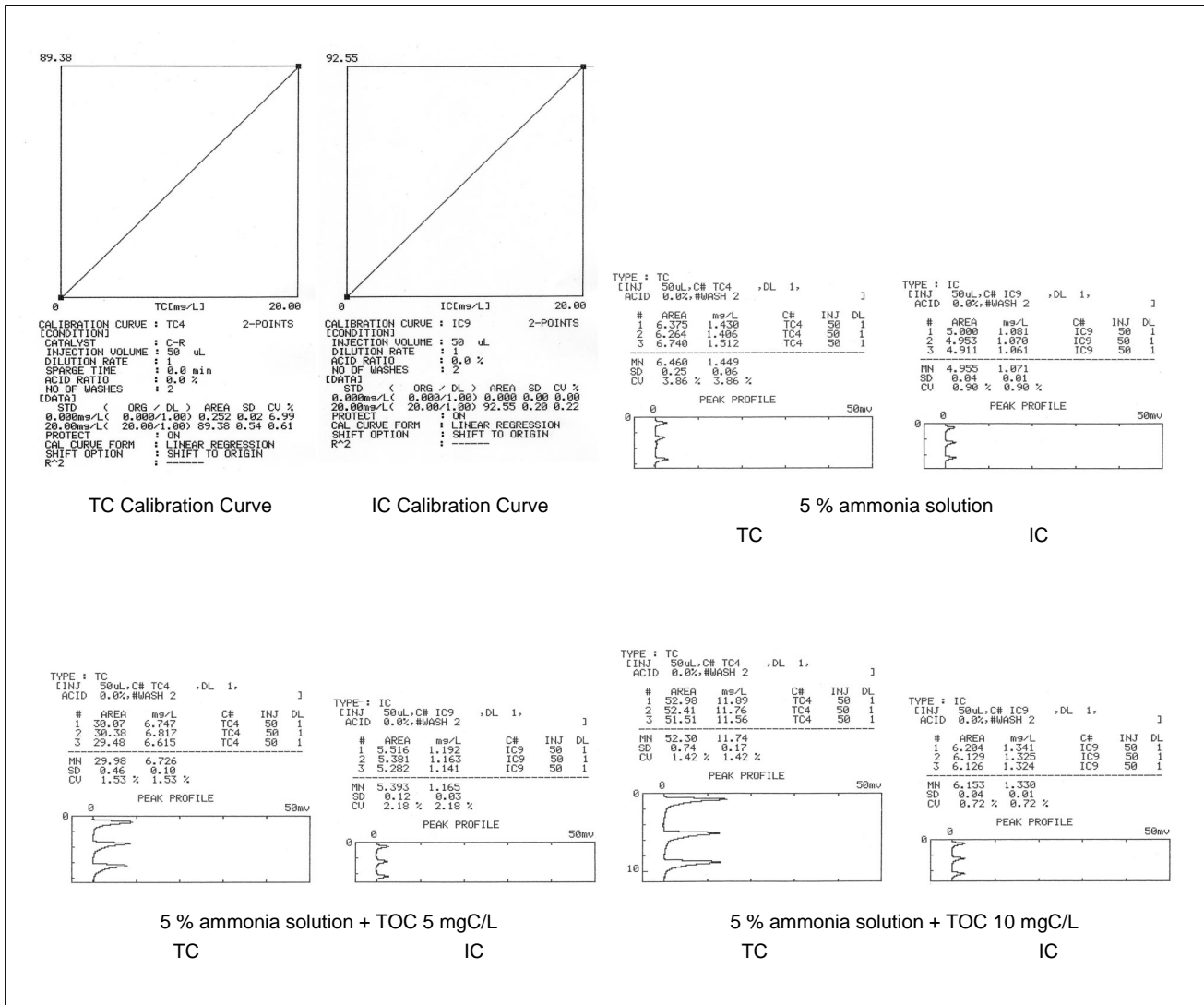


Fig.1 Measurement of TOC in Ammonia Solution

NOTES:

\*This Application News has been produced and edited using information that was available when the data was acquired for each article. This Application News is subject to revision without prior notice.



SHIMADZU CORPORATION. International Marketing Division  
 3, Kanda-Nishikicho 1-chome, Chiyoda-ku, Tokyo 101-8448, Japan Phone: 81(3)3219-5641 Fax: 81(3)3219-5710  
 Cable Add.:SHIMADZU TOKYO