

Sheet No.

**GT200-WA014E** Water

## Determination of residual chlorine in tap water — 1/3

Method	: Oxidation-reduction titration
Apparatus	: Automatic Titrator model GT-200 (GT0EF) Electrodes: Reference electrode, double junction (GTRE10B) — *Inner solution: 1mol/l Potassium chloride *Outer solution: 1mol/l Potassium nitrate Platinum electrode (GTPT1B)
Titration mode	: INF, Detection: pH and mV
Related standard	: Standard Methods for the Examination of Water, Japan Water Works Association: Residual chlorine in tap water measured by Iodometric titration method

\*This application sheet is provided as reference, and does not assure the measurement results. Please consider analysis environment, external factors and sample nature for optimal conditions before the measurement.

### Outline

Residual chlorine is available chlorine remaining in water after the chlorination of tap water. Free available chlorine such as hypochlorous acid is called free residual chlorine and combined available chlorine such as monochloramine is called combined residual chlorine. The Water Supply Act provides that the content of free residual chlorine at the water tap should be maintained at 0.1 mg/L or more (in the case of combined residual chlorine, 0.4 mg/L or more). Residual chlorine is measured by oxidation-reduction titration using a platinum electrode.

### Reagents

[Titrant]

■0.01mol/L-sodium thiosulfate in water (Volumetric analysis grade)

[Reagents]

■Sulfuric acid (Sulfuric acid : Water = 1:5) ... Add 20ml sulfuric acid to 100ml pure water little by little while cooling it down.

■Potassium iodide (Special grade reagent)

### Analytical Procedure

- (1) Collect 500ml tap water using a measuring cylinder and add it into a 500ml beaker.
- (2) Add 1g potassium iodide into the beaker and dissolve it by agitating the content of the beaker.
- (3) Add 5ml sulfuric acid (Sulfuric acid : Water = 1:5).
- (4) Titrate with 0.01mol/L-sodium thiosulfate solution.

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[ Calculation ]

**Residual chlorine (  $\text{Cl}_2$  mg/L ) = (  $A1 - f$  ) x (  $1000/S$  ) x 0.3545**

A1 : Titration volume of 0.01mol/L-sodium thiosulfate solution until the end point (ml)

F : Factor of 0.01mol/L-sodium thiosulfate solution (1.000)

S : Sample volume (ml)

**Other Requirements**

- Set tap water at room temperature.
- Make sure to confirm labels and safety data sheets of reagents and gases used for the measurement and handle them with enough care.
- Wear protective equipment (eye protector, gloves and others) when handling reagents.

**Measurement Results**

	Sample size (g)	Titration volume (ml)	Results ( $\text{Cl}_2$ mg/L)
1	500ml	0.3369	0.24
2		0.3332	0.24
3		0.3336	0.24

Nos. of data (n) 3  
Average 0.24  
Standard deviation (SD) 0.001  
Relative standard deviation (RSD%) 0.61

Residual chlorine in tap water was measured using GT-200. The average of three measurements was 0.24mg/L and the relative standard deviation (RSD %) was 0.61%. GT-200 can measure residual chlorine in tap water with good repeatability.

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ID No. : 5 GT No.1

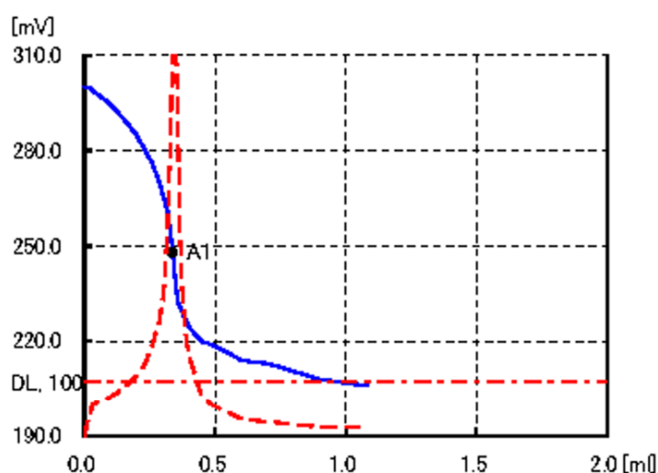
User : GT-200

Measurement : 2013/03/08 14:11

Sample name : Tap water

Type : Sample Titr

Sample size(S) : 500 [ml]



C1 : 0.24 [mg/L]

A1 : 0.3369 [ml] 248 [mV]

Initial potential (Pi) : 300 [mV]

Start : 0 [ml] 300 [mV]

End : 1.084 [ml] 206 [mV] Time : 2'13"

Run file No. : 0 Quick Mode

Titration file No. : 26 Standard method for the examination of water, Residual chlorine

\*Run file and Titration file parameters are set for each analysis item

Mode : INF End1, End1 Width : 300 [mV]  $\pm$  500 [mV]

Detect : mV1

BRT No. : 1

Reagent : 22

WTint : 0 [sec]

Vup : 200 [ $\mu$ l]Vlow : 10 [ $\mu$ l]

dE : 2 [mV]

dT : 3 [sec]

DL : 100 [mV/ml]

DetCnt : 6

C1 :  $(A1 \cdot f) \cdot (1000/S) \cdot 0.3545$ 

Vmax : 10 [mg/L]

[ml]

Vover : 0.5 [ml]

Reagent name (Reag) : Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>

Equivalent (E) : 1

Molarity (M) : 0.01 [Mol/l]

Factor (f) : 1

Buret Injection Speed : 500 [ $\mu$ l/sec]