

AQUACOUNTER Application Sheet	COM series	DATA No. D6	1st edition
Environmental	Measurement of ammonia nitrogen in drainage		

1. Measurement outline

Ammonia nitrogen ($\text{NH}_3\text{-N}$) contained in drainage mainly originates in urine, miscellaneous daily life drainage, industrial drainage, etc. and it is important as an index of water pollution.

The methods for quantifying ammonia nitrogen are described on JIS K0101, JIS K0102 and Standard Methods of Analysis for Hygienic Chemists. These methods are fundamentally the same, and the ammonia contained in the distillate which is separated from interfering substances when the sample is heated and distilled is collected in absorber. Indophenol absorbance method is applied when the concentration is low, and neutralization titration method or ion electrode method is used when the concentration is high. This section introduces an example in which ammonia nitrogen in drainage was measured by neutralization titration.

The following provides the measurement procedure:

- | | |
|---|--|
| ① Sample collection | Collected as appropriate so that the ammonium nitrogen will be 0.3 – 30mg. Added to distillation flask (1L). |
| ↓ | |
| ② Saturated boric acid solution collected | 50mL is added to the receiving Erlenmeyer flask (300mL). |
| ↓ | |
| ③ Addition of magnesium oxide | 0.3g MgO and several boiling tips are added to the distillation flask. |
| ↓ | |
| ④ Purified water is added to the volume of 500mL. | |
| ↓ | |
| ⑤ Distillation at distillation speed of 5 – 7mL/min. | |
| ↓ | |
| ⑥ Titration of distillate 200mL with sulfuric acid (0.025mol/L) | |

2. Reagents and Electrodes

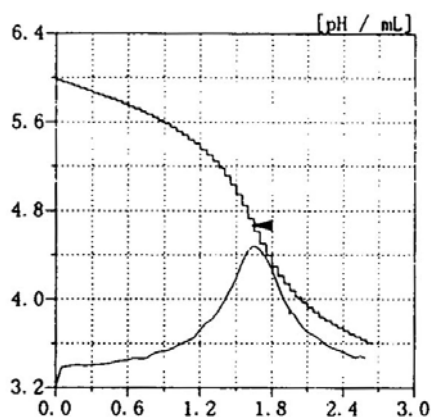
(1) Reagents	Titrant	0.025mol/L sulfuric acid titrant
	Ammonia absorber	50mL saturated boric acid solution
	Magnesium oxide	0.3g (adjusted to pH10.5)
(2) Electrodes	Glass reference combination electrode GR-522B (P/N D252334-1)	

3. Measurement conditions example (for COM-1600S)

Master File No.1	
Condition file: 1	
Parameters for Condition file 1	
Method	Auto
Amp No.	1
Buret No.	1
Meas Unit	pH
S Timer	10 sec
CP	0 mL
DP	0 mL
End Sens	300
Over mL	0.30 mL
Max Vol	20 mL
Mode No.	2
Unit	mg-N/L
Formula	$(D-B) \times M \times F \times K \times 2 \times 1000 / S$
Blank	*BLANK result value
Molarity	0.025
Factor	Titer of the titrant
K	14.00670 (as N)

Mode No.2	
Pre Int	0 sec
Del K	0
Del Sens	0 mV
Int Time	3 sec
Int Sens	3 mV
Brst Speed	2
Pulse	40

4. Measurement example



Measurement results on ammonia nitrogen in drainage

Sample No.	Sample volume (g)	Titration value (mL)	Concentration (mg_N/L)
1	50	1.628	22.8
2	50	1.605	22.5
3	50	1.621	22.7
4	50	1.614	22.6
Avg.			22.7 mg_N/L
Std. Dev.			0.14 mg_N/L
C.V.			0.61 %

5. Note

1) Detection of the end points

The method of end point detection by using MM mixed indicator colored slightly red-purple is officially adopted. This section measured using potentiometric titration with glass electrode and it was possible to obtain clear end point. Though indicator was added at the same time to observe its color change at the end point, end point could not be detected by visual observation.

2) About sample stability

Ammonia nitrogen is unstable and has large concentration change after opening the sample container, indicating tendency to decrease gradually.

3) Electrodes and distillation system used

Figure 1 shows the conceptual drawing of the electrode assembly used, and Figure 2 shows the conceptual drawing of the distillation system used.

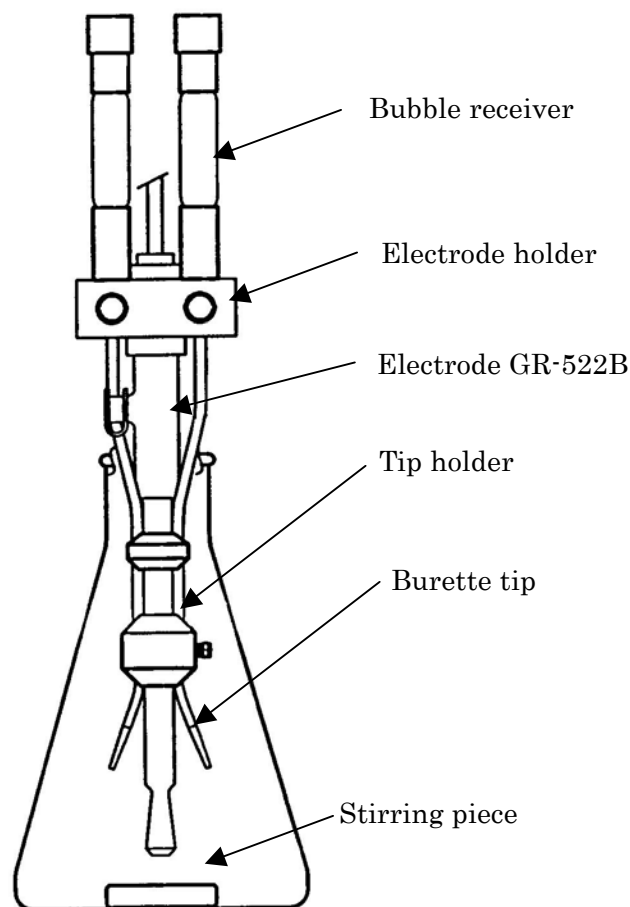


Figure 1. Example of electrode assembly used in titration

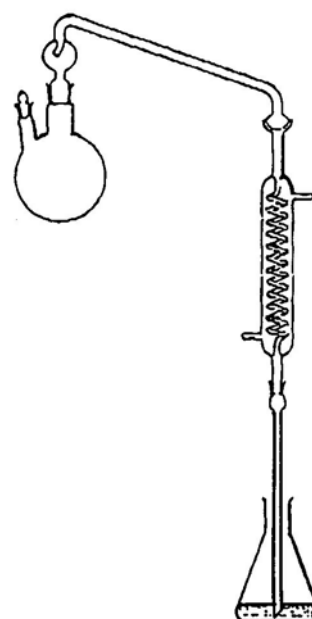


Figure 2. Example of distillation system

Key words

Drainage, ammonia nitrogen, JISK-0101, JISK-0102, Standard Methods of Analysis for Hygienic Chemists

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