	KATHMANDU UPATYAKA KHANEPANI LIMITED	TNHS001
	WATER/WASTE WATER QUALITY ASSURANCE DIVISION	Effective Date:
	Standard Operating Procedure Total Ammonia	Revised No.

1. Scope and Objectives

To determine the total ammonia of the water sample by Nesslerization Method.


2. Principle

Ammonia produces a yellow coloured compound when reacts with alkaline Nessler reagent, provided the sample is clarified properly. Colorimetric method, using Nessler's reagent is sensitive to 20mg/L of ammonia N and may be used up to 5mg/L of ammonia N. Direct nesslerisation of the sample is quicker depending upon interference.

(Note: - Although, the phenate method is the preferred standard procedure for the measurement of total ammonia but due to the lengthiest time interval for determining makes it hard to adopt in water monitoring section for the quick response. So, by nesslerisation method through comparator (Disk comparison method), semi-quantitatively, Ammonia has been measured in KUKL.)

3. Equipment and Materials

1. Spectrophotometer Agilent Cary 60
2. pH meter
3. Lovibond Nessleriser 2250
4. Standard NH₃ Disks

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4. Reagents

1. Zinc sulphate solution
2. EDTA reagent as stabilizer
3. Nessler s reagent
4. Stock ammonium solution 1.00 mL = 1.00mg

5. Sampling and Preservation

Sample collection will be done according to the water quality monitoring plan and SOPs for sample collection.

6. Procedure

1. Residual chlorine is removed by means of a dechlorinating agent (one or two drops sodium thiosulphate solution)
2. 100 mL anhydrous NaSO_4 powder is added to 100 mL sample. This is mixed thoroughly.
3. The floc formed is allowed to settle and the clear supernatant is taken for Nesslerisation.
4. To this is added 2 mL of Nessler s reagent (proportional amount to be added (if the sample volume is less)).
5. A blank using D/W is treated with Nessler s reagent as above and taken as reference or 0 abs.



Prepare the standards NH₃-N from Stock Solutions

Take either (as requirement)

- 50 ml of each standard
- 50 ml of dH₂O (free ammonia as blank)
- 50 ml of sample

Add 1 ml of KNa Tartarate (Filter before use (KNa Tartarate)

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Add 1 ml of Nessler's reagent, wait for 5 minutes


7. Measurement

A. Semi-quantitatively by Comparator

- i. Take 50ml of the sample and the D/W in two different Nessler tubes and compare the NH₃ with the help of standard disks using Nesslerizer comparator.
- ii. Note down the NH₃ having the same colour as the sample.
- iii. If corresponding colours are not developed, the sample may be diluted to get the corresponding colour.

B. Colorimetric Method

- i. Then the sample is put in 1cm standard tubes of spectrophotometer and the absorbance noted at 425 nm wavelengths.
- ii. A calibration curve is prepared as follows:
Prepare a calibration curve using suitable aliquots of standard solution in the range of 0.2 to 1.5 mg/L.
- iii. Each sample is Nesslerised as indicated earlier and the absorbance is noted down.

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8. Precision and bias

Turbidity, colour and substances precipitated by hydroxyl ion interfere with the determination.

For quality assurance run the sample in duplicate.

9. Calculation

1. A graph with mg of NH_3 along x-axis and absorbance along y-axis is plotted and a straight-line graph is drawn.
2. From the absorbance of a solution of unknown concentration, the μg of NH_3 present can be read from the calibration curve.

10. References

- ❖ Standard Methods for the Examination of Water and Wastewater; APHA, AWWA and WEF, 21st Edition, 2005.
- ❖ EPA Method 350.2 (Colorimetric Procedure)

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