1. Scope and Objectives

To provide standard operating procedure for determining turbidity in drinking water and waste water.

Turbidity has huge significance in drinking water as it directly resultant in the appearance of water. For comparison of water treatment efficiencies, turbidity is often estimated.

2. Principle

Turbidity can be measured by its effect on the scattering light, which is termed as Nephelometry. Higher the intensity of scattered lights higher the turbidity. Results from nephelometric measurements are expressed as nephelometric turbidity units (NTU).

3. Equipment and Materials

    a) Micro 1000 IR Turbidimeter

    b) Cuvette

    c) Soft Tissue

4. Reagents

    a) Pure water (e.g. deionized (DI), reverse osmosis (RO), distilled)

    b) 0.02 NTU Calibration Standard

    c) 10 NTU Calibration Standard

    d) 100 NTU Calibration Standard
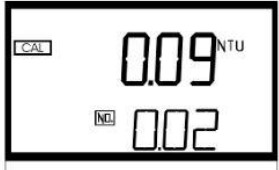
    e) 1750 NTU Calibration standard

5. Sampling and Preservation

Determine turbidity on the day the sample is taken. It storage is unavoidable, store the samples in dark for up to 24 hr. Prolonged storage before measurement is not recommended because irreversible changes in turbidity may occur. All samples should be shaken vigorously before examination.
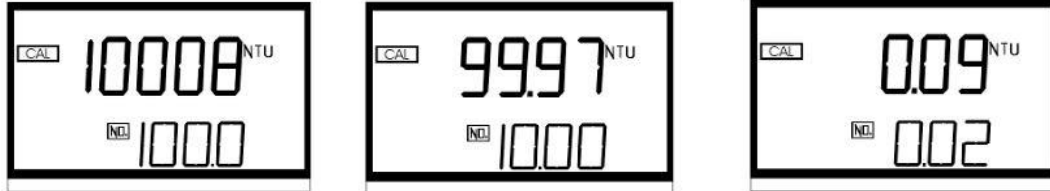
6. Procedure

6.1 Calibration

➤ Select the calibration function of the instrument by pressing either the up or down arrow key until the "Cal" block is lit.

➤ Insert the 0.02 NTU calibration standard into the sample well. At this point press the ↵ key to initiate calibration on the 0.02 NTU standard.

➤ When the instrument has completed the calibration, then "Cal" and the "Store" block will lit and automatically showed 1750 NTU.

➤ Insert the 1750 NTU calibration standard into the sample well. At this point press the ↵ key to initiate calibration on the 1750 NTU standard.

➤ When the instrument has completed the calibration, then "Cal" and the "Store" block will lit and automatically showed 10000 NTU. At this point, skip this by pressing "Up" arrow.

➤ Follow the same steps for standard 100 NTU, 10 NTU and 0.02 NTU.

(NOTE: 0.02 NTU i standard must be evaluated in calibration at both the start and end of

calibration to ensure accurate measurements in the ratio mode and when recording FAU

measurements.)

6.3 Measurement

a) Rinse the cuvette with distilled water.

b) Pour sample in the cuvette and clean the cuvette outer part. Then, insert in cuvette well.

c) The Turbidity value is obtained directly from the instrument after 5 seconds.

7. Quality Control

The Accuracy of the test results are determined by the statistical examination repetition of test. The difference between successive results obtained by the same operator with the same apparatus under constant operating conditions on identical test material would varied. Therefore, replication of the test method is applied.

Accuracy of true value is calculated By

$$accuracy = \frac{|data1 - data2|}{average\ data} \times 100\%$$

Test results validity,

Accuracy < 20 % is Better

Accuracy < 10 % is Perfect

Accuracy < 20 % is Insignificant

8. Precision and bias

For comparison of water treatment efficiencies, it may be desirable to estimate turbidity more closely. However, the uncertainties and discrepancies in turbidity measurements make it unlikely that two or more laboratories will duplicate results on the same sample more closely than specified. To maintain the precision, analyse the sample in duplicate

9. References

❖ HI Scientific Micro IR 1000 Turbidity Manual

❖ APHA 21st edition
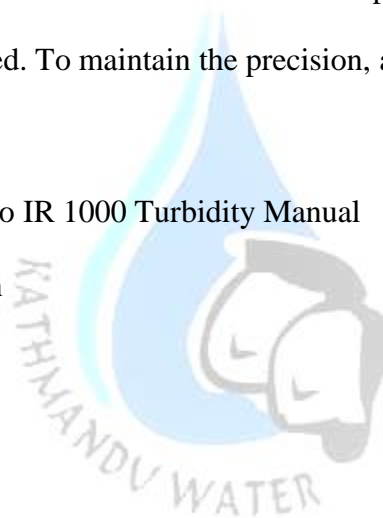
Written By:	Puranjan Nepal	
Reviewed By:	Prem Paudyal	
Approved By:	Shailaja Adhikari	