

EXPERIMENT NO-7

DETERMINATION OF TURBIDITY IN A WATER SAMPLE

AIM

To determine the turbidity of the given water sample as per **IS: 3025 (Part 10) - Reaffirmed 2002**.

5.2 INTRODUCTION

Turbidity is the technical term referring to the cloudiness of a solution and it is a qualitative characteristic which is imparted by solid particles obstructing the transmittance of light through a water sample. Turbidity often indicates the presence of dispersed and suspended solids like clay, organic matter, silt, algae and other microorganisms.

When the turbid water in a small, transparent container such as drinking glass is held up to the light, an aesthetically displeasing opaqueness or milky coloration is apparent. The colloidal material which exerts turbidity provides adsorption sites for chemicals and for biological organism that may not be harmful. They may be harmful or cause undesirable tastes and odours. Disinfection of turbid water is difficult because of the adsorptive characteristics of some colloids and because the solids may partially shield organisms from disinfectant. In natural water bodies, turbidity may impart a brown or other color to water and may interfere with light penetration and photosynthetic reaction in streams and lakes. Turbidity increases the load on slow sand filters.

The filter may go out of operation, if excess turbidity exists. Knowledge of the turbidity variation in raw water supplies is useful to determine whether a supply requires special treatment by chemical coagulation and filtration before it may be used for a public water supply. Turbidity measurements are used to determine the effectiveness of treatment produced with different chemicals and the dosages needed.

Turbidity measurements help to gauge the amount of chemicals needed from day-to-day operation of water treatment works.

Measurement of turbidity in settled water prior to filtration is useful in controlling chemical dosages so as to prevent excessive loading of rapid sand filters. Turbidity measurements of the filtered water are needed to check on faulty filter operation.

Turbidity measurements are useful to determine the optimum dosage of coagulants to treat domestic and industrial wastewaters. Turbidity determination is used to evaluate the performance of water treatment plants.

PRINCIPLE

Turbidity is based on the comparison of the intensity of light scattered by the sample under defined conditions with the intensity of the light scattered by a standard reference suspension under the same conditions. The turbidity of the sample is thus measured from the amount of light scattered by the sample taking a reference with standard turbidity suspension. The higher the intensity of scattered light the higher is the turbidity. Formazin polymer is used as the primary standard reference suspension.

Equipments Required

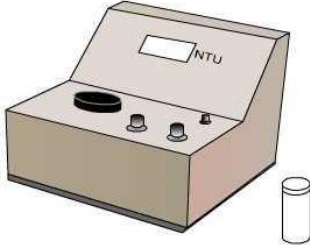
1. Turbidity Meter
2. Sample Cells
3. Standard flasks
4. Funnel
5. Wash Bottle
6. Tissue Papers

Chemicals Required

1. Hexamethylenetetramine
2. Hydrazine sulphate
3. Distilled Water.

Experimental Steps

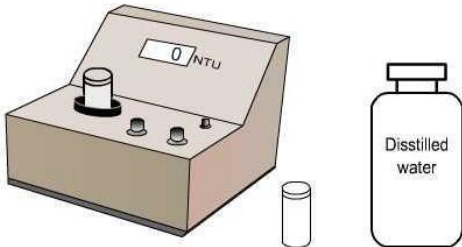
Switch on the Turbidity meter
(Atleast 30 min before the test)



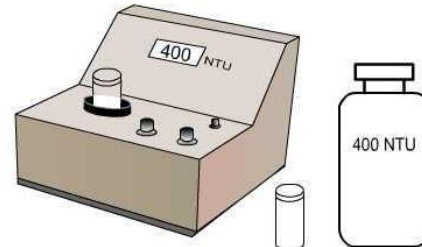
Prepare 400 NTU
solution



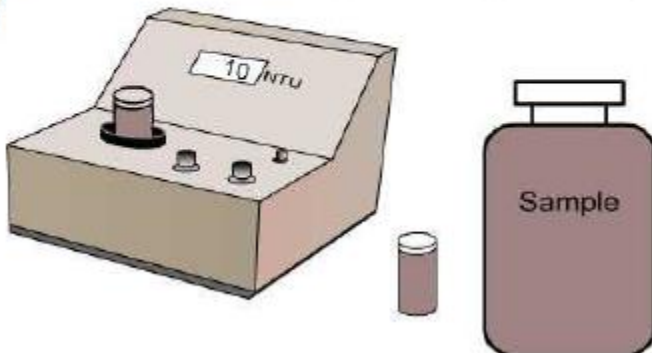
Calibrate the turbidity meter
to 0 NTU using disstilled water
and by adjusting the
calibration knob



Calibrate the turbidity meter
to 400 NTU using
the standard solution
by adjusting the
calibration knob



Read the Turbidity meter
by inserting the sample



NOTE:- IN STEP 3, USE SET ZERO KNOB TO ADJUST THE READING TO ZERO WITH DISTILLED WATER

PREPARATION OF REAGENTS

1. Hydrazine Sulphate

Weigh accurately 1 g of hydrazine sulphate and dissolve it in turbidity free distilled water.

Take 100 mL standard measuring flask and place a funnel over it.

Transfer it to a 100 mL standard flask and make up to 100 ml using turbidity free distilled water.

2. Hexamethylene Tetramine

Weigh accurately 10 g of Hexamethylene tetramine and dissolve it in turbidity free distilled water.

Take 100 mL standard measuring flask and place a funnel over it.

Transfer it to a 100 mL standard flask and make up to 100 ml

3. Standard 4000 NTU Solution

Mix 5 mL of hydrazine sulphate solution and 5 mL of Hexamethylenetetramine solution in a 100 mL standard measuring flask.

Allow the mixture to stand for 24 hours.

After 24 hours, make up the volume to 100 mL using turbidity free distilled water.

The standard 4000 NTU solution is ready.

NOTE:- FOR MAKING SOLUTIONS OF LOWER TURBIDITY VALUES, USE THE NORMALITY EQUATION, $N_1V_1=N_2V_2$ USING DISTILLED WATER FOR DILUTION PURPOSES

example :- $N_1=4000$, N_2 required= 200 NTU for experiment, V_1 =say 10 ml, then $V_2= N_1V_1 / N_2 = (4000 \times 10) / 200 = 400$ ml. Hence to make a solution of 200 NTU, you need to dilute 10 ml of 4000 NTU to 400 ml.