भारतीय मानक **IS 3025 (Part 16) : 2023**

Indian Standard

जल और अपशिष्ट जल के नमूने लेने और परीक्षण (भौतकि और रासायनिक) की पध्दतियाँ

भाग 16 फिल्टर करने योग्य अवशेष (कुल घुले हुए ठोस) 180 °C पर

(दूसरा पुनरीक्षण)

Methods of Sampling and Test (Physical and Chemical) for Water and Wastewater

Part 16 Filterable Residue (Total Dissolved Solids) at 180 °C

(Second Revision)

ICS 13.060.50

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January 2023 **Price Group 4**

Water Quality Sectional Committee, CHD 36

FOREWORD

'This Indian Standard (Part 16) (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Water Quality Sectional Committee had been approved by the Chemical Division Council'.

Solid analyses are important for controlling water and wastewater treatment processes andassessing compliance with the regulatory requirements. Filterable residue is the term applied to the residue remaining in a weighed dish after the sample has been passed through a standard fiberglass filter and dried to constant mass at 103 °C – 105 °C or 179 °C – 181 °C.

The Technical Committee responsible for formulation of IS 3025 : 1964 'Methods of sampling and test (physical and chemical) for water used in industry' decided to revise the standard and publish it in separate parts. This method superseded clause **12** of IS 3025 : 1964 'Methods of sampling and test (physical and chemical) for water used in industry' and was one among the different parts published under IS 3025 series of standards. The first revision of this standard was published in 1984.

In this second revision the following modification have been incorporated:

a) The gravimetric method has been updated; and
b) The Amendment no.1 issued to the standard have been incorporated.

In the preparation of this standard, considerable assistance has been derived from the method no. 2540 C of — Standard Methods for the Examination of Water and Wastewater, published by theAmerican Public Health Association, Washington, USA, 23nd Edition, 2017.

The composition of the committee responsible for the formulation of this standard is listed in Annex A.

In reporting the results of a test or analysis in accordance with this standard, if the final valueobserved or calculated, is to be rounded off, it shall be done in accordance with IS 2 : 2022 'Rules for rounding off numerical values (*second revision*)'.

Indian Standard

METHODS OF SAMPLING AND TEST (PHYSICAL AND CHEMICAL) FOR WATER AND WASTEWATER

PART 16 FILTERABLE RESIDUE (TOTAL DISSOLVED SOLIDS) AT 180 °C

(Second Revision)

1 SCOPE

1.1 This standard (Part 16) prescribes a gravimetric method for the determination of filterableresidue in water and wastewater.

1.2 This method is applicable to all types of water and waste water.

2 REFERENCES

The following standards contain provisions which through reference in this text constitute provisions of this standard. At the time of publications, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	*Title*
IS 1070 : 1992	Reagent grade water — Specification (*third revision*)

3 SAMPLE HANDLING AND PRESERVATION

Preservation of the samples is not practical. Analysis should begin as soon as possible. Refrigeration or chilling to 4 °C to minimize microbiological decomposition of solids is recommended.

4 PRINCIPLE

A well-mixed sample is filtered through a standard glass-fiber filter and the filtrate is evaporated in a pre-weighed tared dish on steam-bath. The residue after evaporation is dried to constant mass in an oven at 180 °C ± 2 °C.

NOTE — The value of filterable residue obtained by drying at 180 °C conforms more closely to those obtained by summation of various constituents. (Since bicarbonatesdecompose to carbonates, only half of bicarbonate should be taken while summing up of the various constituents).

5 INTERFERENCES

The portion of total solids in a water sample that passes through a filter with a nominal pore size of 2.0 µm (or smaller) under specified conditions. Highly mineralized waters with a considerable calcium, chloride, magnesium, and/or sulphate content may be hygroscopic and require prolonged drying, proper desiccation and rapid weighing. Samples with high bicarbonate concentrations require careful, possibly prolonged drying at 180 °C ± 2 °C to ensure that bicarbonate is completely converted to carbonate.

6 APPARATUS

6.1 Dishes of 90 mm diameter with 100 ml capacity made of porcelain / platinum / high silica.

6.2 Wide-Bore Pippets — Class B lass, mechanical or electronic.

6.3 Graduated Cylinders — Class A.

6.4 Hot Plate/Block to Maintain <100 °C Temperature

6.5 Desiccator — Provided with a colour indicating desiccant.

6.6 Analytical Balance of 200g capacity and capable of weighing to 0.1 mg.

6.7 Magnetic Stirrer — With teflon coating stirring bars

6.8 Glass Fibre Filter Disc — (Whatman GF/C or equivalent) 22 mm to 125 mm dia, ≤ 2 µm nominal pore size without organic binder.

6.9 Oven — With thermostatic control for maintaining temperature up to 180 °C ± 2 °C.

6.10 Filtering Apparatus

Anyone of the following may be used:

6.10.1 Membrane Filter Funnel — Of various capacities to fit the selected filter.

6.10.2 Gooch Crucible — 25 ml to 40 ml capacity, with Gooch-Crucible adapter.

6.11 Filtration apparatus with reservoir and coarse (40 µm - 60 µm) fritted disk with filter support

6.12 Suction Flask — Sufficient capacity for selected sample size.

7 PROCEDURE

7.1 Preparation of Glass Fibre Filter Disc

Place the glass fibre filter disk into the filtration apparatus with wrinkled surface up. While vacuum is applied, wash the dish with three successive 20 ml volumes of reagent grade water (*see* IS 1070). Remove all traces of water by continuing suction.7.3 Preparation of Evaporating Dish

Heat the clean evaporating dish to 180 °C for 1 h. Cool in the desiccator, weigh and store in the desiccator until ready for use.

7.2 Filter a portion of the sample through any of the filters mentioned in **6.10**, Select volume of the sample which has residue between 25 mg and 250 mg or preferably between 100 mg to 200 mg. This volume may be estimated from values of specific conductance. To obtain a measurable residue. Successive aliquots of filtered sample may be added to the sample dish.

7.3 Stir volume of sample with a magnetic stirrer or shake it vigorously. Pipette this volume to a weighed evaporating dish placed on a steam-bath. Evaporation may also be performed in a drying oven. The temperature shall be lowered to approximately 98 °C to prevent boiling and splattering of the sample. After complete evaporation of water from the residue, transfer the dish to an oven at 180 °C ± 2 °C and dry to constant mass, that is, till the difference in the successive weighing is less than 0.5 mg. Drying for a long duration (usually 1 h to 2 h) is done to eliminate necessity of checking for constant mass.

7.4 Using forceps, carefully remove filter from filtration apparatus and transfer to an inert weighing dish or pan as a support. If using a Gooch crucible, remove crucible and filter combination from the crucible adapter. Weigh the dish as soon as it has cooled avoiding residue to stay for long time as some residues are hygroscopic and may absorb water from desiccant thatis not absolutely dry.

8 CALCULATION

Calculate the filterable residue from the following equation :

Total Dissolved Solids, mg/l = $\frac{(A-B)*1000}{V}$

where

A = final weight of dried residue + dish, in mg;

B = weight of dish, in mg; and

V = volume of sample, in ml.

9 REPORT

Report in whole numbers for less than 100 mg/l and to three significant figures tor values above 100 mg/1. Report the temperature of determination.

10 PRECISION AND ACCURACY

The precision of the method is about 5 percent. Accuracy cannotbe estimated because filterable residue as determined by this method is a quantity defined by the procedure followed.

ANNEX A
(*Foreword*)

COMMITTEE COMPOSITION

Water Quality Sectional Committee, CHD 36

Organization	*Representative(s)*
Chief Scientist, EPTRI, Hyderabad	SHRI N. RAVEENDHAR (***Chairperson***)
Andhra Pradesh Pollution Control Board, Vijaywada	SHRIMATI M. SREERANJANI SHRIMATI A. SRI SAMYUKTHA (*Alternate*)
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MS SHUBHANJALI UMRAO
SCIENTIST 'B'/ASSISTANT DIRECTOR
(CHEMICAL DEPARTMENT), BIS

Bureau of Indian Standards

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