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IS 1069 : 1993

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( दूसरा पुनरीक्षण )

*Indian Standard*

QUALITY TOLERANCES FOR WATER FOR  
STORAGE BATTERIES — SPECIFICATION

( *Second Revision* )

UDC 663'634 : 621'355

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**BUREAU OF INDIAN STANDARDS**  
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Price Group 2

## FOREWORD

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

Water for storage batteries could be obtained either through the process of distillation or by any other process by which the dissolved substances in it are removed, for example, by demineralization or with the help of ion-exchange, electro dialysis and reverse osmosis membrane.

This standard was first published in 1957 and revised in 1964. In this second revision, limits for chlorides, heavy metals, iron and manganese have been incorporated and requirements for pH value, hardness, total dissolved solids have been included while requirements for ammonia, calcium have been deleted. Also requirement for specific electric conductivity has been suitably modified. Also reference to the latest methods of tests has been given.

The Committee responsible for the preparation of this standard is given at Annex C.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2:1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

## Indian Standard

# QUALITY TOLERANCES FOR WATER FOR STORAGE BATTERIES — SPECIFICATION

( *Second Revision* )

### 1 SCOPE

This standard prescribes requirements and methods of sampling and test for water intended for use in storage batteries (lead-acid type).

### 2 REFERENCES

The Indian Standards listed below are necessary adjuncts to this standards:

IS No.	Title	IS No.	Title
			for water and wastewater: Part 21 Total hardness ( <i>first revision</i> )
		3025 ( Part 32 ) : 1988	Methods of sampling and test (physical and chemical) for water and wastewater: Part 32 Chlorides ( <i>first revision</i> )
1070 : 1992	Reagent grade water ( <i>third revision</i> )	7017 : 1973	Method of colorimetric determination of traces of heavy metals by dithizone
3025 : 1964	Methods of sampling and test (physical and chemical) for water used in industry.		
3025 ( Part 11 ) : 1983	Methods of sampling and test (Physical and Chemical) for water and wastewater: Part 11 pH value ( <i>first revision</i> )		
3025 ( Part 14 ) : 1984	Methods of sampling and test (physical and chemical) for water and wastewater: Part 14 Specific conductance (wheatstone bridge, conductance cell) ( <i>first revision</i> )		
3025 ( Part 16 ) : 1984	Methods of sampling and test (physical and chemical) for water and wastewater: Part 16 Filterable residue (total dissolved solids) ( <i>first revision</i> )		
3025 ( Part 21 ) : 1984	Methods of sampling and test (physical and chemical)		

### 3 REQUIREMENTS

#### 3.1 Description

The material shall be clear, odourless, tasteless, colourless and free from suspended impurities.

3.2 The material shall also comply with the requirements given in Table 1. Reference to the relevant parts of IS 3025 and Annex A is given in col 4 of Table 1.

### 4 PACKING AND MARKING

4.1 The material shall be packed in stoneware jars or glass carboys or any other suitable containers as agreed to between the purchaser and the supplier.

4.2 The containers shall be securely closed and legibly marked with the following information:

- a) Indication of source of manufacture;
- b) Quantity of material in the container;
- c) Recognized trade-mark, if any; and

**Table 1 Requirements for Water for Storage Batteries**  
( Clause 3.2 )

Sl No.	Characteristic	Requirement	Method of Test, Ref to
(1)	(2)	(3)	(4)
i)	Non-volatile residue, mg/l, <i>Max</i>	1	A-2
ii)	Chloride ( as Cl ), mg/l, <i>Max</i>	1	IS 3025 ( Part 32 ) : 1988
iii)	pH	6.5-7.5	IS 3025 ( Part 11 ) : 1983
iv)	Heavy metals ( as Pb ), mg/l, <i>Max</i>	0.1	IS 7017 : 1973
v)	Hardness ( as CaCO <sub>3</sub> ), mg/l <i>Max</i>	Not detectable	IS 3025 ( Part 21 ) : 1983
vi)	Iron and manganese, mg/l, <i>Max</i>	0.1	35 to IS 3025 : 1964
vii)	Oxidizable matter	To pass the test	A-3
viii)	Specific electrical conductivity at 25°C in dionic units ( or micromhos per cm ), <i>Max</i>	5	IS 3025 ( Part 14 ) : 1984
ix)	Total dissolved solids, mg/l, <i>Max</i>	2	IS 3025 ( Part 16 ) : 1984

- d) Identification in code or otherwise to enable the date and lot to be traced back from records.

## 5 SAMPLING

### 5.1 Preparation of Test Samples

Representative test samples of the material shall be prepared as prescribed in Annex B.

### 5.2 Number of Tests

Tests for all the characteristics given in 3.1, 3.2 and Table 1 shall be carried out on the composite sample ( see B-3.2 ).

### 5.3 Criteria for Conformity

The material shall be considered as conforming to this specification if the composite sample complies with all the requirements given in 3.1, 3.2 and in Table 1.

## ANNEX A ( Clause 3.2 )

### ANALYSIS OF WATER FOR STORAGE BATTERIES

#### A-1 QUALITY OF REAGENTS

A-1.1 Unless specified otherwise, pure chemicals and distilled water ( see IS 1070 : 1992 ) shall be used in tests.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the results of analysis,

#### A-2 DETERMINATION OF NON-VOLATILE RESIDUE

##### A-2.1 Procedure

Transfer 500 ml of the material to a silica or glass dish and evaporate to about 50 ml. Transfer the liquid to a small tared platinum or porcelain dish, rinsing the previous dish well with water, and again evaporate. Dry the residue at  $105 \pm 2^\circ\text{C}$  to constant mass. Report the mass of the residue in terms of mg per litre of the material.

NOTE — Proper care has to be taken to avoid any contamination during evaporation.

#### A-3 TEST FOR OXIDIZABLE MATTER

##### A-3.1 Reagent

###### A-3.1.1 Dilute Sulphuric Acid

10 percent ( *m/v* ).

###### A-3.1.2 Potassium Permanganate Solution

Approximately 0.01 N.

##### A-3.2 Procedure

Transfer 100 ml of the material to a beaker. Add 10 ml of dilute sulphuric acid and 1 ml of potassium permanganate solution. Boil for 10 minutes.

A-3.2.1 The material shall be taken to have passed the test if the colour of potassium permanganate is not completely destroyed.

## ANNEX B ( Clause 5.1 )

### SAMPLING OF WATER FOR STORAGE BATTERIES

#### B-1 GENERAL REQUIREMENTS OF SAMPLING

B-1.0 In drawing, preparing, storing and handling samples, the following precautions and directions shall be observed.

B-1.1 Samples shall not be taken in an exposed place.

B-1.2 The sampling instruments shall be clean. Before use these shall also be washed several times with the material to be sampled.

B-1.3 Precautions shall be taken to protect the sample, the material being sampled, the sampling instruments and the containers for samples from adventitious contamination.

B-1.4 To draw a representative sample, the contents of each container selected for sampling shall be mixed as thoroughly as possible by suitable means.

B-1.5 The Samples shall be placed in clean and air-tight glass or other suitable containers on which the material has no action and which have been previously washed several times with the material to be sampled.

B-1.6 The sample containers shall be of such a size that they are filled by the sample, leaving ullage of 10 percent.

B-1.7 Each sample container shall be sealed air-tight after filling, and marked with full details of sampling, the date of sampling and the year of manufacture of the material.

**B-2 SCALE OF SAMPLING****B-2.1 Lot**

All containers in a single consignment of the material drawn from a single batch of manufacture shall constitute a lot. If a consignment is declared or known to consist of different batches of manufacture, the batches shall be marked separately and the groups of containers in each batch shall constitute separate lots.

**B-2.2** For ascertaining conformity of the material in a lot to the requirements of this specification, samples shall be tested for each lot separately. The number be in accordance with Table 2.

**B-2.2.1** In order to ensure randomness of selection, the following procedure shall be adopted. Arrange all the containers in the lot in a systematic manner and starting from any one, count them as 1, 2, 3 ... up to  $r$ , where  $r$  is the integral part of  $N/n$  ( $N$  and  $n$  being the lot size and sample size respectively). Every  $r$ th container thus counted shall be withdrawn to constitute the test sample.

**B-3 PREPARATION OF TEST SAMPLES**

**B-3.1** From each of the containers selected according to **B-2.2.1**, equal portions of the

**Table 2 Number of Containers to be Selected from Lots of Different Sizes**

( Clause B-2.2 )

Lot Size $N$	Sample Size $n$
(1)	(2)
3 to 15	3
16 ,, 40	4
41 ,, 65	5
66 ,, 110	7
111 and above	10

material shall be taken out so that the total quantity collected from all the containers is about 8 litres. This shall be the composite sample.

**B-3.2** The composite sample shall be divided into 3 test samples not less than 2 litres each. These test samples shall be transferred immediately to thoroughly washed bottles which are sealed air-tight with glass stoppers and marked with the particulars of sampling as given in **B-1.7**. One test sample shall be sent to the purchaser and one to the supplier. The third test sample bearing the seals of the purchaser and the supplier shall constitute the referee sample, to be used in case of dispute.

**ANNEX C**

( Foreword )

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