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*Indian Standard*

# QUALITY TOLERANCES FOR WATER FOR ICE MANUFACTURE

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

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# *Indian Standard*

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# QUALITY TOLERANCES FOR WATER FOR ICE MANUFACTURE

## 0. FOREWORD

**0.1** This Indian Standard was adopted by the Indian Standards Institution on 24 September 1966, after the draft finalized by the Water Sectional Committee had been approved by the Chemical Division Council.

**0.2** Ice is manufactured in a number of food industries, in cold storage plants and exclusively in ice-making industry. Good quality ice should be clear, colourless, free from air bubbles, snowy butts and heavy cores. It should not shatter when handled. On melting, it should give a water of potable quality in its bacteriological, physical and chemical features. Hence the quality of water used in ice making is of utmost public health importance.

**0.3** In preparing this standard, assistance has been obtained from the following publications:

United States of America. California State Water Pollution Control Board. Mckee and Wolf. Water quality criteria. Ed 2 ( Publication No. 3A ). 1963. Sacramento.

Special Technical Publication 148-D. 1959. Manual on industrial water. Ed 2. American Society for Testing and Materials, USA.

**0.4** 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*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

## 1. SCOPE

**1.1** This standard prescribes the quality tolerances for water used in ice manufacture.

## 2. TOLERANCES

**2.1** The water shall comply with the tolerances given in Tables 1 to 3 for its bacteriological; physical and chemical; and radioactive characteristics when tested according to the methods given in IS : 1622-1964† and

*Rules for rounding off numerical values ( *revised* ).

†Methods of sampling and test for microbiological examination of water used in industry.

IS : 3025-1964*. Reference to the relevant clauses of these standards is given in col 4 of Table 1, Table 2 and Table 3.

**TABLE 1 TOLERANCES FOR BACTERIOLOGICAL QUALITY**

( *Clause* 2.1 )

| Sl No. | Characteristic | Tolerance | Method of Test ( Ref to Cl No. in IS : 1622-1964* ) |
|---|---|---|---|
| (1) | (2) | (3) | (4) |
| i) | Coliform bacteria, MPN index per 100 ml, *Max* | Less than 1 | 3·2 |
| ii) | Standard plate count, per ml, *Max* | 100 | 5 |

*Methods of sampling and test for microbiological examination of water used in industry.

**TABLE 2 TOLERANCES FOR PHYSICAL AND CHEMICAL QUALITY**

( *Clause* 2.1 )

| Sl No. | Characteristic | Tolerance | Method of Test ( Ref to Cl No. in IS : 3025-1964* ) |
|---|---|---|---|
| (1) | (2) | (3) | (4) |
| i) | Colour ( Hazen units ), *Max* | 5 | 5 |
| ii) | Turbidity, units, *Max* | 5 | 6 |
| iii) | Odour | None | 7 |
| iv) | *p*H | 6·5 to 9·2 | 8 |
| v) | Total dissolved solids, mg/l, *Max* | 1 000† | 12 |
| vi) | Alkalinity ( as $CaCO_3$ ), mg/l, *Max* | 100 | 13 |
| vii) | Total hardness ( as $CaCO_3$ ), mg/l, *Max* | 600 | 16 |
| viii) | Sulphate ( as $SO_4$ ), mg/l, *Max* | 200 | 20 |
| ix) | Fluoride ( as F ), mg/l, *Max* | 1·5 | 23 |
| x) | Chloride ( as Cl ), mg/l, *Max* | 250 | 24 |
| xi) | Cyanide ( as CN ), mg/l, *Max* | 0·01 | 27 |
| xii) | Selenium ( as Se ), mg/l, *Max* | 0·05 | 28 |
| xiii) | Iron ( as Fe ), mg/l, *Max* | 0·3 | 32 |
| xiv) | Magnesium ( as Mg ), mg/l, *Max* | 125 | 34 |
| xv) | Manganese ( as Mn ), mg/l, *Max* | 0·2 | 35 |
| xvi) | Copper ( as Cu ), mg/l, *Max* | 1·0 | 36 |
| xvii) | Lead ( as Pb ), mg/l, *Max* | 0·1 | 37 |
| xviii) | Chromium ( as $Cr^{6+}$ ), mg/l, *Max* | 0·05 | 38 |
| xix) | Zinc ( as Zn ), mg/l, *Max* | 15·0 | 39 |
| xx) | Arsenic ( as As ), mg/l, *Max* | 0·2 | 40 |
| xxi) | Phenolic substances ( as $C_6H_5OH$), mg/l, *Max* | 0·001 | 54 |

*Methods of sampling and test ( physical and chemical ) for water used in industry.

†For clear, transparent ice, total dissolved solid content should not exceed 300 mg/l.

*Methods of sampling and test ( physical and chemical ) for water used in industry.

TABLE 3 TOLERANCES FOR RADIOACTIVITY

( *Clause* 2.1 )

| Sl No. | Characteristic | Tolerance | Method of Test ( Ref to Cl No. in IS : 3025-1964* ) |
|---|---|---|---|
| (1) | (2) | (3) | (4) |
| i) | *Alpha* emitters, μ c/ml, *Max* | $10^{-9}$ | 58 |
| ii) | *Beta* emitters, μ c/ml, *Max* | $10^{-8}$ | |

*Methods of sampling and test ( physical and chemical ) for water used in industry.

## 3. SAMPLING

**3.1** Representative test samples of water shall be drawn as prescribed in 2 of IS : 1622-1964* and 2 of IS : 3025-1964†.

## 4. TEST METHODS

**4.1** Tests shall be carried out as prescribed in the appropriate clauses, indicated against the characteristic in Table 1, Table 2 and Table 3, of IS : 1622-1964* and IS : 3025-1964†.

*Methods of sampling and test for microbiological examination of water used in industry.

†Methods of sampling and test ( physical and chemical ) for water used in industry.

# BUREAU OF INDIAN STANDARDS


*Headquarters :*

Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002

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Reprography Unit, BIS, New Delhi, India

AMENDMENT NO. 1 APRIL 1981

TO

IS:3957-1966 QUALITY TOLERANCES FOR WATER FOR ICE MANUFACTURE

Addendum

[*Page 4, Table 2, Sl NO.* (xxi)] - Add the following new matter under respective columns after Sl No. (xxi):

| (1) | (2) | (3) | (4) |
|---|---|---|---|
| xxii) | Cadmium (as Cd), mg/l, *Max* | 0.01 | *See* Note |
| xxiii) | Mercury (as Hg), mg/l, *Max* | 0.001 | *See* Note |

NOTE - Methods of test for these characteristics are under preparation; till then methods of test as given in Standard Methods for the examination of water and wastewater. 1975. American Public Health Association; American Water Works Association; and Water Pollution Control Federation, USA, shall be followed.'

(CDC 26)

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