इंटरनेट मानक

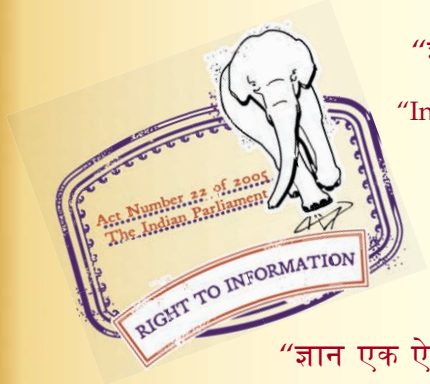
Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

"जानने का अधिकार, जीने का अधिकार"
Mazdoor Kisan Shakti Sangathan
"The Right to Information, The Right to Live"

"पुराने को छोड नये के तरफ"
Jawaharlal Nehru
"Step Out From the Old to the New"

IS 8770 (1978): Artificial sea water for laboratory use
[CHD 1: Inorganic Chemicals]



"ज्ञान से एक नये भारत का निर्माण"
Satyanarayan Gangaram Pitroda
"Invent a New India Using Knowledge"

"ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है"
Bhartṛhari—Nītiśatakam
"Knowledge is such a treasure which cannot be stolen"

BLANK PAGE

IS : 8770 - 1978
(Reaffirmed 2003)

Indian Standard

SPECIFICATION FOR ARTIFICIAL SEA WATER FOR LABORATORY USE

UDC 663·648 : 542

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

July 1978

Indian Standard

SPECIFICATION FOR ARTIFICIAL SEA WATER FOR LABORATORY USE

Chemical Standards Sectional Committee, CDC 1

Chairman	*Representing*
DR H. L. BAMI	Central Forensic Science Laboratory, New Delhi
Members	
DR K. NARAYANASWAMY (*Alternate* to Dr H. L. Bami)	
AGRICULTURAL MARKETING ADVISER	Central Agmark Laboratory, Nagpur
SHRI T. V. MATHEW (*Alternate*)	
SHRI A. K. BHATTACHARYA	National Test House, Calcutta
SHRI K. C. SEAL (*Alternate*)	
SHRI B. N. BHATTACHARYYA	Geological Survey of India, Calcutta
SHRI V. M. BHUCHAR	National Physical Laboratory (CSIR), New Delhi
SHRI D. S. CHADHA	Directorate General of Health Services, New Delhi
SMT DEBI MUKHERJEE (*Alternate*)	
DR M. S. CHADHA	Bhabha Atomic Research Centre, Bombay
SHRI R. S. CHATIM	Municipal Corporation of Greater Bombay
SHRI C. HINGARH	The Century Spg & Mfg Co Ltd, Bombay
SHRI OM PRASAD (*Alternate*)	
DR B. N. MATTO	Maharashtra State Forensic Science Laboratory, Bombay
DR M. S. MADIWALA (*Alternate*)	
DR P. R. PABRAI	Central Indian Pharmacopoeia Laboratory, Ghaziabad
SHRI D. RAMAMURTHY	Bharat Heavy Electricals Ltd, Tiruchirapalli
SHRI M. B. UNNI (*Alternate*)	
DR V. S. RAMANATHAN	Central Revenues Control Laboratory, New Delhi
SHRI KESHAV PRASAD (*Alternate*)	
SHRI G. K. RAO	Ministry of Defence (DGI)
DR A. K. SEN (*Alternate*)	
DR M. P. SAHAKARI	Italab Pvt Ltd, Bombay
SHRI S. S. HONAVAR (*Alternate*)	

(*Continued on page* 2)

(*Continued from page* 1)

Members	*Representing*
DR B. R. SANT	Regional Research Laboratory (CSIR), Bhubaneswar
DR T. P. PRASAD (*Alternate*)	
SENIOR CHEMIST & METALLURGIST, CENTRAL RAILWAY, BOMBAY	Railway Board (Ministry of Railways)
ASSISTANT DIRECTOR (MET), RDSO, LUCKNOW (*Alternate*)	
DR R. T. THAMPY	Shriram Institute for Industrial Research, Delhi
DR G. M. SAXENA, Director (Chem)	Director General, ISI (*Ex-officio Member*)

Secretary

SHRI N. K. SHARMA
Deputy Director (Chem), ISI

Panel for Artificial Sea Water for Laboratory Use, CDC 1 : P3

Convener	
SHRI V. M. BHUCHAR	National Physical Laboratory (CSIR), New Delhi
Members	
SHRI C. P. DE	Paints & Allied Products Sectional Committee; CDC 8, ISI; *and* Corrosion Protection Sectional Committee, SMDC 29, ISI
DR K. P. BUCH (*Alternate*)	
LT-COL T. R. K. SUNDARAM	Environmental Testing Procedures Sectional Committee, LTDC 2, ISI

Indian Standard

SPECIFICATION FOR ARTIFICIAL SEA WATER FOR LABORATORY USE

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 25 April 1978, after the draft finalized by the Chemical Standards Sectional Committee had been approved by the Chemical Division Council.

0.2 This standard is intended to achieve uniformity and avoid unnecessary variations in the details of the composition of artificial sea water for conducting laboratory tests as given in different Indian Standards.

0.3 Artificial sea water is used for laboratory testing such as evaluating the deleterious effects on metallic, wooden and concrete surfaces and structures, electronic components, test for oil contamination and detergency evaluation and for oceanographic, biochemical and forensic purposes, etc, where a reproducible solution simulating sea water is required. The effect of marine flora and fauna are excluded.

0.3.1 The sea water composition required for the salt mist test for electronic and electrical equipment has also been given in this standard for guidance.

0.4 The lack of organic matter, suspended matter, and marine life in this solution does not permit unqualified acceptance of test results as representing performance in actual sea water.

0.5 Since the concentration of sea water varies with the sampling location, the gross concentration employed herein is the average of many reliable individual analysis of sea water along the Indian coast line.

0.6 In the preparation of this standard assistance has been derived from ASTM D 1141-52 (reapproved 1971) Standard specification for substitute ocean water, issued by the American Society for Testing and Materials, USA.

0.7 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, 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.

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

1. SCOPE

1.1 This standard specifies the composition and the method of preparation of artificial sea water for conducting tests in the laboratory.

2. CHEMICAL COMPOSITION

2.1 The artificial sea water for laboratory use shall conform to the chemical composition given in Table 1 when prepared by the method given in **5.2.**

TABLE 1 CHEMICAL COMPOSITION OF ARTIFICIAL SEA WATER

Sl No.	Compound (Anhydrous)	Concentration, g/l
(1)	(2)	(3)
i)	Sodium chloride	23·5
ii)	Magnesium chloride	5·0
iii)	Sodium sulphate	3·9
iv)	Calcium chloride	1·1
v)	Potassium chloride	0·66
vi)	Sodium bicarbonate	0·20
vii)	Potassium bromide	0·10
viii)	Boric acid	0·026
ix)	Strontium chloride	0·024
x)	Sodium fluoride	0·003

NOTE — Chlorinity of this artificial sea water is 18·57. Chlorinity as used in this standard is an oceanographic term and is a measure of total halides in sea water which are precipitated by silver nitrate. It is numerically defined as the mass of silver required to completely precipitate the halogens in 0·328 5 kg of sea water.

2.2 The composition of artificial sea water required for the salt mist test for electronic and electrical equipment is given in Appendix A for guidance.

3. QUALITY OF REAGENTS

3.1 Unless specified otherwise, pure chemicals and distilled water (*see* IS : 1070-1977*) shall be employed in the preparation of the required solution.

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

*Specification for water for general laboratory use (*second revision*).

4. REAGENTS

4.1 Sodium Chloride — *See* IS : 4408-1967*.

4.2 Magnesium Chloride — *See* IS : 254-1973†.

4.3 Sodium Sulphate

4.4 Calcium Chloride — *See* IS : 1314-1967‡.

4.5 Potassium Chloride — *See* IS : 7223-1973§.

4.6 Sodium Bicarbonate — *See* IS : 2124-1962‖.

4.7 Potassium Bromide — *See* IS : 2797-1964¶.

4.8 Boric Acid

4.9 Strontium Chloride

4.10 Sodium Fluoride

4.11 Standard Sodium Carbonate Solution — 0·1 N.

5. METHOD OF PREPARATION

5.1 Preparation of Solution

5.1.1 *Stock Solution A* — Dissolve the indicated amounts of the following salts in water and dilute to a total volume of 10 litres. Store in well-stoppered glass container:

Magnesium chloride ($MgCl_2 \cdot 6H_2O$)	5 335·0 g
Calcium chloride, anhydrous ($CaCl_2$)	550·0 g
Strontium chloride ($SrCl_2 \cdot 6H_2O$)	21·0 g

5.1.2 *Stock Solution B* — Dissolve the indicated amounts of the following salts in water and dilute to a total volume of 10 litres. Store in well-stoppered glass container:

Potassium chloride (KCl)	660·0 g
Sodium bicarbonate ($NaHCO_3$)	200·0 g
Potassium bromide (KBr)	100·0 g
Boric acid (H_3BO_3)	26·0 g
Sodium fluoride (NaF)	3·0 g

*Specification for sodium chloride, analytical reagent.
†Specification for magnesium chloride (*second revision*).
‡Specification for calcium chloride (*first revision*).
§Specification for potassium chloride, analytical reagent.
‖Specification for sodium bicarbonate.
¶Specification for potassium bromide.

5.2 Preparation of Artificial Sea Water — Dissolve 235·0 g of sodium chloride and 39·0 g of anhydrous sodium sulphate in 8 to 9 litres of water. Add slowly with vigorous stirring 200 ml of stock solution A and then 100 ml of stock solution B. Dilute to 10 litres. Adjust the *p*H to 7·8 to 8·2 with sodium carbonate solution. Only a few millilitres of sodium carbonate should be required.

NOTE — The solution should be mixed and the *p*H adjusted immediately before use.

APPENDIX A

(*Clause* 2.2)

COMPOSITION OF ARTIFICIAL SEA WATER FOR SALT MIST TEST FOR ELECTRONIC AND ELECTRICAL EQUIPMENT

A-1. The composition of artificial sea water required for the salt mist test is given in Table 2.

TABLE 2 CHEMICAL COMPOSITION OF ARTIFICIAL SEA WATER FOR SALT MIST TEST FOR ELECTRONIC AND ELECTRICAL EQUIPMENT

Sl No.	Compound (Anhydrous)	Concentration, g/l
(1)	(2)	(3)
i)	Sodium chloride	26·5
ii)	Magnesium sulphate	3·3
iii)	Magnesium chloride	2·4
iv)	Calcium chloride	1·1
v)	Potassium chloride	0·73
vi)	Sodium bromide	0·28
vii)	Sodium bicarbonate	0·20

INDIAN STANDARDS

ON

GENERAL METHODS OF CHEMICAL ANALYSIS

IS:

2088-1971 Methods for determination of arsenic (*first revision*)
2263-1962 Methods of preparation of indicator solutions for volumetric analysis
2316-1968 Methods of preparation of standard solutions for colorimetric and volumetric analysis (*first revision*)
2317-1975 Method for gravimetric determination of sulphates (*first revision*)
2362-1973 Determination of water by Karl Fischer method (*first revision*)
3225-1965 Methods for preparation of buffer solutions
4016-1966 Density-composition tables for aqueous solutions of sodium hydroxide
4048-1966 Density-composition tables for aqueous solutions of sulphuric acid
4284-1967 Method for volumetric determination of iron
4285-1967 Method for volumetric determination of calcium
4542-1968 Colorimetric methods for determination of iron
4730-1968 Method for determination of density of liquids
5194-1969 Method for determination of nitrogen — Kjeldahl method
5298-1969 Method for determination of distillation range and distillation yield
5305-1969 Method for volumetric determination of phosphorus
5741-1970 Methods for determination of *p*H
5762-1970 Methods for determination of melting point and melting range
5813-1970 Methods for determination of crystallizing point
5949-1970 Methods for volumetric determination of calcium and magnesium using EDTA
6361-1971 Methods for colorimetric determination of phosphorus
7017-1973 Method for colorimetric determination of traces of heavy metals by dithizone
7212-1974 Methods of determination of copper

INDIAN STANDARDS INSTITUTION

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

Telephone : 27 01 31 (20 lines) **Telegrams : Manaksanstha**

Regional Offices:

		Telephone
Western : Novelty Chambers, Grant Road	BOMBAY 400007	37 97 29
Eastern : 5 Chowringhee Approach	CALCUTTA 700072	23-08 02
Southern : C. I. T. Campus, Adyar	MADRAS 600020	41 24 42

Branch Offices:

'Pushpak', Nurmohamed Shaikh Marg, Khanpur	AHMADABAD 380001	2 03 91
'F' Block, Unity Bldg, Narasimharaja Square	BANGALORE 560002	2 76 49
R-26 Guru Teg Bahadur Complex	BHOPAL 462003	6 27 16
Showhouse Bldg, Sachivalaya Marg	BHUBANESHWAR 751001	5 36 27
Ahimsa Bldg, SCO 82-83, Sector 17C	CHANDIGARH 160017	2 83 20
5-8-56/57 L. N. Gupta Marg	HYDERABAD 500001	22 10 83
D-277 Todarmal Marg, Banipark	JAIPUR 302006	6 98 32
117/418 B Sarvodaya Nagar	KANPUR 208005	82 72
B. C. I. Bldg (3rd Floor), Gandhi Maidan East	PATNA 800004	5 36 55
Hantex Bldg (2nd Floor), Rly Station Road	TRIVANDRUM 695001	32 27

Printed at New India Printing Press, Khurja, India