IS : 12086 - 1987
(Reaffirmed 1997)

Indian Standard

SPECIFICATION FOR HYDRAZINE HYDRATE

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

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TO

IS 12086 : 1987 SPECIFICATION FOR HYDRAZINE HYDRATE

(*Page* 7, *clauses* A-0 *to* A-3.1) — Substitute the following for the existing clauses:

'A-0 PRINCIPLE

A-0.1 Hydrazine reacts with potassium iodate under the usual Andrew's conditions as follows:

$$IO_3^- + N_2H_4 + 2H^+ + Cl^- \longrightarrow ICl + N_2 + 3H_2O$$

thus, $KIO_3 \equiv N_2H_4$

A-1 REAGENTS

A-1.1 **Potassium Iodate Solution** — 0·025 M. Dissolve exactly 5·35 g of dried potassium iodate in one litre of de-oxygenated water.

A-1.2 **Carbon Tetrachloride**

A-2 PROCEDURE

A-2.1 Weigh accurately about 0·08 to 0·1 g of hydrazine hydrate. Add a mixture of 30 ml of concentrated hydrochloric acid and 20 ml of de-oxygenated water. Shake well. Add 5 ml of carbon tetrachloride. Titrate against potassium iodate solution, with continuous shaking. At first the colourless organic layer of carbon tetrachloride changes to blood red and then just decolourises at the end point.

A-3 CALCULATION

A-3.1 Purity of hydrazine hydrate, percent $= \dfrac{0{\cdot}001\,25 \times V_1 \times 100}{M}$

where

V_1 = volume in ml of potassium iodate solution, and

M = mass in g of the sample.

(CHD 13)

Reprography Unit, BIS, New Delhi, India

Indian Standard

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SPECIFICATION FOR HYDRAZINE HYDRATE

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 1 January 1987, after the draft finalized by the Boiler Water Sectional Committee had been approved by the Chemical Division Council.

0.2 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 requirements and methods of sampling and test for hydrazine hydrate.

2. TERMINOLOGY

2.1 For the purpose of this standard, definitions given in IS : 11671-1985† shall apply.

3. REQUIREMENTS

3.1 The material shall be colourless liquid free from visible impurities and suspended particles.

3.2 The material shall comply with the requirements given in Table 1.

4. PACKING AND MARKING

4.1 Packing — The material shall be packed in mild steel drums suitably lined with plastic material or in PVC carboys.

*Rules for rounding off numerical values (*revised*).
†Glossary of terms relating to boiler water.

TABLE 1 REQUIREMENTS FOR HYDRAZINE HYDRATE

(*Clause* 3.2)

Sl No.	Characteristic	Requirement	Methods of Test, Ref to
(1)	(2)	(3)	(4)
i)	Purity (as hydrazine hydrate), percent by mass, *Min*	80	Appendix A
ii)	Relative density, 20°C/20°C, *Min*	1·05	IS : 3025 (Part 12)-1983*
iii)	*p*H of 1 percent solution at 20°C, *Min*	10·5	IS : 3025 (Part 11)-1983†
iv)	Boiling range	115 to 119°C	IS : 5298-1983‡
v)	Colour, Hazen Units, *Max*	10	IS : 3025 (Part 4)-1983§
vi)	Residue on evaporation, percent by mass, *Max*	0·01	10 of IS : 3025-1964‖
vii)	Ash content, g/100 ml, *Max*	0·003	11 of IS : 3025-1964‖
viii)	Ammonia content (as NH_3), *Max*, percent by mass	0·3	5 of IS : 2488 (Part 4)-1974¶
ix)	Iron (as Fe), ppm, *Max*	5	32 of IS : 3025-1964‖
x)	Copper (as Cu), ppm, *Max*	5	36 of IS : 3025-1964‖
xi)	Silica (as SiO_2), ppm, *Max*	5	30 of IS : 3025-1964‖
xii)	Chloride (as Cl), ppm, *Max*	5	24 of IS : 3025-1964‖
xiii)	Sulphates (as SO_4), ppm, *Max*	5	21 of IS : 3025-1964‖
xiv)	Water insoluble matter, percent by mass, *Max*	0·005	Appendix B

*Methods of sampling and test (physical and chemical) for water and waste water: Part 1 2 Density (*first revision*).

†Methods of sampling and test (physical and chemical) for water and waste water: Part 11 *p*H Value (*first revision*).

‡Method for determination of distillation range and of distillation yield (*first revision*).

§Methods of sampling and test (physical and chemical) for water and wate water: Part 4 Colour (*first revision*).

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

¶Methods of sampling and test for industrial effluents, Part 4.

4.2 Marking — The containers shall be marked with the following:

a) Name of the material;

b) Net volume or mass;

c) Batch number;

d) Name of the manufacturer or his registered trade-mark, if any; and

e) Suitable cautionary note as follows:

NOTE — It has been known that hydrazine hydrate is likely to have some carcenogenous properties. Hydrazine hydrate as a product should not be used in boilers, the steam from which will be used in a process industry, processing food and/or skin products.

4.2.1 The containers may also be marked with the Standard Mark.

NOTE — The use of the Standard Mark is governed by the provisions of the Bureau of Indian Standards Act, 1986 and the Rules and Regulations made thereunder. The Standard Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well defined system of inspection, testing and quality control which is devised and supervised by BIS and operated by the producer. Standard marked products are also continuously checked by BIS for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or producers, may be obtained from the Bureau of Indian Standards.

5. SAMPLING

5.1 General Requirements of Sampling

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

5.1.2 The sampling instruments shall be clean and dry.

5.1.3 Precautions shall be taken to protect the samples, the material being sampled, the sampling instruments and the containers for samples from adventitious contamination. To draw a representative sample from a container, the material shall be mixed thoroughly by suitable means before sampling.

5.1.4 The sample shall be placed in clean and air-tight glass bottles 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.

5.1.5 The sample containers shall be of such a size that they are filled by the sample leaving an ullage of not more than five percent.

5.1.6 Each sampling 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 materials.

5.2 Scale of Sampling

5.2.1 *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.

5.2.2 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 of containers to be selected at random from lots of different sizes shall be in accordance with Table 2.

TABLE 2 NUMBER OF CONTAINERS TO BE SELECTED FOR SAMPLING

(*Clause* 5.2.2)

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

5.2.2.1 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 rth container thus counted shall be withdrawn to constitute the test sample.

5.3 Preparation of Test Samples

5.3.1 From each of the containers selected according to **5.2.2.1**, equal portions of the material shall be taken out so that the total quantity collected from all the containers is about 3 litres. This shall be the composite sample.

5.3.2 The composite sample shall be divided into 3 test samples not less than 1 litre each. These test samples shall be transferred immediately to clean, dry bottles which are sealed air-tight with glass stoppers and marked with the particulars of sampling as given in **5.1.6**. 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.

5.3.3 Tests fordetermination of all characteristics shall be conducted on the composite sample.

5.4 Criteria for Conformity

5.4.1 The lot shall be declared as conforming to the requirements of this specification if all the test results on the composite sample satisfy the corresponding requirements.

6. TESTS

6.1 Tests shall be conducted as prescribed in col 4 of Table 1.

6.2 Quality of Reagents — Unless otherwise specified, pure chemicals and distilled water (*see* IS : 1070-1977*) shall be employed in tests.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities.

APPENDIX A

[*Table* 1, *Sl No.* (i)]

DETERMINATION OF PURITY OF HYDRAZINE HYDRATE

A-0. PRINCIPLE

A-0.1 The sample is treated with hydrochloric acid and heated to 60°C and titrated against standard potassium bromate-bromide solution.

A-1. REAGENTS

A-1.1 Standard Potassium Bromate-Bromide Solution — 0·1 N. Dissolve 2·783 6 g of potassium bromate, and 10 g of potassium bromide in 1 000 ml of water.

A-1.2 Hydrochloric Acid — Concentrated (*see* : 265-1976†).

A-1.3 Methyl Orange Indicator — *See* IS : 2263-1979‡.

A-2. PROCEDURE

A-2.1 Take one gram of the sample in a 250-ml conical flask. Add 20 ml of concentrated hydrochloric acid and heat up to 60°C. Add 3 to 4 drops of indicator. Titrate the contents of the flask against standard potassium bromate-bromide solution till the red colour changes into yellow.

A-3. CALCULATION

A-3.1 The hydrazine hydrate content,

$$\text{percent by mass} = 0{\cdot}0\,125 \times V_1$$

where

V_1 = volume in ml of standard potassium bromate-bromide solution

*Specification for water for general laboratory use (*second revision*).
†Methods for preparation of indicator solutions (*first revision*).
‡Specification for hydrochloric acid (*second revision*).

APPENDIX B

[*Table* 1, *Sl No.* (xiv)]

DETERMINATION OF WATER INSOLUBLE MATTER

B-1. PROCEDURE

B-1.1 Weigh accurately about 10 g of the material in a beaker and add equal quantity of water. Mix well with a glass rod. Filter the contents of the beaker quantitatively through a previously weighed sintered glass crucible No. 4. Wash the beaker with water and filter this also. Similarly wash the crucible a few times with water. Dry the crucible in an air oven at 105 ± 2°C. Weigh the dried crucible for constant weight.

B-2. CALCULATION

B-2.1 Water insoluble matter, percent by mass $= \frac{M_1}{M_2} \times 100$

where

M_1 = mass in g of the residue after drying, and

M_2 = mass in g of the sample taken for test.

(*Continued from page* 2)

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