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INTERNATIONAL STANDARD



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**Formaldehyde solutions for industrial use —
Limit test for inorganic chlorides**

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ISO 2221-1972 (E)

FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO Member Bodies). The work of developing International Standards is carried out through ISO Technical Committees. Every Member Body interested in a subject for which a Technical Committee has been set up has the right to be represented on that Committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the Technical Committees are circulated to the Member Bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 2221 was drawn up by Technical Committee ISO/TC 47, *Chemistry*.

It was approved in July 1971 by the Member Bodies of the following countries :

Austria	Ireland	Sweden
Belgium	Israel	Switzerland
Czechoslovakia	Italy	Thailand
Egypt, Arab Rep. of	Korea, Rep. of	Turkey
France	Netherlands	United Kingdom
Germany	New Zealand	U.S.A.
Hungary	Romania	U.S.S.R.
India	South Africa, Rep. of	

No Member Body expressed disapproval of the document.

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Formaldehyde solutions for industrial use — Limit test for inorganic chlorides

WARNING

Formaldehyde is toxic. It is therefore necessary to avoid inhaling its vapour during sampling and testing.

1 SCOPE

This International Standard specifies a limit test for inorganic chlorides in formaldehyde solutions for industrial use.

2 FIELD OF APPLICATION

The method, as described, is applicable when the required limit (x), expressed as a percentage by mass of Cl, is not greater than 0,05 % and not less than 0,000 5 %. If the required limit lies outside that range, the mass of the test portion (see 7.1) should be changed and an appropriate adjustment made to the factor $\left(\frac{0,05}{x}\right)$ in 7.3.

3 PRINCIPLE

Comparison of the turbidity obtained by the addition of silver nitrate solution to a solution of the sample, in the presence of nitric acid, with that similarly produced from a chloride solution of known concentration.

4 REAGENTS

Distilled water, or water of equivalent purity, shall be used in the test. All reagents and filter paper shall be free from chloride.

4.1 Nitric acid, approximately 5 N solution.

4.2 Chloride, standard solution, 0,1 g of Cl per litre.

Place 28,2 ml of exactly 0,1 N hydrochloric acid solution in a 1 000 ml one-mark volumetric flask, dilute to the mark and mix.

1 ml of this standard solution contains 0,000 1 g of Cl.

4.3 Silver nitrate, 50 g/l solution.

5 APPARATUS

Ordinary laboratory apparatus and

5.1 Two matched Nessler cylinders, capacity 100 ml.

6 SAMPLING

Follow the principles given in ISO . . .¹⁾.

Attention is drawn to the following recommendation. Place the laboratory sample, representative of the material taken from the bulk, in a clean, dry, and air-tight glass bottle, fitted with a ground glass stopper, of such a size that it is nearly filled by the sample.

If it is necessary to seal this bottle care shall be taken to avoid the risk of contamination.

Owing to polymerization, paraformaldehyde will tend to be deposited on standing and this will occur more rapidly if the temperature is allowed to fall below 25 °C. Accordingly the material shall be sampled as soon as possible after receipt.

7 PROCEDURE

7.1 Test portion and preparation of test solution

Weigh $50 \pm 0,5$ g of the laboratory sample, transfer to a 250 ml one-mark volumetric flask, dilute to the mark and mix.

If the solution is not clear, pass it through a filter paper.

7.2 Preparation of the standard matching solution

To prepare the chloride solution of known concentration, add to one of the Nessler cylinders (5.1) 1,0 ml of the chloride standard solution (4.2), dilute to the mark, add 2 ml of the nitric acid solution (4.1) and mix.

7.3 Preparation of the comparison solution

For a material required to contain not more than x % of Cl, transfer to the second Nessler cylinder an aliquot, $\frac{0,05}{x}$ ml, of the test solution (7.1), dilute to the mark, add 2 ml of the nitric acid solution (4.1), and mix.

1) Sampling from the consignment of the product will form the subject of a future International Standard.

ISO 2221-1972 (E)**7.4 Comparison**

Add to each Nessler cylinder 1 ml of the silver nitrate solution (4.3) and mix. Allow the cylinders to stand in the dark for 5 min and then compare the turbidity produced in the comparison solution (7.3) with that produced in the standard matching solution (7.2), viewing vertically against a dark background.

8 EXPRESSION OF RESULTS

If the turbidity produced in the comparison solution (7.3) is less than that in the standard matching solution (7.2), report the material as containing less than x % of inorganic chlorides, expressed as Cl; otherwise report it as containing not less than x %.

9 TEST REPORT

The test report shall include the following particulars :

- a) the reference of the method used;
- b) the results and the method of expression used;
- c) any unusual features noted during the determination;
- d) any operation not included in this International Standard, or regarded as optional.