INTERNATIONAL STANDARD 3123

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Sodium perborates for industrial use — Determination of rate of solution — Conductivity method

Perborates de sodium à usage industriel — Détermination de la vitesse de dissolution — Méthode conductimétrique

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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 3123 was drawn up by Technical Committee ISO/TC 47, *Chemistry*, and circulated to the Member Bodies in April 1973.

It has been approved by the Member Bodies of the following countries :

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

No Member Body expressed disapproval of the document.

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Sodium perborates for industrial use — Determination of rate of solution — Conductivity method

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies a conductivity method for determining the rate of solution of sodium perborates for industrial use.

2 PRINCIPLE

Dissolution of an agreed mass of sample in water at an agreed temperature, with controlled agitation. Measurement of the conductivity of the solution at 60 s intervals, and of the final conductivity when the sample is dissolved completely, and calculation of the ratio of conductivity at an agreed time to the final conductivity, thereby giving a measure of the rate of solution.

NOTE — The mass of test portion, the water temperature and the time at which the conductivity is measured shall be the subject of agreement between the interested parties for the purpose of a contract specification.

3 APPARATUS

Ordinary laboratory apparatus and

3.1 Conductivity indicator.

3.2 Conductivity cell.

3.3 Laboratory stirrer, capable of maintaining 350 ± 10 rev/min under working conditions and with an agitator of stainless steel having two vertical blades 42 mm long and 11 mm deep, set at right angles (see the figure). The shaft shall be insulated with polyethylene at the point of attachment to the motor.

Dimensions in millimetres

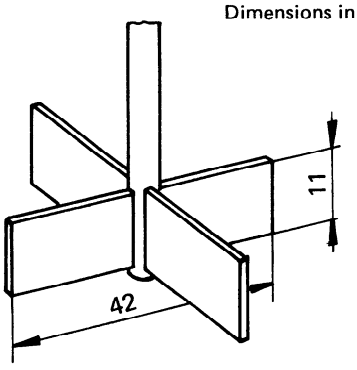

FIGURE — **Agitator**

3.4 Stop-watch, calibrated in 1 s intervals.

4 PROCEDURE

Weigh the agreed mass of sample, to the nearest 0,01 g, in a weighing dish. Place 1 000 ml of distilled water, or water of equivalent purity, in a suitable 2 000 ml capacity squat-form beaker, and adjust to the agreed temperature, ± 1 °C. Place the stirrer (3.3) centrally in the beaker with the bottom of the blades approximately 10 mm from the bottom of the beaker. Immerse the conductivity cell (3.2) in the water.

Switch on the stirrer, check the temperature and adjust if necessary.

Add the test portion to the water and quickly wash the weighing dish with 2 to 5 ml of water to complete the transfer. Immediately start the timer (3.4) and record the conductivity at intervals of 60 s up to 4 min. Continue the stirring until the whole of the test portion is dissolved and record the final conductivity.

5 NOTE ON PROCEDURE

It is necessary to establish that the conductivity/concentration relationship of the sodium perborate under test is substantially linear under the test conditions selected, and this can be checked as follows.

Prepare a series of solutions using sodium perborate of the grade under examination, covering the range of concentrations expected. Read the conductivity of each solution under the agreed conditions of temperature and stirring. Prepare a graph from the data, thus enabling concentrations of sodium perborate to be predicted from conductivity readings. The graph should be substantially linear but slight deviations are permissible.

Once prepared, the calibration graph may be regarded as valid for that particular grade of sodium perborate under the agreed test conditions and the relationship between the conductivity at the agreed time and the final conductivity may be used to express the ratio of concentrations.

Values of 2 g, 15 °C and 2 min for the mass of test portion, the water temperature and the time at which the conductivity is measured, respectively, are typical and are known to meet the requirement for the conductivity/concentration relationship to be linear.

6 EXPRESSION OF RESULTS

The ratio of concentrations under the agreed conditions is given, as a percentage by mass, by the formula :

$$\frac{\sigma_1}{\sigma_2} \times 100$$

where

σ_1 is the conductivity, in siemens per metre, at the agreed time;

σ_2 is the final conductivity, in siemens per metre.

7 TEST REPORT

The test report shall include the following particulars :

a) the reference of the method used;

b) the results and conditions of test 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.

ANNEX

ISO PUBLICATIONS RELATING TO (A) BORIC ACID, (B) BORIC OXIDE, (C) *DI*SODIUM TETRABORATES, (D) SODIUM PERBORATES, AND (E) CRUDE SODIUM BORATES, FOR INDUSTRIAL USE

Applicability	
A	ISO 1914 – Determination of boric acid content – Volumetric method.
B	ISO 1915 – Determination of boric oxide content – Volumetric method.
C	ISO 1916 – Determination of sodium oxide and boric oxide contents and loss on ignition.
D	ISO 1917 – Determination of sodium oxide, boric oxide and available oxygen contents – Volumetric methods.
A B C E	ISO 1918 – Determination of sulphur compounds – Volumetric method.
A B C	ISO 2214 – Determination of manganese content – Formaldehyde oxime photometric method.
A B C	ISO 2215 – Determination of copper content – Zinc dibenzyldithiocarbamate photometric method.
E	ISO 2216 – Determination of sodium oxide and boric oxide contents – Volumetric method.
E	ISO 2217 – Determination of matter insoluble in alkaline medium and preparation of test solutions.
E	ISO 2218 – Determination of loss in mass after heating at 900 °C.
E	ISO 2760 – Determination of total aluminium content – Titrimetric method.
E	ISO 2761 – Determination of total titanium content – Photometric method.
D	ISO 3118 – Determination of particle size distribution by mechanical sieving.
A B C	ISO 3119 – Determination of chromium content – Diphenylcarbazide photometric method.
C E	ISO 3120 – Determination of water content – Gravimetric method.
A B C	ISO 3121 – Determination of chloride content – Mercurimetric method.
A B C D E	ISO 3122 – Determination of iron content – 2,2′-Bipyridyl photometric method.
D	ISO 3123 – Determination of rate of solution – Conductivity method.
E	ISO 3124 – Determination of iron soluble in alkaline medium – 2,2′-Bipyridyl photometric method.
E	ISO 3125 – Determination of aluminium soluble in alkaline medium – EDTA titrimetric method.
D	ISO 3424 – Determination of bulk density.

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