
INTERNATIONAL STANDARD



3900

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

Rubber — Nitrile latex — Determination of bound acrylonitrile content

Caoutchouc — Latex de nitrile — Détermination de la teneur en acrylonitrile lié

First edition — 1976-09-01

ITeH STANDARD PREVIEW
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[ISO 3900:1976](https://standards.iteh.ai/catalog/standards/sist/a6897c61-48b1-455a-aa63-702c727d6dcd/iso-3900-1976)

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UDC 678.031.5/.8 : 543.86

Ref. No. ISO 3900-1976 (E)

Descriptors : rubber, nitrile latex, chemical analysis, determination of content, acrylonitriles.

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 3900 was drawn up by Technical Committee ISO/TC 45, *Rubber and rubber products*, and was circulated to the Member Bodies in June 1975.

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

Australia	Hungary	ISO 3900:1976
Belgium	India	http://standards.iteh.ai/catalog/standards/sist/7051-48b1-455a-aa63-702c72/iso-3900-1976
Brazil	Ireland	South Africa, Rep. of
Bulgaria	Italy	Sweden
Canada	Mexico	Thailand
Czechoslovakia	Netherlands	Turkey
France	Poland	U.S.A.
Germany	Romania	U.S.S.R.
		Yugoslavia

No Member Body expressed disapproval of the document.

Rubber – Nitrile latex – Determination of bound acrylonitrile content

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies a method for the determination of the bound acrylonitrile content of emulsion polymerized NBR latices having a bound acrylonitrile content, expressed on the polymer content, of between 18 and 45%. The method is also applicable to, for example, carboxylic-nitrile-butadiene rubber (XNBR) latices and nitrile-isoprene rubber (NIR) latices.

NOTE – The determination includes any water-insoluble nitrogen-containing additives present in the latex.

2 REFERENCES

ISO 123, *Rubber latex – Sampling.*

ISO 124, *Rubber latices – Determination of total solids content.*

ISO 1407, *Rubber – Determination of solvent extract.*

ISO 1656, *Raw natural rubber and natural rubber latex – Determination of nitrogen.*

3 PRINCIPLE

Extraction of an air-dried film of the latex with water to remove water-soluble nitrogen-containing material, and drying to constant mass. Digestion of a known mass of the dried extracted film with a mixture of sulphuric acid, potassium sulphate and a catalyst, to convert its nitrogen content into ammonium hydrogen sulphate, from which the ammonia is distilled after making the mixture alkaline. Absorption of the liberated ammonia in boric acid solution and titration with a standard volumetric acid solution. Calculation of the bound acrylonitrile content from the volumes of standard volumetric acid solution required in sample and blank titrations.

4 REAGENTS

The reagents specified in ISO 1656 for the semi-micro method shall be used, except that 0,1 N sulphuric acid shall be employed instead of 0,02 N sulphuric acid and that the 0,02 N sodium hydroxide is not required.

5 APPARATUS

5.1 **Mould**, preferably of glass, 1 mm deep and approximately 50 mm square.

5.2 **Extraction apparatus**, in accordance with ISO 1407.

5.3 **Apparatus** specified in ISO 1656 for the semi-micro method.

6 SAMPLING

Sampling shall be carried out in accordance with one of the methods specified in ISO 123.

7 PROCEDURE

If the total solids content of the latex is not known, determine it in accordance with ISO 124.

If the total solids content of the latex is greater than 41 %, dilute the latex with water to a total solids content of 40 ± 1 %.

Pour the latex into the level mould (5.1) and scrape off excess latex with a straightedge. Allow the latex to dry out in dust-free air at a temperature of approximately 23 °C.

Roll the dry film in filter paper so that no part of the film is anywhere in contact with any other part of the film and place the roll in the extraction cup of the extraction apparatus (5.2). Pour into the extraction flask sufficient water to fill the extraction cup two or three times. Assemble the extraction apparatus and reflux continuously for 4 h such that each extraction takes 15 to 30 min. Remove the extracted film and dry it to constant mass in accordance with ISO 124.

Weigh about 100 mg of the dried extracted film to the nearest 0,5 mg, and determine its nitrogen content in accordance with the procedure specified in ISO 1656 for the semi-micro method, including the specified blank test, using boric acid solution to absorb the distilled ammonia and 0,1 N sulphuric acid to titrate the distillate. Take the end-point of the titration as the colour change from bright green to grey.

8 EXPRESSION OF RESULTS

The bound acrylonitrile content is given, as a percentage by mass of the dried extracted film, by the formula

$$\frac{5,31 \times T \times (V_1 - V_2)}{m}$$

where

T is the normality of the sulphuric acid solution;

V_1 is the volume, in cubic centimetres*, of the sulphuric acid solution used in the titration of the test portion;

V_2 is the volume, in cubic centimetres, of the sulphuric acid solution used in the blank titration;

m is the mass, in grams, of dried extracted film used for the determination.

9 TEST REPORT

The test report shall include the following particulars :

- a) a reference to this International Standard;
- b) the results, and the form in which they are expressed;
- c) the date of testing;
- d) any operation not included in this International Standard or in the International Standards to which reference is made, or regarded as optional.

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* The term millilitre (ml) is commonly used for the cubic centimetre (cm³), particularly to denote the capacity of laboratory glassware. Apparatus with either type of marking is satisfactory to use with this International Standard.