SVENSK STANDARD
SS-ISO 24698-1:2008

Fastställd/Approved: 2008-05-29
Publicerad/Published: 2008-06-26
Utgåva/Edition: 1
Språk/Language: engelska/English
ICS: ISO 24698-1:2008

Gummi, ovulkat – Bestämning av halt bunden akrylnitril i akrylnitrilbutadien (NBR) – Del 1: Förbränningsmetod (Dumas) (ISO 24698-1:2008, IDT)

Rubber, raw – Determination of bound acrylonitrile content in acrylonitrile-butadiene (NBR) – Part 1: Combustion (Dumas) method (ISO 24698-1:2008, IDT)

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Den internationella standarden ISO 24698-1:2008 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av ISO 24698-1:2008.

The International Standard ISO 24698-1:2008 has the status of a Swedish Standard. This document contains the official English version of ISO 24698-1:2008.

Upplysningar om sakinnehållet i standarden lämnas av SIS, Swedish Standards Institute, telefon 08-555 520 00.
Standarder kan beställas hos SIS Förlag AB som även lämnar allmänna upplysningar om svensk och utländsk standard.

Information about the content of the standard is available from the Swedish Standards Institute (SIS), tel +46 8 555 520 00.
Standards may be ordered from SIS Förlag AB, who can also provide general information about Swedish and foreign standards.

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established 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. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 24698-1 was prepared by Technical Committee ISO/TC 45, *Rubber and rubber products*, Subcommittee SC 2, *Testing and analysis*.

ISO 24698 consists of the following parts, under the general title *Rubber, raw — Determination of bound acrylonitrile content in acrylonitrile-butadiene rubber (NBR)*:

— *Part 1: Combustion (Dumas) method*

— *Part 2: Kjeldahl method*

Rubber, raw — Determination of bound acrylonitrile content in acrylonitrile-butadiene rubber (NBR) —

Part 1:
Combustion (Dumas) method

WARNING — Persons using this part of ISO 24698 should be familiar with normal laboratory practice. This part of ISO 24698 does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user to establish appropriate safety and health practices and to ensure compliance with any national regulatory conditions.

CAUTION — Certain procedures specified in this part of ISO 24698 may involve the use or generation of substances, or the generation of waste, that could constitute a local environmental hazard. Reference should be made to appropriate documentation on safe handling and disposal after use.

1 Scope

This part of ISO 24698 specifies a method for the determination of the bound acrylonitrile content in NBR by an automatic analyser which uses a combustion process. The method is also applicable to NBR latex.

NOTE Parts 1 and 2 of this International Standard may not necessarily give the same result for any given rubber sample.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 123, *Rubber latex — Sampling*

ISO 1407:1992, *Rubber — Determination of solvent extract*

ISO 1795, *Rubber, raw natural and raw synthetic — Sampling and further preparative procedures*

3 Principle

The nitrogen in a sample of raw rubber is converted into oxides of nitrogen in an atmosphere of high-purity oxygen in the combustion unit of the analyser. The oxides of nitrogen are then converted into elemental nitrogen by a catalyst in the reduction unit. The carbon dioxide and water vapour produced are removed by absorption or another means of separation. Finally, the resultant gas is passed, with a carrier gas, into a thermal conductivity detector (TCD) to determine the nitrogen content.

4 Reagents and materials

4.1 Reference materials:

— L-aspartic acid, purity $\geqslant$ 99 %;

— L-glutamic acid, purity $\geqslant$ 99 %;

— EDTA, purity $\geqslant$ 99 %.

4.2 Oxygen gas, purity $\geqslant$ 99,99 % or in accordance with the analyser manufacturer's instructions.

4.3 Carrier gases:

— **helium gas**, purity $\geqslant$ 99,995 % or in accordance with the analyser manufacturer's instructions;

— **carbon dioxide gas**, purity $\geqslant$ 99,995 % or in accordance with the analyser manufacturer's instructions.

4.4 Ethanol, purity $\geqslant$ 95 % by volume.

4.5 Methanol, purity $\geqslant$ 99,8 % by volume.

5 Apparatus

5.1 Automatic analyser.

5.1.1 General

The automatic analyser consists of the following components:

a) a combustion unit, capable of maintaining a minimum operating temperature in accordance with the manufacturer's instructions for combustion of the sample in an atmosphere of high-purity oxygen;

b) a high-purity oxygen feeder, capable of feeding enough high-purity oxygen for complete combustion;

c) a reduction unit, capable of fully converting liberated nitrogenous compounds to nitrogen gas;

d) an absorber (or another type of separator) of by-products, capable of removing the water and carbon dioxide formed;

e) a TCD, capable of detecting the nitrogen gas formed;

f) a microprocessor, capable of calibrating the apparatus with a standard reference material and of converting the detector response into mass % of nitrogen in the sample.

5.1.2 Performance requirements

The accuracy of the system shall be demonstrated by performing ten successive determinations using a reference material such as L-aspartic acid, L-glutamic acid or EDTA. The mean of the ten determinations with the reference material shall be within $\pm$ 0,2 percentage points of the theoretical value. The relative standard deviation shall be within 0,5 % by mass of nitrogen for the reference material.

NOTE Relative standard deviation (%) $= \frac{s}{w_{\mathrm{N}}} \times 100$

where

s is the standard deviation;

w_{N} is the mean nitrogen content, in mass %.

5.2 Balance, weighing to the nearest 0,1 mg.

5.3 Extraction apparatus, as specified for method B in ISO 1407:1992.

5.4 Beaker, capacity 300 cm^3.