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**Rubber — Determination of residual  
unsaturation of hydrogenated nitrile rubber  
(HNBR) by infrared spectroscopy**

*Caoutchouc — Détermination de la non-saturation résiduelle du caoutchouc  
nitrile hydrogéné (HNBR) par spectroscopie à infrarouge*



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## Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

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 International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 14558 was prepared by Technical Committee ISO/TC 45, *Rubber and rubber products*, Subcommittee SC 2, *Testing and analyses*.

Annex A of this International Standard is for information only.

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# Rubber — Determination of residual unsaturation of hydrogenated nitrile rubber (HNBR) by infrared spectroscopy

**WARNING** — Persons using this International Standard should be familiar with normal laboratory practice. This standard 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.

## 1 Scope

This International Standard specifies a method for determining the residual unsaturation in hydrogenated nitrile rubber (HNBR) by measuring the infrared (IR) absorbance of HNBR films cast from solution.

This standard assumes that samples and IR spectra are prepared and analysed by experienced personnel and that equipment is operated in accordance with the manufacturer's instructions. Details for operating an IR spectrometer are not included in this method.

## 2 Normative reference

The following normative document contains provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, this publication do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent edition of the normative document indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 1795:—<sup>1)</sup>, *Rubber, raw natural and raw synthetic — Sampling and further preparative procedures.*

## 3 Principle

Raw, unvulcanized HNBR is purified by precipitation with methanol from a solution in methyl ethyl ketone (MEK) or by extraction of the solid HNBR with methanol in a Soxhlet apparatus.

The purified sample is dissolved in MEK and a film is cast on a potassium bromide (KBr) disc.

The IR spectrum of the film is obtained with a Fourier-transform (FT) or dispersive IR spectrometer.

The “corrected absorbance” of the specific absorbance bands for acrylonitrile (AN), butadiene (BD) and hydrogenated butadiene (HBD) are determined using the baseline method and the percentage of residual unsaturation (double bonds in unhydrogenated butadiene) is calculated with the aid of absorbance factors from the literature (see 8.5).

1) To be published. (Revision of ISO 1795:1992)