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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 21464-2025

Replacing GB/T 21464-2008

**Rubber - Determination of 5-ethylidenenorbornene (ENB) or
dicyclopentadiene (DCPD) in ethylene-propylene-diene (EPDM)
terpolymers**

(English Translation)

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Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part 1: Structure and Drafting Rules of Standardization Documents".

Drafting.

This document replaces GB/T 21464-2008 "5-Ethylene norbornene in ethylene-propylene-diolefin (EPDM) terpolymers".

"Determination of (ENB) or dicyclopentadiene (DCPD) content", compared with GB/T 21464-2008, except for structural adjustments and editorial changes.

In addition, the main technological changes are as follows.

a) The "Principle" has been modified, adding provisions for sample preparation using the coating method, and provisions for calibrating instruments using EPDM standards with known content (see...).

Chapter 4 (Chapter 2 of the 2008 edition);

b) A new chapter on "Reagents or Materials" has been added (see Chapter 5);

c) The regulations for "flat vulcanizing machines" have been amended (see 6.1, 3.1 of the 2008 edition);

d) The specifications for "sample holder" have been changed (see 6.4, 3.4 of the 2008 edition);

e) Added "sampling" (see 7.1);

f) A "coating method" for sample preparation has been added (see 7.2.2);

g) The positions of points A and B in Figure 1 were changed (see Figure 1).

This document is modified to adopt ISO 16565:2013 "5-Ethylenenorborneol in

ethylene-propylene-diolefin (EPDM) terpolymers".

Determination of olefins (ENB) or dicyclopentadiene (DCPD).

This document has undergone the following structural adjustments compared to ISO 16565:2013.

---Two new chapters have been added. "Normative References" and "Terms and Definitions".

The technical differences between this document and ISO 16565:2013, and the reasons therefor, are as follows.

---The "Range" has been changed (see Chapter 1), removing the use of Fourier transform infrared spectroscopy as a method for determining ENB and DCPD content.

The description should conform to the scope writing requirements;

---The "Principles" (see Chapter 4) have been revised, adding provisions for sample preparation using the coating method, and calibrating the instrument with EPDM standards of known content.

The specifications of the instruments are designed to improve the applicability of the method;

---A new chapter on "Reagents or Materials" (see Chapter 5) has been added to meet the needs of experiments;

---The specifications for "flat vulcanizing machine" (see 6.1) have been amended to meet the requirements of sample preparation;

---The specifications for the "sample holder" (see 6.4) have been changed to meet the requirements of the "coating method";

---Added "Sampling" (see 7.1) to meet users' sampling needs;

---The addition of the "coating method" (see 7.2.2) improves the applicability of the method.

The following editorial changes have been made to this document.

---Added a correction curve for BENB content in the appendix;

---Added "Precision in 2023" to Appendix C.

Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents.

This document was proposed by the China Petroleum and Chemical Industry Federation.

This document is under the jurisdiction of the National Technical Committee on Standardization of Rubber and Rubber Products (SAC/TC35).

1 Scope

This document describes 5-ethylidene norbornene (ENB) or dicyclopentadiene in ethylene-propylene-diene (EPDM) terpolymers.

Methods for determining the content of (DCPD).

This document applies to the determination of ethylene-propylene-diene (EPDM) terpolymers with a diene content in the range of 0.1% to 10%.

Note: The difference between the ENB and DCPD content determination methods lies in the different positions of the quantitative infrared peaks.

2 Normative references

The contents of the following documents, through normative references within the text, constitute essential provisions of this document. Dated citations are not included.

For references to documents, only the version corresponding to that date applies to this document; for undated references, the latest version (including all amendments) applies.

This document.

GB/T 15340 Sampling and Sample Preparation Methods for Natural and Synthetic Raw Rubber

3 Terms and Definitions

This document does not contain any terms or definitions that need to be defined.

4 Principles

The sample is prepared by pressing two sheets of polytetrafluoroethylene-coated aluminum foil or polyester film together to form a film, or by using a coating method. The determination is then performed...

The ENB content was determined by the infrared absorption of the exocyclic double bonds in the range of 1681 cm^{-1} to 1690 cm^{-1} . The content of ENB was obtained by measuring the single bond concentration of DCPD.

DCPD content was obtained by infrared absorption of cyclic double bonds in the range of 1605 cm^{-1} to 1610 cm^{-1} .

Calculate the peak height (or second derivative peak height) of the absorbance at this location and compare it with the internal standard. Calibrate using an EPDM standard with known concentration.

For ENB, the peak height (or second derivative peak height) at approximately 1690 cm^{-1} is

related to the ENB content. Similarly, for DCPD, approximately...

The peak height at 1610 cm⁻¹ (or the peak height of the second derivative) is related to the DCPD content.

For oil-extended polymers, the filler oil should be completely extracted before determining the diene content.

5 Reagents or materials

5.1

Toluene. analytical grade.

5.2

Annular gasket. outer diameter 22mm, inner diameter 16mm, thickness 400μm.

5.3

Aluminum foil with polytetrafluoroethylene coating. 36 μm thick, or siloxane polyester film.