



**International
Standard**

ISO 24862

**Plastics — Polyols for use in the
production of polyurethanes
— Determination of degree of
unsaturation for polyols by Raman
spectrometric method**

*Plastiques — Polyols destinés à la production de polyuréthanes
— Détermination du degré d'insaturation des polyols par
spectrométrie Raman*

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Sample Document

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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This document was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 12, *Thermosetting materials*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Conventionally, a titration method using mercuric acetate (see ISO 17710) has been used as a method for measuring degree of unsaturation of polyether polyols for polyurethanes. However, in recent years, the treatment of mercury waste liquid associated with analysis has become a global problem.

This document is intended to replace the mercuric acetate titration method with a more facile and environmentally friendly Raman spectrometric method.

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Plastics — Polyols for use in the production of polyurethanes — Determination of degree of unsaturation for polyols by Raman spectrometric method

1 Scope

This document specifies a method to measure the total unsaturation of polyether polyols used in the production of polyurethanes by a Raman spectrometric method. It is not applicable to unsaturated compounds that are conjugated with a carbonyl group, a carboxyl group, or a nitrile group.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 472, *Plastics — Vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 472 apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

4 Principle

The Raman shifts of the C=C bond stretching of allyl and *cis*-propenyl groups appear at 1 649 cm⁻¹ and 1 670 cm⁻¹, respectively.

The intensities of both peaks can be measured relative to the intensity of an internal standard peak. Compounds without peaks in the 1 600 to 1 700 cm⁻¹ region and with appropriate peaks in the immediate vicinity can be used as an internal standard. Because *m*-dichlorobenzene has aromatic ring C=C peak appearing at 1 580 cm⁻¹, it can be used as an internal standard.

The relative intensity of each unsaturated terminal group, allyl and *cis*-propenyl, are determined using model compounds.

On the basis of the above relative intensities, degree of unsaturation of the allyl and the *cis*-propenyl groups in polyether polyols are individually determined.

The total degree of unsaturation can be calculated by addition of both values.

5 Reagents and materials

5.1 Internal standard

m-Dichlorobenzene