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Plastics — Determination of xylene-soluble matter in polypropylene

Plastiques — Détermination des matières présentes dans le polypropylène solubles dans le xylène

Reference number
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Contents

Page

Foreword ..... **iv**
Introduction ..... **v**
1 Scope **1**
2 Normative references **1**
3 Terms and definitions **1**
4 Method 1 — Reference method **1**
4.1 Principle 1
4.2 Apparatus 1
4.3 Reagents and materials 2
4.4 Procedure 3
4.4.1 Preparation of the xylene 3
4.4.2 Determination of level of impurities in the xylene (solvent blank) 3
4.4.3 Determination of percentage xylene-soluble matter in the polypropylene 4
4.5 Calculations 6
4.6 Precision and bias 7
5 Method 2 — Automated instrumental method **7**
5.1 Principle 7
5.2 Apparatus 7
5.3 Reagents and materials 8
5.4 Procedure 9
5.4.1 Preparation of the solvent 9
5.4.2 Preparation of the sample 9
5.4.3 Calibration curve 9
5.4.4 Testing 9
5.5 Calculation 10
5.6 Precision and bias 11
6 Test report **11**
Annex A (informative) **Precision data for polypropylene obtained from an intercomparison of xylene-soluble content testing** **12**
Bibliography **13**

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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.

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 documents 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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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 9, *Thermoplastic materials*.

This second edition cancels and replaces the first edition (ISO 16152:2005), which has been technically revised.

The main changes are as follows:

— the introduction has been updated;

— the mandatory normative references clause has been added and subsequent clauses have been renumbered;

— the pipette with capacity of 200 ml has been deleted from the list of apparatus;

— the symbols S_s, S_m and S_c have been replaced with w_s, w_m and w_c, respectively (see 3.1 and 4.5);

— an automated instrumental method has been added (see Clause 5);

— a new informative Annex A (Precision data for polypropylene obtained from an intercomparison of xylene-soluble content testing) has been added.

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.

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Introduction

With the development of analytical and testing instruments, a new technique of measuring xylene-soluble matter in polypropylene by automatic instrument has been developed. Automation improves the precision, removing human-factor variability, and enhances safety for the laboratory and the operator.

The soluble content represents the fraction of amorphous material and it is important as it has a major influence on the properties of the polypropylene.

The method is used to quantify the soluble/amorphous fraction in polypropylene homopolymers as well as copolymers and can be used with other polyolefin materials, such as homopolymer polyethylene or polyethylene α-olefin copolymers.

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Plastics — Determination of xylene-soluble matter in polypropylene

1 Scope

This document specifies two methods of determining the mass fraction of a polypropylene homopolymer or copolymer which is amorphous, expressed as soluble in xylene at 25 °C.

— Method 1: Reference method;

— Method 2: Automated instrumental method.

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 and the following 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/

3.1
xylene-soluble fraction
w_s
percentage, by mass, of the polymer that does not precipitate out when a solution of the polymer in xylene is cooled from reflux temperature to 25 °C and held at that temperature for a specified period of time

4 Method 1 — Reference method

4.1 Principle

The polypropylene is dissolved in xylene under reflux conditions, then cooled under controlled conditions and maintained at 25 °C, to ensure the complete crystallization of the insoluble fraction. The xylene-soluble fraction is then recovered by evaporation of the xylene and determined by weighing the residue.

4.2 Apparatus

4.2.1 Reflux condenser, length 400 mm.

4.2.2 Flat-bottomed flask, capacity 500 ml, with one or two necks, or conical flask or cylindrical bottle of similar capacity.

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