

Binders for paints —

Part 14: Gel permeation chromatography (GPC) with tetrahydrofuran (THF) as eluent

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National foreword

This British Standard reproduces ISO 13885-1:1998 and implements it as the UK national standard.

The UK participation in its preparation was entrusted to Technical Committee STI/3, Paints, media and related products, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this committee can be obtained on request to its secretary.

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the BSI Standards Catalogue under the section entitled “International Standards Correspondence Index”, or by using the “Find” facility of the BSI Standards Electronic Catalogue.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the ISO title page, pages ii to iv, pages 1 to 20 and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

This British Standard, having been prepared under the direction of the Sector Committee for Materials and Chemicals, was published under the authority of the Standards Committee and comes into effect on 15 March 1999

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INTERNATIONAL STANDARD

ISO
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Binders for paints and varnishes — Gel permeation chromatography (GPC) —

Part 1:

Tetrahydrofuran (THF) as eluent

*Liants pour peintures et vernis — Chromatographie par perméation
de gel (GPC) —*

Partie 1: Utilisation de tétrahydrofurane (THF) comme éluant



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Descriptors: Paints, varnishes, binders (materials), tests, physicochemical tests, mass measurement, chromatographic analysis.

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.

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.

International Standard ISO 13885-1 was prepared by Technical Committee ISO/TC 35, *Paints and varnishes*, Subcommittee SC 10, *Test methods for binders for paints and varnishes*.

ISO 13885 will consist of the following parts, under the general title *Binders for paints and varnishes — Gel permeation chromatography*.

- *Part 1: Tetrahydrofuran (TMF) as eluent;*
- *Part 2: N,N-dimethylacetamide (DMAC) as eluent;*
- *Part 3: Water as eluent.*

At the time of publication of this part of ISO 13885, parts 2 and 3 were still at the planning stage.

Annex A to Annex C of this part of ISO 13885 are for information only.

WARNING — This part of ISO 13885 may involve hazardous materials, operations and equipment. It does not purport to address all of the safety problems associated with its use. It is the responsibility of the user of this part of ISO 13885 to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use. A specific hazard statement appears in clause 6.

1 Scope

This part of ISO 13885 is one of a series of standards dealing with the sampling and testing of paints, varnishes and related products.

It describes conditions for the determination of the molecular-mass distribution, number-average molecular mass M_n and mass-average molecular mass M_w of polymers that are soluble in THF (tetrahydrofuran) by gel permeation chromatography (GPC)¹⁾.

It is possible that, in spite of the good repeatability obtained with this method, it cannot be used with certain polymer types because of specific interactions, such as adsorption within the sample/eluent/column system.

The method is not an absolute one and requires calibration with commercially available unbranched-polystyrene standards that have been characterized by absolute methods. The results for samples of polymers other than polystyrene are therefore only comparable within groups of samples of the same type.

The conditions specified in this part of ISO 13885 are not suitable for the GPC analysis of polymer samples with M_w values greater than 10^6 (see Annex A).

No correction methods, e.g. for the elimination of peak broadening, are included in this part of ISO 13885. If absolute molecular-mass values are required, an absolute method, e.g. membrane osmometry for M_n or light scattering for M_w , must be used.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 13885. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 13885 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 1513:1992, *Paints and varnishes — Examination and preparation of samples for testing*.

ISO 5725-1:1994, *Accuracy (trueness and precision) of measurement methods and results — Part 1: General principles and definitions*.

ISO 15528:—, *Paints and varnishes — Sampling*²⁾.

ASTM D 3536-91, *Test method for molecular weight averages and molecular weight distribution by liquid exclusion chromatography (gel permeation chromatography — GPC)*.

ASTM D 5296-92, *Test method for molecular weight averages and molecular weight distribution of polystyrene by high performance size-exclusion chromatography*.

3 Definition

For the purposes of this part of ISO 13885, the following definition applies.

3.1

gel permeation chromatography

a chromatographic method in which the completely dissolved molecules of a polymer sample are fractionated on a porous column material, separation taking place according to the size of the molecule (or more precisely the size of the polymer coil which forms in this elution solvent)

NOTE 1 Small molecules diffuse into the pores of the column material more frequently and are therefore retarded more than large molecules. Thus large molecules are eluted earlier, small molecules later. Under the test conditions given, the retention volume is solely a function of the size of the molecule.

NOTE 2 This is a special form of liquid chromatography.

¹⁾ Also known as size exclusion chromatography (SEC).

²⁾ To be published. (Revision of ISO 842:1984 and ISO 1512:1991)