BS EN ISO 2431:2019
Incorporating corrigendum October 2019

BSI Standards Publication

Paints and varnishes — Determination of flow time by use of flow cups

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National foreword

This British Standard is the UK implementation of EN ISO 2431:2019. It is identical to ISO 2431:2019. It supersedes BS EN ISO 2431:2011, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee STI/10, Test methods for paints.

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

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EUROPÄISCHE NORM

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Supersedes EN ISO 2431:2011

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Paints and varnishes - Determination of flow time by use of flow cups (ISO 2431:2019, Corrected version 2019-09)

Peintures et vernis - Détermination du temps d'écoulement au moyen de coupes d'écoulement (ISO 2431:2019, Version corrigée 2019-09)

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European foreword

This document (EN ISO 2431:2019) has been prepared by Technical Committee ISO/TC 35 "Paints and varnishes" in collaboration with Technical Committee CEN/TC 139 “Paints and varnishes” the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by January 2020, and conflicting national standards shall be withdrawn at the latest by January 2020.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN ISO 2431:2011.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Endorsement notice

The text of ISO 2431:2019, Corrected version 2019-09 has been approved by CEN as EN ISO 2431:2019 without any modification.

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Full document details: BS EN ISO 2431:2019

Contents

Page

Foreword ... **iv**
Introduction ... **v**
1 Scope ... **1**
2 Normative references ... **1**
3 Terms and definitions ... **1**
4 Temperature considerations ... **2**
5 Apparatus ... **2**
5.1 Flow cups ... 2
5.1.1 Dimensions ... 2
5.1.2 Material ... 2
5.1.3 Construction ... 2
5.1.4 Finish ... 3
5.1.5 Measurement range ... 4
5.1.6 Marking ... 5
5.1.7 Care and checking of flow cups ... 5
5.2 Supplementary apparatus ... 6
6 Sampling ... **6**
7 Procedure ... **6**
7.1 Preliminary check for Newtonian flow ... 6
7.2 Determination of flow time ... 6
7.2.1 Choice of flow cup ... 6
7.2.2 Temperature adjustment ... 6
7.2.3 Preparation of the flow cup ... 7
7.2.4 Filling the flow cup ... 7
7.2.5 Measurement of flow time ... 7
7.2.6 Repeat determinations ... 7
8 Marking of products tested ... **7**
9 Precision ... **8**
9.1 General ... 8
9.2 Repeatability limit, *r* ... 8
9.3 Reproducibility limit, *R* ... 8
10 Test report ... **9**
Annex A (normative) **Checking flow cups for wear and tear** ... **10**
Annex B (informative) **Conversion of flow times from one temperature to another** ... **12**
Bibliography ... **14**

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Full document details: BS EN ISO 2431:2019

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 35, *Paints and varnishes*, Subcommittee SC 9, *General test methods for paints and varnishes*.

This sixth edition cancels and replaces the fifth edition (ISO 2431:2011), which has been technically revised. The main changes compared to the previous edition are as follows:

— a general reference to ISO 4618 has been added in Clause 3;

— the information in Clause 4 on measuring at other temperatures and humidities specified in this document has been amended;

— Figure 1 has been corrected;

— information on conduction of measurements in a fume cupboard has been added to Clause 4.

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.

This corrected version of ISO 2431:2019 incorporates the following correction:

— In Table 1, the formula for calculating the kinematic viscosity, v, of flow cup No 5 was corrected to read: $v = 3{,}28 \times t - \frac{220}{t}$.

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Introduction

The first edition of this document, ISO 2431, published in 1972, specified only one flow cup with an orifice diameter of 4 mm. The second edition specified three flow cups with an orifice diameter of 3 mm, 4 mm and 6 mm. The third edition corrected errors in Figures 2 and 4 and the formulae for those figures. The fourth edition specified four flow cups with an orifice diameter of 3 mm, 4 mm, 5 mm and 6 mm. In the fifth edition the curves in Figures 2 to 5 have been placed in a single figure (Figure 2) and the formulae for the conversion of flow time to kinematic viscosity and vice versa represented by the curves in these figures have been moved from the figures to a table (Table 1). The procedure for checking the flow cups for wear and tear has been revised to include two alternative methods (one using a certified reference material or secondary working standard, the other using a certified flow cup) and has been moved to an informative annex. The main changes made in this sixth edition are given in the foreword.

As is well known, many countries over the years have developed their own standard flow cups and the difficulty in correlation between them has led to considerable confusion in comparing values. The standardization of an improved design of flow cup has been recommended after careful consideration of the role of flow cups for the measurement of the flow time of paints, varnishes and related products.

Flow times are a measure for sample viscosity only for products with Newtonian or near-Newtonian flow properties. This effectively limits the practical use of flow cups. Nevertheless, for checking purposes, these flow cups do serve a useful purpose. Furthermore, the measurement of flow time is often used to confirm the application consistency.

Paints often contain thickening agents to ensure increased viscosity. Such paints exhibit non-Newtonian flow properties. Their viscosity during application can only be properly assessed using viscometers such as that described in ISO 3219.

Resins and varnishes can exhibit Newtonian or near-Newtonian flow at much higher viscosities than most paints and, where this applies, flow cups can provide a useful means of controlling the consistency. As a result, this document provides flow cups suitable for viscosities up to about 700 mm^2/s.

With thixotropic materials, stirring or other such mechanical stress immediately before testing will reduce the flow time compared with that for an unstirred sample. With such materials, uncertain and variable flow time values are obtained with all the flow cups. The repeatability and reproducibility limits given in Clause 9 cannot be achieved in the determination of the flow time of such materials.

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