International Standard

ISO 19396-1

Paints and varnishes — Determination of pH value —

Part 1: pH sensors with glass membrane

Peintures et vernis — Détermination de la valeur de pH —

Partie 1: Sondes de pH à membrane en verre

Second edition
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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

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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 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 35, *Paints and varnishes*, Subcommittee SC 9, *General test methods for paints and varnishes*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 139, *Paints and varnishes,* in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 19396-1:2017), which has been technically revised.

The main changes are as follows:

— definitions for “theoretical slope”, “stability of measured value”, “potentiometric measurement chain” and “reference element” have been deleted;

— the term “pH electrode” has been changed to “pH sensor” in the entire text including the title of the document;

— the calibration (7.2) has been clarified;

— the normative references have been updated.

A list of all parts in the ISO 19396 series can be found on the ISO website.

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

The pH value of aqueous products is of decisive importance for the product properties and durability.

This document covers a method for laboratory measurement of the pH value of polymer dispersions and coating materials using pH sensors with a glass membrane. ISO 19396-2 specifies a method for measuring the pH value using pH sensors with ion-sensitive field-effect transistor (ISFET) technology.

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Paints and varnishes — Determination of pH value —

Part 1:
pH sensors with glass membrane

1 Scope

This document specifies a method for laboratory measurement of the pH value of polymer dispersions and coating materials using pH sensors with a glass membrane.

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 1513, *Paints and varnishes — Examination and preparation of test samples*

ISO 4618, *Paints and varnishes — Vocabulary*

ISO 15528, *Paints, varnishes and raw materials for paints and varnishes — Sampling*

ISO 80000-9, *Quantities and units — Part 9: Physical chemistry and molecular physics*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 4618, ISO 80000-9 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
pH
measure for the acidic or basic reaction of an aqueous solution or polymer dispersion

Note 1 to entry: For the notation of pH, the p and the H are vertically on one line. The same is valid for pOH.

Note 2 to entry: The acidic reaction is determined by the activity of the existing “hydrogen ions”. The basic reaction is determined by the activity of the existing hydroxide ions. The direct relationship between the activities of the “hydrogen ions” and the hydroxide ions is described by the ionic product of the water.

3.2
pH value
decadal logarithm of the hydrogen ion activity multiplied with (–1)

$$\mathrm{pH} = \mathrm{p}a_{\mathrm{H}^+} = -\lg\left(\frac{a_{\mathrm{H}^+}}{m^0}\right) = -\lg\left(\frac{m_{\mathrm{H}^+}\cdot\gamma_{\mathrm{H}^+}}{m^0}\right)$$

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