SLOVENSKI STANDARD
oSIST prEN ISO 19396-1:2019

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Barve in laki - Določevanje pH-vrednosti - 1. del: pH-elektrode s stekleno membrano (ISO 19396-1:2017)

Paints and varnishes - Determination of pH value - Part 1: pH electrodes with glass membrane (ISO 19396-1:2017)

Beschichtungsstoffe - Bestimmung des pH-Wertes - Teil 1: pH-Elektroden mit Glasmembran (ISO 19396-1:2017)

Peintures et vernis - Détermination de la valeur pH - Partie 1: Électrodes pH avec membrane de verre (ISO 19396-1:2017)

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87.040	Barve in laki	Paints and varnishes

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Paints and varnishes — Determination of pH value —

Part 1: pH electrodes with glass membrane

Peintures et vernis — Détermination de la valeur pH —

Partie 1: Électrodes pH avec membrane de verre

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Foreword

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For an explanation on 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 the following URL: 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*.

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

Introduction

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

Paints and varnishes — Determination of pH value —

Part 1:
pH electrodes 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 electrodes with a glass membrane. ISO 19396-2 specifies a method for measuring the pH value using pH electrodes with ion-sensitive field-effect transistor (ISFET) technology.

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 — Terms and definitions*

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

ISO 80000-9:2009, *Quantities and units — Part 9: Physical chemistry and molecular physics*

3 Terms and definitions

For the purpose of this document, the terms and definitions given in ISO 4618 and ISO 80000-9 and the following apply.

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

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

3.1
pH
measure for the acidic or basic reaction of an aqueous solution or polymer dispersion

Note 1 to entry: 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)

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

with $a_{H^+} = m_{H^+} \cdot \gamma_{m,H^+}$

where

a_{H^+} is the activity of the hydrogen ion, in mol/kg;

m^0 is the standard molality (1 mol/kg);

γ_{m,H^+} is the activity coefficient of the hydrogen ion;

m_{H^+} is the molality of the hydrogen ion, in mol/kg.

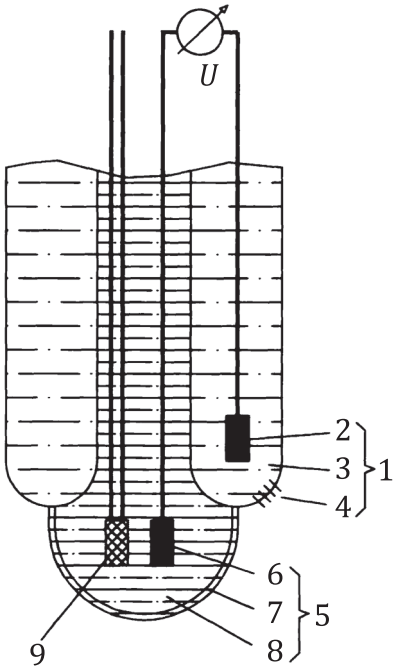
Note 1 to entry: The pH value is not measurable as a measure of a single ion activity. Therefore, pH (PS) values of solutions of primary reference material (PS, en: Primary Standard) are determined, which are approximate to it and can be attributed to it. This is based on a worldwide agreement; see ISO 80000-9:2009, Annex C.

3.3
potentiometric measuring chain
combination of electrochemical half cells

3.4
pH (combination) electrode
pH (single-rod) measuring chain
potentiometric measuring chain (3.3) providing a voltage which depends on the *pH value* (3.2) of the measuring solution

Note 1 to entry: One of the two electrochemical half cells is the pH measuring electrode, the second is a *reference electrode* (3.5) (see Figure 1). Both electrodes can be combined as a single-rod measuring chain in one unit.

Note 2 to entry: An integrated temperature sensor is recommended (see Figure 1).



Key

1	reference electrode, consisting of 2, 3 and 4	6	reference element
2	reference element	7	glass membrane
3	reference electrolyte	8	internal buffer
4	diaphragm	9	temperature sensor
5	pH measuring electrode, consisting of 6, 7 and 8	*U*	pH proportional voltage

Figure 1 — Design of a pH electrode with glass membrane and temperature sensor (schematic illustration)

Note 3 to entry: This document refers to pH electrodes with glass membrane. The electrode shaft should be made of material resistant to chemicals and solvents.

3.5
reference electrode
electrode providing a constant potential which is independent from the *pH value* (3.2) of the measuring medium

Note 1 to entry: At present, the most commonly used type is the silver/silver chloride reference electrode, whose potential is stabilized by a constant concentration of potassium chloride (KCl) in the *reference electrolyte* (3.7).

3.6
reference element
galvanic cell which dips into the *reference electrolyte* (3.7) and transmits the reference potential to the pH meter

Note 1 to entry: The reference elements of the pH measuring electrode and of the reference electrode should be aligned so that identical temperature characteristics are given.