SLOVENSKI STANDARD
SIST EN ISO 16773-2:2016

01-julij-2016

Nadomešča:

SIST EN ISO 16773-2:2007

Barve in laki - Elektrokemijska impedančna spektroskopija (EIS) premazanih in nepremazanih kovinskih vzorcev - 2. del: Zbiranje podatkov (ISO 16773-2:2016)

Paints and varnishes - Electrochemical impedance spectroscopy (EIS) on coated and uncoated metallic specimens - Part 2: Collection of data (ISO 16773-2:2016)

Elektrochemische Impedanzspektroskopie (EIS) an beschichteten und unbeschichteten Proben - Teil 2: Datenerfassung (ISO 16773-2:2016)

Spectroscopie d'impédance électrochimique (SIE) sur des éprouvettes métalliques revêtues et non revêtues - Partie 2: Recueil des données (ISO 16773-2:2016)

Ta slovenski standard je istoveten z: EN ISO 16773-2:2016

ICS:

87.040	Barve in laki	Paints and varnishes

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 16773-2

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ICS 87.040

Supersedes EN ISO 16773-2:2007

English Version

Electrochemical impedance spectroscopy (EIS) on coated and uncoated metallic specimens - Part 2: Collection of data (ISO 16773-2:2016)

Spectroscopie d'impédance électrochimique (SIE) sur des éprouvettes métalliques revêtues et non revêtues - Partie 2: Recueil des données (ISO 16773-2:2016)

Elektrochemische Impedanzspektroskopie (EIS) an beschichteten und unbeschichteten metallischen Proben - Teil 2: Datenerfassung (ISO 16773-2:2016)

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Contents

Page

European foreword

This document (EN ISO 16773-2:2016) 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of an identical text or by endorsement, at the latest by October 2016, and conflicting national standards shall be withdrawn at the latest by October 2016.

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

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Endorsement notice

The text of ISO 16773-2:2016 has been approved by CEN as EN ISO 16773-2:2016 without any modification.

INTERNATIONAL STANDARD

ISO 16773-2

Second edition
2016-04-01

Electrochemical impedance spectroscopy (EIS) on coated and uncoated metallic specimens —

Part 2: Collection of data

Spectroscopie d'impédance électrochimique (SIE) sur des éprouvettes métalliques revêtues et non revêtues —
Partie 2: Recueil des données

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Contents

Page

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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Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 35, *Paints and varnishes*, Subcommittee SC 9, *General test methods for paints and varnishes*.

This second edition cancels and replaces the first edition (ISO 16773-2:2007), which has been technically revised. The main changes are the following:

a) the introductory element of the title, *Paints and varnishes*, has been omitted, because the scope is broadened to include metals and alloys and the main element of the title has been changed to: *Electrochemical impedance spectroscopy (EIS) on coated and uncoated metallic specimens*;

b) a reference to ISO/TR 16208 has been added;

c) considerations about the precise determination of the exposed area have been added as an informative annex;

d) a test report has been added.

ISO 16773 consists of the following parts, under the general title *Electrochemical impedance spectroscopy (EIS) on coated and uncoated metallic specimens*:

— *Part 1: Terms and definitions*

— *Part 2: Collection of data*

— *Part 3: Processing and analysis of data from dummy cells*

— *Part 4: Examples of spectra of polymer-coated and uncoated specimens*

Electrochemical impedance spectroscopy (EIS) on coated and uncoated metallic specimens —

Part 2: Collection of data

1 Scope

This part of ISO 16773 gives guidelines for optimizing the collection of EIS data with focus on high-impedance systems. High impedance in the context of intact coatings refers to systems with an impedance greater than 10^9 Ω·cm^2. This does not preclude measurements on systems with lower impedance. For uncoated samples extra information can be found in ISO/TR 16208.

This part of ISO 16773 deals with the following:

— instrumental set-up: requirements and pit-falls;

— data validation: checking the measurement range and the accuracy of the data;

— performing an EIS measurement: specimen considerations and instrumental parameters;

— the experimental results: different methods of presenting EIS data.

These guidelines are intended to ensure the acquisition of EIS data that can be used to study the performance of the specimen. This part of ISO 16773 does not give guidelines for the interpretation of the data.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 16773-1, *Electrochemical impedance spectroscopy (EIS) on coated and uncoated metallic specimens — Part 1: Terms and definitions*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 16773-1 apply.

4 Principle

A so-called “confidence” test is described in order to check the suitability of the entire set-up and recommendations are given as to how to perform EIS experiments. For convenience, only potentiostatically controlled EIS measurements are described, although it is also possible to make EIS measurements under galvanostatic control.

A potentiostat is connected either to a dummy cell or to an electrochemical cell (with working, counter- and reference electrodes). A single-sinusoidal- or multi-sinusoidal-waveform potential, either in conjunction with a d.c. offset or not, is applied by the potentiostat to the dummy cell or to the electrochemical cell, and the resulting a.c. current is measured. Both potential and a.c. current data are collected and analysed for amplitude and phase shift. This can be done in a variety of ways, depending

on the type of equipment used. All data are presented and compared graphically or computed for equivalent circuits. In the case of the dummy cell, the values of these equivalent components are compared to the actual cell components connected to the potentiostat and evaluated for coherence.

5 Electrochemical cell

5.1 General

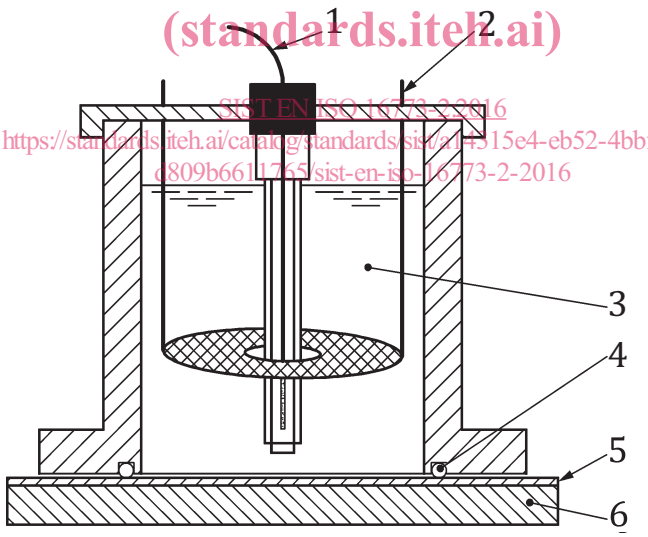
NOTE 1 Various types of measurement cell exist which are suitable for use with this part of ISO 16773. Most commonly used are two-electrode and three-electrode arrangements for measurements in an aqueous electrolyte.

The cell shall be constructed of materials that will not corrode, otherwise deteriorate or contaminate the solution (e.g. PMMA, PTFE or glass). A material compatibility test should be carried out.

The cell shall be leak-proof to ensure that the geometrical surface of the specimen does not change with time. Use an electrically insulating gasket material (O-ring, etc.) for the seal, i.e. with a through-thickness resistance much greater than that of the coating.

The cell should preferably be designed to allow the following items to be inserted into the electrolyte chamber: the working electrode, the reference electrode, the counter-electrode, a thermometer (for temperature control) and gas inlet/outlet tubes to modify the oxygen content of the electrolyte. When using an inert gas, a gas scrubber should be used.

An example of an electrochemical cell is shown in Figure 1.



Key

1 reference electrode
2 counter electrode
3 electrolyte
4 O-ring
5 coating
6 working electrode

Figure 1 — Example of an electrochemical cell

NOTE 2 Other designs can be suitable.

For uncoated metallic specimens, IR drop should be considered.