



**NSAI**  
Standards

Irish Standard  
I.S. EN ISO 13129:2012

Paints and varnishes - Electrochemical measurement of the protection provided to steel by paint coatings - Current interrupter (CI) technique, relaxation voltammetry (RV) technique and DC transient (DCT) measurements (ISO 13129:2012)

## I.S. EN ISO 13129:2012

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English Version

**Paints and varnishes - Electrochemical measurement of the protection provided to steel by paint coatings - Current interrupter (CI) technique, relaxation voltammetry (RV) technique and DC transient (DCT) measurements (ISO 13129:2012)**

Peintures et vernis - Mesurage électrochimique de la protection apportée à l'acier par des revêtements de peinture - Technique du courant interrompu (CI), voltamétrie de relaxation (VR) ou mesurages de courants continus transitoires (CCT) (ISO 13129:2012)

Beschichtungsstoffe - Elektrochemische Messung der Schutzwirkung von Beschichtungen auf Stahl - Stromunterbrechnungsverfahren (CI), Relaxationsvoltammetrie (RV) oder Gleichstromtransientenmessung (DCT) (ISO 13129:2012)

This European Standard was approved by CEN on 1 September 2012.

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## **Foreword**

This document (EN ISO 13129:2012) 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of an identical text or by endorsement, at the latest by June 2013, and conflicting national standards shall be withdrawn at the latest by June 2013.

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.

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

### **Endorsement notice**

The text of ISO 13129:2012 has been approved by CEN as a EN ISO 13129:2012 without any modification.

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STANDARD**

**ISO  
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**Paints and varnishes — Electrochemical measurement of the protection provided to steel by paint coatings — Current interrupter (CI) technique, relaxation voltammetry (RV) technique and DC transient (DCT) measurements**

*Peintures et vernis — Mesurage électrochimique de la protection apportée à l'acier par des revêtements de peinture — Technique du courant interrompu (CI), voltamétrie de relaxation (VR) et mesurages de courants continus transitoires (CCT)*



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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

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

ISO 13129 was prepared by Technical Committee ISO/TC 35, *Paints and varnishes*, Subcommittee SC 9, *General test methods for paints and varnishes*.

## **Introduction**

Quantitative assessment of protection performance of organic coatings has been required in industry, for example for evaluating the durability of organic coatings or judging the life of protective coatings. Electrochemical methods can be used for these purposes. The current interrupter (CI) technique, relaxation voltammetry (RV) and DC transient (DCT) measurements are simple techniques giving effective data which are comparable with electrochemical impedance spectroscopy (EIS) in principle.

An advantage is that the principle is simple and time for one measurement is short.



# Paints and varnishes — Electrochemical measurement of the protection provided to steel by paint coatings — Current interrupter (CI) technique, relaxation voltammetry (RV) technique and DC transient (DCT) measurements

## 1 Scope

This International Standard specifies the procedure for evaluation of the experimental set-up of electrochemical measurements on high-impedance coated samples using methods that are based on the current interrupter (CI) technique, relaxation voltammetry (RV) or DC transient (DCT) measurements.

It provides specific definitions and guidance on optimizing the collection of CI, RV and DCT data from high-impedance systems. High impedance in the context of intact coatings refers to systems with an impedance greater than  $10^9 \Omega/\text{cm}^2$ . This does not preclude measurements on systems with lower impedance. This International Standard deals in particular with:

- instrumental set-up: requirements and shortcomings;
- data validation: checking the measurement range and the accuracy of the data;
- performing CI, RV, DCT measurements: specimen considerations and instrumental parameters;
- the experimental results: different methods of presenting CI, RV and DCT data.

Following the recommendations should ensure the acquisition of CI, RV and DCT data that can be used to study the performance of the specimen. This International Standard does not give guidelines for the interpretation of the data.

## 2 Normative references

The following referenced documents are indispensable for the application 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 16773-1, *Paints and varnishes — Electrochemical impedance spectroscopy (EIS) on high-impedance coated 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 and the following apply.

### 3.1

#### excitation

application of a voltage,  $U_{\text{exc}}$ , or current,  $I_{\text{exc}}$ , to force the system into a new state

### 3.2

#### current interrupter method

##### CI method

electrochemical technique which allows the relaxation potential of an electrochemical system to be recorded as a function of time just after the excitation current is interrupted and the potential decay curve obtained to be analysed

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