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Method of measurement of hydrogen permeation and determination of hydrogen uptake and transport in metals by an electrochemical technique

Méthode de mesure de la perméation de l'hydrogène et détermination de l'absorption d'hydrogène et de son transport dans les métaux à l'aide d'une technique électrochimique

Reference number
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Contents

Page

Foreword ..... **iv**

1 Scope **1**

2 Normative references **1**

3 Terms and definitions **1**

4 Symbols **2**

5 Principle **3**

6 Samples **4**
6.1 Dimensions 4
6.2 Preparation 5

7 Apparatus **6**

8 Test environment considerations **8**

9 Test procedure **9**

10 Control and monitoring of test environment **11**

11 Analysis of results **11**
11.1 General 11
11.2 Analysis of steady-state current 11
11.3 Analysis of permeation transient 12

12 Test report **14**

Annex A (informative) **Recommended test environments for specific alloys** **16**

Bibliography **19**

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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.

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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 156, *Corrosion of metals and alloys*.

This second edition cancels and replaces the first edition (ISO 17081:2004), of which it constitutes a minor revision. Figure 1 has been corrected and Figure 2 made language independent.

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Method of measurement of hydrogen permeation and determination of hydrogen uptake and transport in metals by an electrochemical technique

1 Scope

1.1 This International Standard specifies a laboratory method for the measurement of hydrogen permeation and for the determination of hydrogen atom uptake and transport in metals, using an electrochemical technique. The term "metal" as used in this International Standard includes alloys.

1.2 This International Standard describes a method for evaluating hydrogen uptake in metals, based on measurement of steady-state hydrogen flux. It also describes a method for determining effective diffusivity of hydrogen atoms in a metal and for distinguishing reversible and irreversible trapping.

1.3 This International Standard gives requirements for the preparation of specimens, control and monitoring of the environmental variables, test procedures and analysis of results.

1.4 This International Standard may be applied, in principle, to all metals for which hydrogen permeation is measurable and the method can be used to rank the relative aggressivity of different environments in terms of the hydrogen uptake of the exposed metal.

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 17475, *Corrosion of metals and alloys — Electrochemical test methods — Guidelines for conducting potentiostatic and potentiodynamic polarization measurements*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
charging
method of introducing atomic hydrogen into the metal by exposure to an aqueous environment under galvanostatic control (constant charging current), potentiostatic control (constant electrode potential), free corrosion or by gaseous exposure

3.2
charging cell
compartment in which hydrogen atoms are generated on the sample surface, including both aqueous and gaseous charging

3.3
decay current
decay of the hydrogen atom oxidation current, after attainment of steady state, following a decrease in charging current

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