

# INTERNATIONAL STANDARD

**IEC**  
**60746-2**

Second edition  
2003-01

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## **Expression of performance of electrochemical analyzers –**

### **Part 2: pH value**

*Expression des qualités de fonctionnement  
des analyseurs électrochimiques –*

*Partie 2:  
Mesure du pH*



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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**EXPRESSION OF PERFORMANCE OF  
ELECTROCHEMICAL ANALYZERS –****Part 2: pH value**

## FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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International Standard IEC 60746-2 has been prepared by subcommittee 65D: Analysing equipment, of IEC technical committee 65: Industrial-process measurement and control.

This second edition cancels and replaces the first edition published in 1982 and constitutes a technical revision.

The text of this standard is based on the following documents:

FDIS	Report on voting
65D/90A/FDIS	65D/94/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

The contents of this second edition remain substantially unchanged.

The major change is that Annex B has been updated in line with recent IUPAC *Recommendations for the measurement of pH*.

This part of IEC 60746 shall be used in conjunction with IEC 60746-1, which includes further definition of the scope and provides for the general aspects of all electrochemical analyzers.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this publication will remain unchanged until 2007. At this date, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

The contents of the corrigendum of May 2003 and July 2003 have been included in this copy.

# EXPRESSION OF PERFORMANCE OF ELECTROCHEMICAL ANALYZERS –

## Part 2: pH value

### 1 Scope

This International Standard is intended:

- to specify terminology, definitions and requirements for statements by manufacturers for analyzers, sensor units and electronic units used for the determination of the pH of aqueous solutions;
- to establish performance tests for such analyzers, sensor units and electronic units;
- to provide basic documents to support the applications of quality assurance standards ISO 9001, ISO 9002 and ISO 9003.

### 2 Normative reference

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.

IEC 60746-1:2002, *Expression of performance of electrochemical analyzers – Part 1: General*

ISO 9001, *Quality management systems – Requirements*

ISO 9002, *Quality systems – Model for quality assurance in production, installation and servicing*

ISO 9003, *Quality systems – Model for quality assurance in final inspection and test*

### 3 Terms, definitions, symbols and abbreviations

#### 3.1 Terms and definitions

For the purposes of this part of IEC 60746, the definitions given in Clause 3 of IEC 60746-1, as well as the following apply.

##### 3.1.1

##### pH value

A measure of the conventional hydrogen ion activity  $a_{H^+}$  (see equation (1)), in an aqueous solution given by the expression:

$$pH = -\log a_{H^+}$$

It is measured with respect to pH values assigned to certain reference pH buffer solutions. The measurement is performed by determining the e.m.f.,  $E$ , between a pair of electrodes immersed in the sample to be measured, according to the cell scheme:

Reference electrode | Sample | pH electrode       $E$

and a measurement with the same electrode pair at the same temperature in a reference buffer solution of pH ( $S_1$ ) according to