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Gas analysis — Comparison methods for determining and checking the composition of calibration gas mixtures

Analyse des gaz — Méthodes comparatives pour la détermination et la vérification de la composition des mélanges de gaz pour étalonnage

Reference number
ISO 6143:2001(E)

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ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.ch
Web www.iso.ch

Printed in Switzerland

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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 3.

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 International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 6143 was prepared by Technical Committee ISO/TC 158, *Analysis of gases*, to cancel and replace the first edition (ISO 6143:1981), of which the methods for the design and evaluation of calibrations of analytical systems have been updated and a method for estimating the uncertainty of the composition of calibration gas mixtures has been added. It also cancels and replaces ISO 6711:1981, of which entirely new methods for checking the composition of calibration gases have been specified, thus replacing the method which is no longer in use.

Annex A forms a normative part of ISO 6143. Annexes B and C are for information only.

Introduction

In gas analysis, calibration of analytical systems, as specified in the first edition of ISO 6143, has largely been confined to the determination of a straight line through the origin, or of a straight-line segment, using only the minimum number of calibration standards (one for a straight line through the origin, two for a line segment). The approach adopted in the revision, relating to calibration as well as to uncertainty evaluation, goes far beyond this simple scheme by

— including non-linear response curves and/or functions,

— replacing interpolation by regression,

— taking into account the uncertainty on the calibration standards,

— including validation of calculated response curves and/or functions,

— calculating uncertainties by uncertainty propagation.

As a consequence of adopting non-linear response models, advanced regression techniques (errors in both variables) and uncertainty propagation, the main calculation procedures can only be performed on a computer, using a specific program. Such a program is available (see annex C). As an alternative, sufficient information is given in the document to enable the user to develop a program on his own.