



**NSAI**  
Standards

Irish Standard  
I.S. EN ISO 6142-1:2015

# Gas analysis - Preparation of calibration gas mixtures - Part 1: Gravimetric method for Class I mixtures (ISO 6142-1:2015)

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## I.S. EN ISO 6142-1:2015

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NSAI  
1 Swift Square,  
Northwood, Santry  
Dublin 9

T +353 1 807 3800  
F +353 1 807 3838  
E standards@nsai.ie  
W NSAI.ie

Sales:  
T +353 1 857 6730  
F +353 1 857 6729  
W standards.ie

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## National Foreword

I.S. EN ISO 6142-1:2015 is the adopted Irish version of the European Document EN ISO 6142-1:2015, Gas analysis - Preparation of calibration gas mixtures - Part 1: Gravimetric method for Class I mixtures (ISO 6142-1:2015)

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**EUROPEAN STANDARD**

**EN ISO 6142-1**

**NORME EUROPÉENNE**

**EUROPÄISCHE NORM**

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Supersedes EN ISO 6142:2006

English Version

**Gas analysis - Preparation of calibration gas mixtures -  
Part 1: Gravimetric method for Class I mixtures (ISO 6142-  
1:2015)**

Analyse des gaz - Préparation des mélanges de gaz  
pour étalonnage - Partie 1 : Méthode gravimétrique des  
mélanges Classe I (ISO 6142-1:2015)

Gasanalyse - Herstellung von Kalibriergasen - Teil 1:  
Wägeverfahren für Gemische der Klasse I (ISO 6142-  
1:2015)

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**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

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## **European foreword**

This document (EN ISO 6142-1:2015) has been prepared by Technical Committee ISO/TC 158 "Analysis of gases".

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of an identical text or by endorsement, at the latest by March 2016, and conflicting national standards shall be withdrawn at the latest by March 2016.

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This document supersedes EN ISO 6142:2006.

According to the CEN-CENELEC Internal Regulations, the national standards organizations 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 6142-1:2015 has been approved by CEN as EN ISO 6142-1:2015 without any modification.

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# INTERNATIONAL STANDARD

**ISO  
6142-1**

First edition  
2015-08-01

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## **Gas analysis — Preparation of calibration gas mixtures —**

### **Part 1: Gravimetric method for Class I mixtures**

*Analyse des gaz — Préparation des mélanges de gaz pour  
étalonnage —*

*Partie 1: Méthode gravimétrique pour les mélanges de Classe I*



Reference number  
ISO 6142-1:2015(E)

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**ISO 6142-1:2015(E)**



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ISO copyright office  
Ch. de Blandonnet 8 • CP 401  
CH-1214 Vernier, Geneva, Switzerland  
Tel. +41 22 749 01 11  
Fax +41 22 749 09 47  
copyright@iso.org  
www.iso.org

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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.

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](http://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 158, *Analysis of gases*.

This first edition of ISO 6142-1 cancels and replaces ISO 6142:2001, which has been technically revised to update the methods of preparation, estimation of the uncertainty, and validation of the composition of gravimetrically prepared calibration gases. It also incorporates the Amendment ISO 6142:2001/Amd.1:2009.

ISO 6142 consists of the following parts, under the general title *Gas analysis — Preparation of calibration gas mixtures*:

— *Part 1: Gravimetric method for Class I mixtures*

A future part dealing with gravimetric method for Class II mixtures.

**ISO 6142-1:2015(E)****Introduction**

The revision of ISO 6142 was initiated to provide better guidance to the users of this International Standard especially with respect to quality assurance measures and laboratory accreditation. In preparing the revision, it was decided to make accommodation for two types of calibration gas mixtures with different levels of quality assurance and with different levels of measurement uncertainty. The difference in the two classes can be summarized as follows:

Class I type calibration gas mixtures are prepared in accordance with this part of ISO 6142. The mixtures are individually verified. Provided rigorous and comprehensive quality assurance and quality control procedures are adopted during the preparation and verification of these mixtures, uncertainties may be achieved that are substantially smaller than by any other preparation method.

Class II type calibration gas mixtures are prepared in a similar manner to Class I calibration gas mixtures but these mixtures are not individually verified. Verification of Class II calibration gas mixtures can be based on random verification checks. These checks are monitored by means of statistical quality control to be described in a future part. For mixtures containing identical compounds and nominally identical amount-of-substance fractions, Class II type calibration gas mixtures will always have amount-of-substance fractions with larger uncertainties than their Class I counterparts.

# Gas analysis — Preparation of calibration gas mixtures —

## Part 1:

## Gravimetric method for Class I mixtures

### 1 Scope

This part of ISO 6142 specifies a gravimetric method for the preparation of calibration gas mixtures in cylinders with traceable values for the amount-of-substance fraction (amount fraction) of one or more components. This part of ISO 6142 describes a method for calculating the uncertainty associated with the amount fraction of each component. This uncertainty calculation requires the evaluation of the contributions to the uncertainty due to factors including the weighing process, the purity of the components, the stability of the mixture, and the verification of the final mixture.

This part of ISO 6142 is only applicable to mixtures of gaseous or totally vaporized components, which may be introduced into the cylinder in the gaseous or liquid state. Both binary and multi-component gas mixtures (including natural-gas type mixtures) are covered by this part of ISO 6142. Methods for the batch production of more than one mixture in a single process are not included in this part of ISO 6142.

This part of ISO 6142 requires estimation of the stability of the mixture for its intended life time (maximum storage life), but it is not for use with components that react with each other unintentionally. This part of ISO 6142 also requires the impurities in each parent gas or liquid used in the preparation of the mixture to be assessed and quantified.

### 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 6141, *Gas analysis — Contents of certificates for calibration gas mixtures*

ISO 6143, *Gas analysis — Comparison methods for determining and checking the composition of calibration gas mixtures*

ISO 7504, *Gas analysis — Vocabulary*

ISO 14912, *Gas analysis — Conversion of gas mixture composition data*

ISO 16664, *Gas analysis — Handling of calibration gases and gas mixtures — Guidelines*

ISO 19229, *Gas analysis — Purity analysis and the treatment of purity data*

ISO/TS 29041, *Gas mixtures — Gravimetric preparation — Mastering correlations in composition*

ISO/IEC Guide 98-3, *Uncertainty of measurement — Part 3: Guide to the expression of uncertainty in measurement (GUM:1995)*

IUPAC, Commission on atomic weights and isotopic abundances: Atomic weights of the elements

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 7504 and ISO/IEC Guide 98-3 apply.

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