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## Gas analysis — Conversion of gas mixture composition data

*Analyse des gaz — Conversion des données de composition de  
mélanges gazeux*



Reference number  
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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 14912 was prepared by Technical Committee ISO/TC 158, *Analysis of gases*.

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## Introduction

The objective of gas analysis is to determine the composition of gas mixtures. Gas mixture composition is expressed qualitatively in terms of specified mixture components of interest, called analytes, and the complementary gas. Gas mixture composition is expressed quantitatively by specifying the amount of every analyte in the mixture and the composition of the complementary gas.

For the purpose of specifying the amount of an analyte in a gas mixture, different quantities are in use. This diversity is due to the fact that in different applications different quantities have decisive advantages. Therefore procedures for conversion between different quantities are required.

In cases where these quantities involve the volumes of the analytes or the gas mixture or both, they depend on the state conditions, i.e. pressure and temperature, of the gas mixture. For each of these quantities, procedures for conversion between different state conditions are required.

As a crude approximation, all of the conversions referred to above can be performed on the basis of the Ideal Gas Law. In most cases, however, an accurate conversion has to take into account the real gas volumetric behaviour of the analyte and of the gas mixture. In particular, many conversions require values of the compression factor (or of the density) of the gas mixture.

This International Standard provides formally exact conversion procedures, based on fundamental principles, which fully account for real gas behaviour of pure gases and gas mixtures. In addition to these, approximate procedures for practical applications are described, designed for different levels of accuracy and available data. These approximations are necessary because measured gas mixture compression factors (or densities) are rarely available and therefore have to be estimated from component data. Uncertainty estimates are given which result from combining approximations in the conversion procedures with the uncertainties of the input data. Where conversions require real-gas volumetric data of pure gases or gas mixtures, these are expressed by compression factors. As equivalents, density data could be converted into compression factor data.