INTERNATIONAL STANDARD

ISO 4259

Third edition
2006-08-01

Petroleum products — Determination and application of precision data in relation to methods of test

Produits pétroliers — Détermination et application des valeurs de fidélité relatives aux méthodes d'essai

Reference number
ISO 4259:2006(E)

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Published 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 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 4259 was prepared by Technical Committee ISO/TC 28, *Petroleum products and lubricants*.

This third edition cancels and replaces the second edition (ISO 4259:1992), Clauses 1, 5, 7 C.7, E.2 and F.3 and subclauses 4.2, 5.2, 6.3.2, 6.3.3.1, 6.3.3.3, 6.4, 8.2, 10.2, 10.4 and 10.5, which have been technically revised. It also incorporates the Technical Corrigendum ISO 4259:1992/Cor.1:1993.

Introduction

For purposes of quality control and to check compliance with specifications, the properties of commercial petroleum products are assessed by standard laboratory test methods. Two or more measurements of the same property of a specific sample by any given test method do not usually give exactly the same result. It is, therefore, necessary to take proper account of this fact, by arriving at statistically-based estimates of the precision for a method, i.e. an objective measure of the degree of agreement expected between two or more results obtained in specified circumstances.

ISO 4259 makes reference to ISO 3534-2 [11], which gives a different definition of true value (see 3.26). ISO 4259 also refers to ISO 5725-2. The latter is required in particular and unusual circumstances (see 5.2) for the purpose of estimating precision.

Petroleum products — Determination and application of precision data in relation to methods of test

1 Scope

This International Standard covers the calculation of precision estimates and their application to specifications. In particular, it contains definitions of relevant statistical terms (Clause 3), the procedures to be adopted in the planning of an inter-laboratory test programme to determine the precision of a test method (Clause 4), the method of calculating the precision from the results of such a programme (Clauses 5 and 6), and the procedure to be followed in the interpretation of laboratory results in relation both to precision of the test methods and to the limits laid down in specifications (Clauses 7 to 10).

The procedures in this International Standard have been designed specifically for petroleum and petroleum-related products, which are normally homogeneous. However, the procedures described in this International Standard can also be applied to other types of homogeneous products. Careful investigations are necessary before applying this International Standard to products for which the assumption of homogeneity can be questioned.

2 Normative references

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.

ISO 5725-2:1994, *Accuracy (trueness and precision) of measurement methods and results — Part 2: Basic method for the determination of repeatability and reproducibility of a standard measurement method*

3 Terms and definitions

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

3.1
analysis of variance
technique that enables the total variance of a method to be broken down into its component factors

3.2
between-laboratory variance
element of the total variance attributable to the difference between the mean values of different laboratories

NOTE 1 When results obtained by more than one laboratory are compared, the scatter is usually wider than when the same number of tests are carried out by a single laboratory, and there is some variation between means obtained by different laboratories. These give rise to the between-laboratory variance which is that component of the overall variance due to the difference in the mean values obtained by different laboratories.

NOTE 2 There is a corresponding definition for between-operator variance.

NOTE 3 The term “between-laboratory” is often shortened to “laboratory” when used to qualify representative parameters of the dispersion of the population of results, for example as “laboratory variance”.