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Petroleum and related products — Precision of measurement methods and results —

Part 5: Statistical assessment of agreement between two different measurement methods that claim to measure the same property

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Produits pétroliers et connexes — Fidélité des méthodes de mesure et de leurs résultats —

Partie 5: Évaluation statistique de l'accord entre deux méthodes de mesure différentes qui prétendent mesurer la même propriété

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Foreword

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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 document 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).

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This document was prepared by Technical Committee ISO/TC 28, *Petroleum and related products, fuels and lubricants from natural or synthetic sources,* in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 19, *Gaseous and liquid fuels, lubricants and related products of petroleum, synthetic and biological origin,* in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

A list of all parts in the ISO 4259 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

This corrected version of ISO 4259-5:2023 incorporates the following corrections:

— Formula (43) has been corrected.

Introduction

This document explains the statistical methodology for assessing the expected agreement between two standardized test methods that purport to measure the same property of a material. Subsequently, it is investigated whether a linear bias correction can significantly improve the expected agreement. The degree of agreement is expressed as a between-methods reproducibility after a bias correction (if necessary) has been applied.

The method uses numerical results from a set of samples that have been analysed independently using both test methods by different laboratories. The variation associated with each test method result is used for assessing the required bias correction.

Annexes A and B give worked out examples showing how the methodology is applied.

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1 Scope

This document specifies statistical methodology for assessing the expected agreement between two test methods that purport to measure the same property of a material, and for deciding if a simple linear bias correction can further improve the expected agreement.

This document is applicable for analytical methods which measure quantitative properties of petroleum or petroleum products resulting from a multi-sample-multi-lab study (MSMLS). These types of studies include but are not limited to interlaboratory studies (ILS) meeting the requirements of ISO 4259-1 or equivalent, and proficiency testing programmes (PTP) meeting the requirements of ISO 4259-3 or equivalent.

The methodology specified in this document establishes the limiting value for the difference between two results where each result is obtained by a different operator using different apparatus and two methods X and Y, respectively, on identical material. One of the methods (X or Y) has been appropriately bias-corrected to agree with the other in accordance with this practice. This limit is designated as the between-methods reproducibility. This value is expected to be exceeded with a probability of 5 % under the correct and normal operation of both test methods due to random variation.

NOTE Further conditions for application of this methodology are given in 5.1 and 5.2.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 4259-1, *Petroleum and related products — Precision of measurement methods and results — Part 1: Determination of precision data in relation to methods of test*

ISO 4259-3, *Petroleum and related products — Precision of measurement methods and results — Part 3: Monitoring and verification of published precision data in relation to methods of test*

ISO 4259-4, *Petroleum and related products — Precision of measurement methods and results — Part 4: Use of statistical control charts to validate 'in-statistical-control' status for the execution of a standard test method in a single laboratory*

3 Terms and definitions

For the purposes of this document, the terms and definitions in ISO 4259-1 and the following terms and definitions apply.