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Petroleum and related products — Determination of chlorine and bromine content — Wavelength-dispersive X-ray fluorescence spectrometry

Produits pétroliers et produits connexes — Détermination de la teneur en chlore et en brome — Spectrométrie par fluorescence X dispersive en longueur d'onde

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Foreword

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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*.

This second edition cancels and replaces the first edition (ISO 15597:2001), which has been technically revised.

The main changes are as follows:

— in 5.5, permission added to allow use of other sources of bismuth;

— throughout the entire document, the notation used in X-ray lines has been changed from Siegbahn to IUPAC notation;

— Clause 3 (Terms and definitions) has been added;

— Bibliography has been added.

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.

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Petroleum and related products — Determination of chlorine and bromine content — Wavelength-dispersive X-ray fluorescence spectrometry

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1 Scope

This document specifies a method for the determination of the chlorine and bromine content of liquid petroleum products, synthetic oils and fluids, and additives for petroleum products (including used oils) that are soluble in organic solvents of negligible or accurately known chlorine/bromine content. The method is applicable to products or additives with chlorine content in the range of a mass fraction of 0,000 5 % to 0,100 0 %, and bromine contents in the range of a mass fraction of 0,001 0 % to 0,100 0 %.

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 3170, *Hydrocarbon Liquids — Manual sampling*

ISO 3171, *Petroleum liquids — Automatic pipeline sampling*

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

4 Principle

The test portion and a bismuth solution as internal standard are mixed in a given mass ratio and exposed, in a sample cell, to the primary radiation of an X-ray tube.

The count rates of the chlorine K-L2,3 at 0,472 9 nm and bismuth M4-N6 at 0,490 9 nm, or bromine K-L2,3 at 0,104 1 nm and bismuth L3–M4,5 at 0,114 4 nm fluorescence are excited, the count rate of the background radiation at 0,480 7 nm or 0,108 5 nm are measured, and the ratio of these net count rates is calculated. The chlorine or bromine content of the sample is determined from calibration curves prepared on the basis of either chlorine or bromine calibration standards, or both.

Other elements do not generally interfere, although lead can interfere at contents above a mass fraction of 0,150 0 % (see note in 9.2).

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