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INTERNATIONAL STANDARD

ISO 14597

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Petroleum products — Determination of vanadium and nickel content — Wavelength-dispersive X-ray fluorescence spectrometry

*Produits pétroliers — Dosage du vanadium et du nickel — Spectrométrie de
fluorescence X dispersive en longueur d'onde*



Reference number
ISO 14597:1997(E)

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.

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.

International Standard ISO 14597 was prepared by Technical Committee ISO/TC 28, *Petroleum products and lubricants*.

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International Organization for Standardization
Case postale 56 • CH-1211 Genève 20 • Switzerland
Internet central@isocs.iso.ch
X.400 c=ch; a=400net; p=iso; o=isocs; s=central

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Petroleum products — Determination of vanadium and nickel content — Wavelength-dispersive X-ray fluorescence spectrometry

WARNING — The use of this International Standard may involve hazardous materials, operations and equipment. This International Standard does not purport to address all of the safety problems associated with its use. It is the responsibility of the user of this International Standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

1 Scope

This International Standard specifies a method for the determination of vanadium and nickel in liquid petroleum products. It may also be applied to semi-solid and solid petroleum products that are either liquefied by moderate heating or completely soluble in the specified organic solvent mixture. The method is applicable to products having vanadium contents in the range 5 mg/kg to 1 000 mg/kg, and nickel contents in the range 5 mg/kg to 100 mg/kg, although precision data have only been determined up to 100 mg/kg for vanadium and 60 mg/kg for nickel; higher contents may be determined by appropriate dilution.

Barium at concentrations above approximately 300 mg/kg interferes with the determination of vanadium, and iron at concentrations above approximately 500 mg/kg interferes with the determination of nickel. Other elements at concentrations above approximately 500 mg/kg may affect precision and accuracy due to spectral line overlap or absorption.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 3170:1988, *Petroleum liquids — Manual sampling*.

ISO 3171:1988, *Petroleum liquids — Automatic pipeline sampling*.

3 Principle

The test portion and a manganese 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 excited metal and reference material are measured, and the ratio of these count rates calculated. The vanadium and nickel contents of the sample are determined from calibration curves prepared on the basis of calibration standards.