This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.

Designation: D8252 – 19ε1

# Standard Test Method for Vanadium and Nickel in Crude and Residual Oil by X-ray Spectrometry[1]

This standard is issued under the fixed designation D8252; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

ε1 NOTE—The title of Table 7 was corrected editorially in October 2019.

## 1. Scope

1.1 This test method covers the quantitative determination of total vanadium and nickel in crude and residual oil in the concentration ranges shown in Table 1 using X-ray fluorescence (XRF) spectrometry.

1.2 Sulfur is measured for analytical purposes only for the compensation of X-ray absorption matrix effects affecting the vanadium and nickel X-rays. For measurement of sulfur by standard test method use Test Methods D4294, D2622 or other suitable standard test method for sulfur in crude and residual oils.

1.3 This test method is limited to the use of X-ray fluorescence (XRF) spectrometers employing an X-ray tube for excitation in conjunction with wavelength dispersive detection system or energy dispersive high resolution semiconductor detector with the ability to separate signals of adjacent and near-adjacent elements.

1.4 This test method uses inter-element correction factors calculated from XRF theory, the fundamental parameters (FP) approach, or best fit regression.

1.5 Samples containing higher concentrations than shown in Table 1 must be diluted to bring the elemental concentration of the diluted material within the scope of this test method.

1.6 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.6.1 The preferred concentrations units are mg/kg for vanadium and nickel.

1.7 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.8 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

## 2. Referenced Documents

2.1 *ASTM Standards:*[2]

D2622 Test Method for Sulfur in Petroleum Products by Wavelength Dispersive X-ray Fluorescence Spectrometry

D4057 Practice for Manual Sampling of Petroleum and Petroleum Products

D4177 Practice for Automatic Sampling of Petroleum and Petroleum Products

D4294 Test Method for Sulfur in Petroleum and Petroleum Products by Energy Dispersive X-ray Fluorescence Spectrometry

D6259 Practice for Determination of a Pooled Limit of Quantitation for a Test Method

D6299 Practice for Applying Statistical Quality Assurance and Control Charting Techniques to Evaluate Analytical Measurement System Performance

D7343 Practice for Optimization, Sample Handling, Calibration, and Validation of X-ray Fluorescence Spectrometry Methods for Elemental Analysis of Petroleum Products and Lubricants

E1621 Guide for Elemental Analysis by Wavelength Dispersive X-Ray Fluorescence Spectrometry

## 3. Terminology

3.1 *Definitions:*

3.1.1 *alpha corrections, n*—influence correction factors that compensate for inter-element X-ray matrix effects; alpha corrections may be determined by best-fit regression, XRF Fundamental Parameters (FP), or XRF theory (called theoretical alphas).

[1] This test method is under the jurisdiction of ASTM Committee D02 on Petroleum Products, Liquid Fuels, and Lubricants and is the direct responsibility of Subcommittee D02.03 on Elemental Analysis.

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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

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