



Standard Test Method for Determination of Solvent Red 164 Dye Concentration in Diesel Fuels¹

This standard is issued under the fixed designation D6258; 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.

1. Scope

1.1 This test method covers the procedure for determining the concentration of dye Solvent Red 164 in commercially available diesel and burner fuels using visible spectroscopy.

NOTE 1—This test method is suitable for all No. 1 and No. 2 grades in Specifications [D396](#) and [D975](#) and for grades DMA and DMB in Specification [D2069](#).

1.2 The concentration ranges specified for the calibration standards are established in response to the Internal Revenue Service dyeing requirements which state that tax-exempt diesel fuel satisfies the dyeing requirement only if it contains the dye Solvent Red 164 (and no other dye) at a concentration spectrally equivalent to 3.9 lb of the solid dye standard Solvent Red 26 per thousand bbl (11.1 mg/L) of diesel fuel.

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

1.4 *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 and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:²

[D396](#) Specification for Fuel Oils

[D975](#) Specification for Diesel Fuel Oils

[D2069](#) Specification for Marine Fuels (Withdrawn 2003)³

[D3699](#) Specification for Kerosine

[D4057](#) Practice for Manual Sampling of Petroleum and Petroleum Products

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 [D02.05](#) on Properties of Fuels, Petroleum Coke and Carbon Material.

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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.

³ The last approved version of this historical standard is referenced on www.astm.org.

[E131](#) Terminology Relating to Molecular Spectroscopy

[E169](#) Practices for General Techniques of Ultraviolet-Visible Quantitative Analysis

[E275](#) Practice for Describing and Measuring Performance of Ultraviolet and Visible Spectrophotometers

[E288](#) Specification for Laboratory Glass Volumetric Flasks

[E691](#) Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

[E969](#) Specification for Glass Volumetric (Transfer) Pipets

2.2 *Federal Regulation:*

[26 CFR 48.4082-1\(b\)](#) Federal Excise Tax Regulation

3. Terminology

3.1 Definitions:

3.1.1 For definitions of terms used in this test method, refer to Terminology [E131](#).

4. Summary of Test Method

4.1 The absorbance of each sample is recorded over a specified wavelength range, and the scan is analyzed using derivative analysis software to determine the dye concentration.

4.2 Derivative analysis methodology is employed to minimize interferences caused by variations in the color and composition of the fuel samples regularly tested using this test method.

4.2.1 Naturally occurring diesel test fuels range in color from water white to nearly black, and many of the samples tested using this test method have also had used oils and other products blended with them. These variations in color and composition have a significant effect upon absorbance characteristics of the samples in the region of the visible spectrum where azo dyes absorb. Standard operating procedures to correct for these background variations would involve running a neat (undyed) sample and subtracting out the background absorbance. In most situations involved with the application of this test method, however, neat material is not available, so no background corrections can be made.

4.2.2 The second derivative of the absorbance of these dyes in the visible region is a function of the fine structure of the dye's absorbance peak (versus its height or area) and is relatively unaffected by changes in background absorbance.