



Designation: D1524 – 15 (Reapproved 2022)

Standard Test Method for Visual Examination of Used Electrical Insulating Liquids in the Field¹

This standard is issued under the fixed designation D1524; 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 for visual examination is applicable to electrical insulating liquids that have been used in transformers, oil circuit breakers, or other electrical apparatus as insulating or cooling media, or both.

1.2 *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.*

1.3 *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

D1500 Test Method for ASTM Color of Petroleum Products (ASTM Color Scale)

D2129 Test Method for Color of Clear Electrical Insulating Liquids (Platinum-Cobalt Scale)

3. Summary of Test Method

3.1 The condition of the test specimen is estimated by observation of cloudiness, foreign particles, or suspended matter in the sample by reflected light.

4. Significance and Use

4.1 By use of this test method and Test Methods **D1500** or **D2129** the color and condition of a test specimen of electrical

insulating liquid may be estimated during a field inspection, thus assisting in the decision as to whether or not the sample should be sent to a central laboratory for full evaluation. Cloudiness, particles of insulation, products of metal corrosion, or other undesirable suspended materials, as well as any unusual change in color may be detected.

5. Apparatus

5.1 *Sample Container*—The sample vessel from a color comparator, or a container in which light can be projected from the bottom into the sample.

5.2 *Light*—A light source such as a pen light with a No. 222 bulb.

5.3 *Cloth*—Photographer's focusing cloth.

6. Procedure

6.1 *Tyndall Beam Examination*—Project a narrow focused light beam from the pen light upward through the sample container, using the photographic focusing cloth to exclude extraneous light. Carefully examine the test specimen by means of this light. A test specimen of good insulating liquid will appear clean and bright. Hazeiness or cloudiness usually denotes moisture in suspension or sludge. If the dielectric strength is satisfactory, the cloudiness may be caused by oxidation products, in which case the neutralization number will probably be high and the interfacial tension low. Particles of metals, insulation, carbon, and other matter will show up very markedly by reflected light. Report the electrical insulating liquid as failing the test if the appearance of any condition other than clear and bright is observed.

7. Report

7.1 Report the following information:

7.1.1 Type of insulating liquid,

7.1.2 Pass or fail, and the description of any deviation from perfectly clear and bright,

7.1.3 Evidence of sediment or free water,

7.1.4 Approximate temperature of the liquid at the time the test specimen was taken, and

7.1.5 Approximate temperature of the liquid at time of observation, if other than at room temperature.

¹ This test method is under the jurisdiction of ASTM Committee D27 on Electrical Insulating Liquids and Gases and is the direct responsibility of Subcommittee D27.07 on Physical Tests.

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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.

8. Precision and Bias

8.1 It is not practical to specify the precision and bias of this test method because this is a rapid field examination to screen test specimens for further testing.

8.2 An interlaboratory investigation was conducted in 1968 to support this test method. The results of this investigation were first reported in January 1969.³

³ Supporting data have been filed at ASTM International Headquarters and may be obtained by requesting Research Report RR:D27-1008.

9. Keywords

9.1 Tyndell beam effect; visual examination

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