Designation: D2108 – 10 (Reapproved 2015)

Standard Test Method for Color of Halogenated Organic Solvents and Their Admixtures (Platinum-Cobalt Scale)[1]

This standard is issued under the fixed designation D2108; 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 visual measurement of the color of halogenated organic solvents and their admixtures. It is valid for values of 50 platinum-cobalt (Pt-Co) units or less.

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

1.3 *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. Significance and Use

2.1 Color may be indicative of the quality of the solvent because any color present is due to the presence of contaminants.

3. Apparatus

3.1 *Color Comparison Tubes*—Matched 50 or 100-mL, tall-form Nessler tubes, provided with ground-on, optically clear, glass caps.

3.2 *Color Comparator*—A color comparator constructed to permit visual comparison of light transmitted through tall-form, Nessler tubes in the direction of their longitudinal axes. The comparator should be constructed so that white light is passed through or reflected off a white glass plate and directed with equal intensity through the tubes and should be shielded so that no light enters the tubes from the side.

3.3 *Digital Color Instrument*—Digital color instruments are available that measure color digitally and convert the result to a numerical value using the Platinum-Cobalt scale. Many manufacturers market instruments of this type.

NOTE 1—There are numerous colorimeters and comparators commercially available that measure the color of liquids and take some of the subjectivity out of the measurement. These instruments may be calibrated with the platinum-cobalt color standards listed in Table 1 at 455 mm or with optically standardized color filter disks such as those available for the Hellige Aqua Tester. Many of these instruments take the measurement across a relatively narrow range of wave lengths, and their readings may be in error if the color of the sample is significantly different from the amber color of the color standards.

4. Reagents

4.1 *Purity of Reagents*—Reagent grade chemicals shall be used in all tests. Unless otherwise indicated, it is intended that all reagents shall conform to the specifications of the Committee on Analytical Reagents of the American Chemical Society, where such specifications are available.[2] Other grades may be used, provided it is first ascertained that the reagent is of sufficiently high purity to permit its use without lessening the accuracy of the determination.

4.2 *Purity of Water*—Unless otherwise indicated, references to water shall be understood to mean distilled water or water of equal purity.

4.3 *Cobaltous Chloride*—($CoCl_2 \cdot 6H_2O$).

4.4 *Hydrochloric Acid* (sp gr 1.19)—Concentrated hydrochloric acid (HCl).

4.5 *Potassium Chloroplatinate*—(K_2PtCl_6).

5. Preparation of Color Standards

5.1 *Platinum-Cobalt Stock Solution*—Dissolve 1.245 g of K_2PtCl_6 and 1.000 g of $CoCl_2 \cdot 6H_2O$ in water. Add 100 mL of HCl (sp gr 1.19) and dilute to 1 L with water. This solution has a color of 500.

NOTE 2—Stock solutions of Pt-Co 500 color may be purchased from reagent supply houses. The stock solution should be certified reagent or verified by the user as being correct.

5.2 *Platinum-Cobalt Standards*—For 100-mL Nessler tubes, prepare color standards as given in Table 1. Dilute the required

[1] This test method is under the jurisdiction of ASTM Committee D26 on Halogenated Organic Solvents and Fire Extinguishing Agents and is the direct responsibility of Subcommittee D26.04 on Test Methods.

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[2] *Reagent Chemicals, American Chemical Society Specifications*, American Chemical Society, Washington, DC. For suggestions on the testing of reagents not listed by the American Chemical Society, see *Analar Standards for Laboratory Chemicals*, BDH Ltd., Poole, Dorset, U.K., and the *United States Pharmacopeia and National Formulary*, U.S. Pharmacopeial Convention, Inc. (USPC), Rockville, MD.

TABLE 1 Platinum-Cobalt Color Standards

Color Standard Number	Stock Solution, mL	Color Standard Number	Stock Solution, mL
5	1	35	7
10	2	40	8
15	3	50	10
20	4	60	12
25	5	70	14
30	6	100	20
		500	100

volumes of the stock solution with water to 100 mL in the Nessler tubes. Cap the tubes and seal the caps with shellac or a waterproof cement.

5.3 For 50-mL Nessler tubes, prepare color standards by using half the volume of stock solution given in Table 1. The stock solution shall then be diluted with water to 50 mL in the Nessler tubes. Cap the tubes and seal the caps with shellac or a waterproof cement.

6. Procedure

6.1 Introduce required sample volume into the Nessler tube, passing the sample through a filter if it has any visible turbidity. Cap the tube, place in the comparator, and compare with the standards.

7. Report

7.1 Report the following information:

7.1.1 Report as the color, the number of the standard that most nearly matches the sample. In the event that the color lies midway between the two standards, report the darker of the two.

7.1.2 If, owing to differences in hue between the sample and the standards, a definite match cannot be obtained, report the range over which an apparent match is obtained, and report the sample as "off-hue."

8. Precision and Bias[3]

8.1 *Precision*—The intralaboratory precision (one standard deviation) of this test method is less than 2 Pt-Co units. The interlaboratory precision is about 5 Pt-Co units (30 to 40 % relative standard deviation). The precision was determined by 100-mL Nessler tubes.

8.2 *Bias*—The bias of this test method was not determined as a result of the lack of known standards of color in solvent.

9. Keywords

9.1 color; halogenated organic solvent; platinum-cobalt scale; Pt-Co color; Pt-Co scale

[3] Supporting data have been filed at ASTM International Headquarters and may be obtained by requesting Research Report RR:D26-1013.