Designation: D 3627 – 96 (Reapproved 2000)

Standard Test Method for Color of Cresylic Acids ("C" Series Standards)[1]

This standard is issued under the fixed designation D 3627; 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 determination of the color of cresylic acids. The material under test is compared to arbitrary color standards that are expressed in terms of the "C" series color standards.[2]

1.2 The following applies to all specified limits in this test method for purposes of determining conformance with this standard. An observed value or a calculated value shall be rounded off "to the nearest unit" in the last right hand digit used in expressing limit, in accordance with the rounding off method of Practice E 29.

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.* For specific hazard statements, see Section 6.

2. Referenced Documents

2.1 *ASTM Standards:*

D 1193 Specification for Reagent Water[3]

D 3852 Practice for Sampling and Handling Phenol and Cresylic Acid[4]

E 29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications[5]

2.2 *Other Document:*

OSHA Regulations, 29 CFR, paragraphs 1910.1000 and 1910.1200[6]

3. Significance and Use

3.1 Color is an important characteristic in certain tar acid use applications. This test method may be used for quality control and specification purposes by producers and users.

4. Apparatus

4.1 *Bottles for Color Standards and for Testing*, clear and unblemished, clean, French square, flint glass, flat-bottom, glass-stoppered, 30-mL (1-oz) capacity bottles holding 31 to 33 mL when filled to the neck.

5. Reagents

5.1 *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.[7] 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.

5.2 *Purity of Water*—Unless otherwise indicated, references to water shall be understood to mean reagent water conforming to Specification D 1193, Type IV minimum.

5.3 *Ferric Chloride* ($FeCl_3 \cdot 6H_2O$).

5.4 *Cobalt Chloride* ($CoCl_2 \cdot 6H_2O$).

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

6. Hazards

6.1 Consult current OSHA regulations, supplier's Material Safety Data Sheets, and local regulations for all materials utilized in this test method.

7. Cleaning of Bottles

7.1 All glassware should be thoroughly cleaned, rinsed with distilled water, and dried.

8. Preparation of Reference Color Standards

8.1 Use the following basic stock solutions for preparing the reference color standards:

8.1.1 *Solution A*—Add 75 mL of concentrated HCl to distilled water in a 3000-mL volumetric flask, dilute to the mark with water and mix thoroughly.

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[1] This test method is under the jurisdiction of ASTM Committee D16 on Aromatic Hydrocarbons and Related Chemicals and is the direct responsibility of Subcommittee D16.02 on Oxygenated Aromatics.

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[2] These color standards have traditionally been known as the Barrett Color-"C" Series (Barrett Division of Allied Chemical Corp.) and have been in general use since at least 1957.

[3] *Annual Book of ASTM Standards*, Vol 11.01.

[4] *Annual Book of ASTM Standards*, Vol 06.04.

[5] *Annual Book of ASTM Standards*, Vol 14.02.

[6] Available from Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

[7] *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.

8.1.2 *Solution B*—Dissolve 1000 g of $FeCl_3 \cdot 6H_2O$ in exactly 600 mL of Solution A. Filter the resulting solution if any turbidity persists.

8.1.3 *Solution C*—Dissolve 100 g of $CoCl_2 \cdot 6H_2O$ in exactly 100 mL of Solution A. Filter the resulting solution if any turbidity persists.

8.2 Prepare the reference color standard solutions as shown in Table 1 using a 100-mL buret to dispense volumes up to 250 mL and using a 250-mL pipet for the remaining volumes. Mix each solution thoroughly and immediately transfer to separate color-standard bottles and stopper tightly. Identify each bottle with its appropriate designation.

8.3 Keep these standards tightly stoppered at all times to prevent evaporation. Coat the entire top of each bottle with sealing wax. Prepare a fresh set of standards at least once a year.

9. Sampling

9.1 Sample the material in accordance with Practice D 3852.

10. Procedure

10.1 If the sample is solid, melt the entire sample using an appropriate container suspended in a water bath maintained at a suitable temperature.

10.2 Carefully fill a clean test bottle with sample and compare its color intensity to the color reference standards by holding the bottles against a white background using transmitted light.

11. Report

11.1 Report the color of the sample as the "C" color to which it most nearly corresponds in color intensity.

12. Precision and Bias

12.1 *Precision*:

12.1.1 *Intermediate Precision (formerly called Repeatability)*—Data were obtained from one laboratory using mixed cresol samples. Two readings were taken by each of seven different operators for each sample on the same day. Based on these data, results in the same laboratory should not be considered suspect unless they differ by the following amounts:

C-Scale Color	Intermediate Precision
⅛	⅛
½	¼
2½	½
5	1½

12.1.2 *Reproducibility*—Reproducibility has not been determined.

12.2 *Bias*—Since there is no accepted reference material suitable for determining the bias for the procedure in this test method, bias has not been determined.

13. Keywords

13.1 color; cresylic acids; phenol

TABLE 1 Reference Color Standard Solutions

Standard Number	Solution A, mL	Solution B, mL	Solution C, mL	Distilled Water, mL	Standard "C" Series/mL
C-⅛	18	...	...	...	6 of C-½
C-¼	12	...	...	...	12 of C-½
C-⅜	6	...	...	...	18 of C-½
C-½	250	1.0	1.0	...	...
C-¾	...	...	...	...	12 of C-½ + 12 of C-1
C-1	250	2.0	1.5	...	...
C-1¼	...	...	...	...	12 of C-1 + 12 of C-1½
C-1½	250	2.8	1.9	...	...
C-2	250	4.0	2.5	...	...
C-2½	250	5.6	3.2	...	...
C-3	250	8.0	4.0	...	...
C-3½	30	12.0	4.0	220	...
C-4	30	16.0	4.0	220	...
C-5	30	20.0	5.5	170	...
C-6	20	40.0	10.0	180	...
C-7	...	80.0	15.0	200	...
C-8	...	130.0	10.0	100	...
C-9	...	250.0	20.0	55	...
C-10	...	250.0	20.0	...	...