

## ORGANIC IMPURITIES IN CONCRETE SANDS

LS-610 R33/ASTM C40/C40M - 19

### LS 1. SCOPE

1.1 This method covers an approximate determination of the presence of possible injurious organic compounds in natural sands, which are to be used in cement mortar or concrete. The principal value of the test is to furnish a warning that further tests of the sands are necessary before they are approved for use.

### ASTM 4. Significance and Use

4.1 This test method is used in making a preliminary determination of the acceptability of fine aggregates with respect to the requirements of Specification **C33/C33M** that relate to organic impurities.

4.2 The principal value of this test method is to furnish a warning that injurious amounts of organic impurities may be present. When a sample subjected to this test produces a color darker than the standard color it is advisable to perform the test for the effect of organic impurities on the strength of mortar in accordance with Test Method **C87/C87M**.

### LS 3. PROCEDURE

3.1 Procedures of ASTM C40 shall be followed, except as noted in section LS 4. REPORT for the approximate determination of the presence of possible injurious organic compounds in natural sands which are to be used in cement mortar or concrete.....

### ASTM 5. Apparatus

5.1 *Bottles*—Colorless glass or plastic graduated bottles, approximately 240 to 470-mL [8 to 16-oz] nominal capacity, equipped with watertight stoppers or caps, not soluble in the specified reagents.....  
In no case shall the maximum outside thickness of the bottles, measured along the line of sight used for the color comparison, be greater than 63.5 mm [2.5 in.] or less than 38.1 mm [1.5 in.] .....  
Replace bottles when no longer colorless due to use.....

5.2 *Standard Color Solution Level*—75 mL [2.5 oz (U.S. fluid)] .....

5.3 *Fine Aggregate Level*—130 mL [4.5 oz (U.S. fluid)] .....

5.4 *NaOH Solution Level*—200 mL [7 oz (U.S. fluid)] .....

#### 5.5 Glass Color Standard

5.5.1 Glass standard colors shall be used as described in Table 1 of Test Method **D1544**.....

NOTE 1—A suitable instrument consists of five glass color standards mounted in a plastic holder. Only the glass identified as Gardner Color Standard No. 11 is to be used as the Glass Color Standard in **10.2**.

### 6. Reagent and Standard Color Solution

6.1 *Reagent Sodium Hydroxide Solution (3 %)*—Dissolve 3 parts by mass of reagent grade sodium hydroxide (NaOH) in 97 parts of water.....

6.2 *Standard Color Solution*—Dissolve reagent grade potassium dichromate ( $K_2Cr_2O_7$ ) in concentrated sulfuric acid (sp gr 1.84) at the rate of 0.250 g/100 mL of acid.....

The solution must be freshly made for the color comparison using gentle heat if necessary to effect solution.....

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### 7. Sampling

7.1 The sample shall be selected in general accordance with Practice **D75/D75M**.....

### 8. Test Sample

8.1 The test sample shall have a mass of about approximately 450 g [1 lb] and be taken from the larger sample in accordance with Practice **C702/C702M**.....

### 9. Procedure

9.1 Fill a glass bottle to the approximately 130-mL [4.5-fluid oz] level with the sample of the fine aggregate (see Terminology **C125**) to be tested.....

9.2 Add the sodium hydroxide solution until the volume of the fine aggregate and liquid, indicated after shaking, is approximately 200 mL [7 fluid oz] .....

9.3 Stopper the bottle, shake vigorously, and then allow to stand for 24 h.....

### 10. Determination of Color Value

10.1 *Standard Color Solution Procedure*—At the end of the 24-h standing period, fill a glass bottle to the approximately 75-mL [2.5-fluid oz] level with the fresh standard color solution, prepared not longer than 2 h previously, as prescribed in **6.2**.....

Hold the bottle with the test sample and the bottle with the standard color solution side-by-side, and compare the color of light transmitted through the supernatant liquid above the sample with the color of light transmitted through the standard color solution.....

Record whether the color of the supernatant liquid is lighter, darker, or equal to the color of the standard color solution.....

10.2 *Glass Color Standard Procedure*—To define more precisely the color of the supernatant liquid of the test sample, five glass standard colors shall be used using the following colors:

	Gardner Color Standard Number	Circular Disk Number (3)	Organic Plate Number (4)
Test Method C40 Standard Color Solution (1)	5	5	-
	8	8	1
	11	11	2
	14	14	3
	16	16	4
	18	-	5

1. See Test Method C40 Section 6.2 for Standard Color Solution. The equivalent numbers to the Standard Color Solution are shown for the various standard color options. Numbers above the Standard Color Solution (Gardner 14) represent lighter colors and numbers below the Standard Color Solution represent darker colors.

2. See Test Method ASTM D1544-04(2018) For Gardner Colors

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3. Manufactured by Lovibond

4. Manufactured by Hellige or Orbeco Tester

The comparison procedure described in 10.1 shall be used, except that the organic plate number which is nearest the color of the supernatant liquid above the test specimen shall be reported. When using this procedure, it is not necessary to prepare the standard color solution.

### 11. Interpretation

11.1 When a sample subjected to this procedure produces a color darker than the standard color, Circular Disk No. 14 or Organic Plate No. 3 (Gardner Color Standard No. 14), the fine aggregate under test shall be considered to possibly contain injurious organic impurities.....

It is advisable to perform further tests before approving the fine aggregate for use in concrete.....

### LS 4. REPORT

The report shall include the following:

4.1 The colour value of the test sample (see Figure 1 of the LS) .....

### COMMENTS