
Test Procedure for**UNIFORMITY OF CONCRETE****TxDOT Designation: Tex-472-A****Effective Dates: February 2005–June 2008**

1. SCOPE

- 1.1 Use this method to evaluate the uniformity of a batch of concrete. Six concrete properties are determined from each of two samples, compared to each other, and the property differences are determined. Except for editorial differences, this procedure is identical to the Annex of ASTM C 94.
- 1.2 The values given in parentheses (if provided) are not standard and may not be exact mathematical conversions. Use each system of units separately. Combining values from the two systems may result in nonconformance with the standard.

2. SAMPLING

- 2.1 Sample the fresh concrete in accordance with Tex-407-A. A sample should be approximately 2.0 ft³ or 300 lbs. (0.06 m³ or 150 kg).

3. APPARATUS

- 3.1 *Standard U.S. sieve, 4.75 mm (No. 4), meeting the requirements of Tex-907-K.*

4. PROCEDURE

- 4.1 Batch and mix concrete per the Department's *Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges*, Item 421.
- 4.2 Take the first sample of concrete at approximately 15% of the total batch discharge. Take the second sample of concrete at approximately 85% of the total batch discharge.
Note 1—Obtain the samples within a mandatory elapsed time of 15 min.
- 4.3 For each sample, determine:
- 4.3.1 *Unit Weight of Concrete and Coarse Aggregate Content, P:*
- 4.3.1.1 Determine unit weight in accordance with Tex-417-A.

- 4.3.1.2 Wet sieve the contents of the unit weight container thru a No. 4 (4.75 mm) sieve. Wash all the mortar away from the coarse aggregate, using as much water as needed.
- 4.3.1.3 Bring the coarse aggregate to saturated surface-dry (SSD) condition in accordance with Tex-403-A, using the amount of coarse aggregate that has been wet sieved as the laboratory test size.
- 4.3.1.4 Once the coarse aggregate reaches the SSD condition, immediately weigh and record as "c" under Section 6.
- 4.3.1.5 Calculate Unit Mass, U, as shown in Section 6, of the coarse aggregate that has been wet-sieved.
- 4.3.1.6 Determine the Specific Gravity, G, in accordance with Tex-403-A, of the coarse aggregate that has been wet-sieved.
- 4.3.1.7 Calculate Coarse Aggregate Content, P, as shown in Section 6.
- 4.3.2 *Air content*, in accordance with Tex-414-A or Tex-416-A.
- 4.3.3 *Slump*, in accordance with Tex-415-A.
- 4.3.4 *Seven-Day Compressive Strength*:
- 4.3.4.1 Mold and cure a minimum of three cylinders per sample in accordance with Tex-447-A.
- 4.3.4.2 Determine the seven-day compressive strength in accordance with Tex-418-A.
- 4.3.5 *Unit Weight of Air-Free Mortar, M*, as shown in Section 6.
- 4.4 Compare the two samples and determine property differences.

5. UNIFORMITY REQUIREMENTS

- 5.1 Table 1 lists the maximum allowable differences for each of the six concrete properties for the two samples.

Table 1—Uniformity Requirements	
Concrete Property	Maximum Allowable Difference
Unit Weight of Concrete	1.0 lb/ft. ³ (16.0 kg/m ³)
Air Content	1.0%
Slump:	
For average slump of 4 in. or less	1 in.(25 mm)
For average slump greater than 4 in. and up to 6 in.	1.5 in. (40 mm)
Coarse aggregate content, P	6.0%
Unit Weight of the air free mortar, M	1.6% ¹

Table 1—Uniformity Requirements	
Seven-day compressive strength	7.5% ¹
1. Based on the average of all test specimens	

6. CALCULATIONS

- 6.1 Calculate percent weight of coarse aggregate in concrete and weight per unit volume of air-free mortar:

$$U = 62.4 \times G$$

$$P = \left(\frac{c}{b} \right) \times 100$$

$$M = \frac{b - c}{V - \left(\frac{V \times A}{100} + \frac{c}{U} \right)}$$

Where:

U = unit mass, lb./ft.³ (kg/m³)

P = percent weight of coarse aggregate in concrete, %

b = weight of concrete contained in the unit weight container, lb. (kg)

c = saturated-surface-dry weight of coarse aggregate retained on the No. 4 (4.75 mm) sieve, using coarse aggregate from wet sieving the concrete in the unit weight container, lb. (kg)

M = weight per unit volume of air-free mortar, lb./ft.³ (kg/m³)

V = volume of the unit weight container, ft.³ (m³)

A = air content of concrete mixture, %

G = specific gravity of coarse aggregate in saturated-surface-dry condition, dimensionless.