

CRD-C 154-77

**STANDARD TEST METHOD FOR
DETERMINATION OF MOISTURE IN FINE
AGGREGATE FOR CONCRETE BY MEANS
OF A CALCIUM-CARBIDE GAS PRESSURE METER**

1. Scope

1.1 This method of test is intended to determine the moisture content of fine aggregate for concrete by means of a calcium-carbide gas pressure (CCGP) moisture tester.

1.2 This method shall not be used on aggregate having particles large enough to affect the accuracy of the test-in general, any appreciable amount retained on a No. 4 sieve. If a 6-g sample is used, the sample should not contain any particles that will be retained on the No. 8 sieve.

2. Apparatus

2.1 Calcium carbide gas pressure moisture meter (Fig. 1).

2.2 Tared scale.

2.3 Two 1-1/4 inch (31.75 mm) steel balls.

2.4 Cleaning brush and cloth.

2.5 Scoop for measuring calcium-carbide reagent.

3. Material

3.1 Calcium carbide reagent.

Note 1.- The calcium carbide must be finely pulverized and should be of a grade capable of producing at least 2.25 cu. ft. (0.14 m³ per kg) of acetylene gas per pound of carbide.

4. Procedure

4.1 When using the 26-g size tester, place three scoops (approximately 24 grams) of calcium carbide and two 1-1/4-inch (31.75 mm) steel balls in the larger chamber of the moisture tester. When using the 6-g tester, place one level scoopful (approximately 8 g) of calcium carbide in the larger chamber of the tester.

4.2 Weigh a 26-g sample (or 6-g sample, if the small tester is being used) on the tared scale.

Note 2.- If the moisture content of the sample exceeds the limit of the pressure gauge (20% moisture), a one-half size sample must be used and the dial reading must bedoubled. Larger samples may be used for low moisture contents (5% or less). Two or three standard size samples can be used and the dial reading must be divided by the number of samples used.



Fig. 1. Calcium carbide gas pressure moisture meter

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4.3 Place the sample in the cap of the tester and, with the pressure vessel in an approximately horizontal position, insert the cap in the pressure vessel and seal the unit by tightening the clamp, taking care that no carbide comes in contact with the sample until a complete seal is achieved.

4.4 Raise the moisture tester to a vertical position so that the sample in the cap will fall into the pressure vessel.

4.5 Shake the instrument vigorously so that all lumps will be broken up to permit the calcium carbide to react with all available free moisture. When steel balls are being used in the tester, the instrument should be shaken with a rotating motion so that the steel balls will not damage the instrument or cause particles to become embedded in the orifice leading to the pressure diaphragm.

Note 3.- Shaking should continue for at least 1 min with samples with little fine material soils and for up to 3 min for samples with much fine material so as to permit complete reaction between the calcium carbide and the free moisture. Time should be permitted to allow dissipation of the heat generated by the chemical reaction.

4.6 When the needle stops moving, read the dial while holding the instrument in a horizontal position at eye level.

4.7 Record the sample mass and the dial reading.

4.8 With the cap of the instrument pointed away from the operator, slowly release the gas pressure. Empty the pressure vessel and examine the material for lumps. If the sample is not completely pulverized, the test should be repeated using a new sample.

4.9 The dial reading is the percent of moisture by wet weight and must be converted to dry weight.

5. Calculation

5.1 The percentage of moisture by dry weight may be determined from the conversion curve (Fig. 2).

Note 4.- A conversion curve similar to Fig. 2 is normally supplied with the moisture tester. However, each moisture tester should be checked for accuracy of its gage, or for the accuracy of the conversion curve. Accuracy of the tester gage may be checked by using a calibration kit (obtainable from the tester manufacturer), equipped with standard gage; in case of discrepancy, the gage on the tester should be adjusted to conform with the standard gage. For checking the accuracy of the conversion curve, a calibration should be made for meter readings versus over-dry moisture contents, using local materials.

Note 5.- It may be more convenient for field use of the apparatus to prepare a table of moisture tester readings versus oven-dry moisture content for the moisture tester.

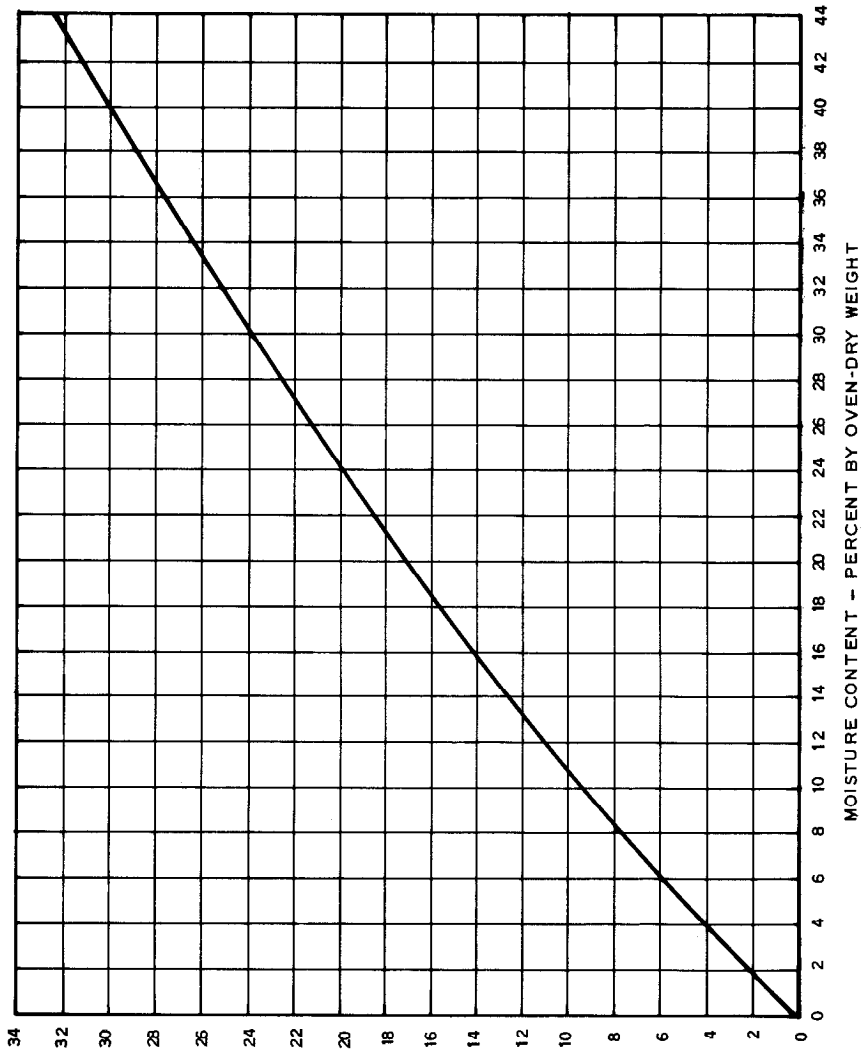


Fig. 2. Conversion curve for moisture tester reading