INFORMATION BULLETIN / PUBLIC - BUILDING CODE
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NUCLEAR DEVICES FOR SOIL DENSITY AND MOISTURE DETERMINATION

Section 91.7011.3 requires all manmade fills to be compacted to specific minimum relative compactions.

Nuclear devices may be used for determining in-place soil density and moisture content subject to the following provisions:

Conventional Nuclear Methods

1. Soil density testing and moisture content shall be performed in accordance with ASTM Designation D6938 *"Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods"* (current version).

2. Calibration curves for each nuclear testing device shall be not more than one year old.

3. To provide correlation with presently approved testing methods, ten percent of the tests shall be determined by using ASTM D1556 *"Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method"* (current version), with not less than one sand-cone test per project. These sand-cone tests shall be taken at the same location as one of the nuclear tests. The results of these correlation tests shall be included in the compaction report.

4. Prior to using the gauge-derived water content on any new material, the value shall be verified by comparison to another ASTM method such as Test Methods D2216 *"Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass"*, D4643 *"Standard Test Method for Determination of Water Content of Soil and Rock by Microwave Oven Heating"*, D4944 *"Standard Test Method for Field Determination of Water (Moisture) Content of Soil by the Calcium Carbide Gas Pressure Tester"*, or D4959 *"Standard Test Method for Determination of Water Content of Soil by Direct Heating"* (current versions).

5. The operation of devices shall conform to the requirements of the State of California and the Los Angeles County Health Department.

Low-Activity Nuclear Methods

1. Soil density testing shall be performed in accordance with ASTM Designation D8167 *"Standard Test Method for In-Place Bulk Density of Soil and Soil-Aggregate by a Low-Activity Nuclear Method (Shallow Depth)"* (current version).

2. Calibration curves for each nuclear testing device shall be not more than one year old.

3. To provide correlation with presently approved testing methods, ten percent of the tests shall be determined by using ASTM D1556 *"Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method"* (current version), with not less than one sand-cone test per project. These sand-cone tests shall be taken at the same location as one of the nuclear tests. The results of these correlation tests shall be included in the compaction report.

4. Moisture content shall be performed in accordance with ASTM Designation D8153 *"Standard Test Method for Determination of Soil Water Contents Using a Dielectric Permittivity Probe",* D4643 *"Standard Test Method for Determination of Water Content of Soil and Rock by Microwave Oven Heating"*, D4944 *"Standard Test Method for Field Determination of Water (Moisture) Content of Soil by the Calcium Carbide Gas Pressure Tester"*, or D4959 *"Standard Test Method for Determination of Water Content of Soil by Direct Heating"* (current versions).

5. To provide correlation with presently approved testing methods, ten percent of the tests shall be determined by using ASTM D2216 *"Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass"* (current version), with not less than one laboratory test per project. These laboratory tests shall be taken at the same location as one of the field tests. The results of these correlation tests shall be included in the compaction report.

6. The operation of devices shall conform to the requirements of the State of California and the Los Angeles County Health Department.