



1.0 SCOPE

This Standard Test Method describes the procedures for measuring in-place density of granular base course by nuclear density gauge.

2.0 REFERENCE STANDARDS

ASTM Standards

- C566 Total Moisture Content of Aggregate by Drying
- D698 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort
- D6938 Standard Test Method for In-Place Density and Water Content of Soil and Soil Aggregate by Nuclear Methods (Shallow Depth)

MEB Standard

- P049 Nuclear Density Gauge Standard Count Calibration
- P052 Density of Material in Place by Control Strip Method

Acts and Regulations


- Transportation of Dangerous Goods Act
- Transportation of Dangerous Good Regulations

3.0 GENERAL

3.1 Gauge Calibration and License

The nuclear density gauge shall be calibrated every 12 months against the certified density reference blocks by either the manufacturer of the gauge or qualified personal.

The registered owner of the gauge shall maintain a valid *Nuclear Substances and Radiation Devices License* issued for portable gauges (Use Type 811) and ensure the *Transportation of Dangerous Goods Act and Regulations* are followed.

 <p>Manitoba Infrastructure</p> <p>MATERIALS ENGINEERING BRANCH</p>	Standard No.: MEB-P051
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3.2 Weather Limitations

The nuclear density gauge shall not be operated when:

- the surface is frozen
- the surface is wet
- temperature below -5°C
- the weather conditions are unfavourable, or are likely to become unfavourable

4.0 PROCEDURE

Complete standard count as per *MEB-P049 Nuclear Density Gauge Standard Count Calibration*.

ASTM D6938 In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth), Procedure B – Backscatter, shall be followed

Secure and record two (2) one-minute density and moisture readings, carefully rotating the gauge 90 degrees for the second reading.

Collect an aggregate sample at approximately 50mm below the surface from between the rod hole and the center of the gauge:

- Sample size must be between 500 to 600 grams
- Double bag and seal to ensure moisture is not lost
- Label the bag to corresponding test location

Perform procedure correcting the gauge-derived moisture content value in accordance to the manufacturer's instructions.

Determine dry density in accordance to *D6938 In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)*

Determine maximum dry density in accordance with *ASTM D698 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort*.

5.0 CALCULATIONS

Calculate the percent compaction of each test location as follows:

$$\% \text{ Compaction} = \frac{\text{Dry Density}}{\text{Maximum Dry Density}} * 100$$

6.0 REPORT

Document values and calculations on forms provided by the Contract Administrator.