

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
MATERIALS CONTROL, SOILS AND TESTING DIVISION
MATERIALS PROCEDURE

COMPACTION TESTING OF HOT-MIX ASPHALT PAVEMENT

- 1.0 PURPOSE
 - 1.1 The purpose of this procedure is to establish the test methods for quality control testing by the Contractor and acceptance by the Division.
- 2.0 SCOPE
 - 2.1 This procedure is applicable for all items of hot-mix asphalt pavements requiring compaction testing.
- 3.0 APPLICABLE DOCUMENTS
 - AASHTO R11
 - MP 712.21.26
- 4.0 EQUIPMENT
 - 4.1 Nuclear density gauges of the backscatter type.
 - 4.2 One measuring tape (approximately 20 m).
 - 4.3 Lime or other suitable material to mark test sites.
 - 4.4 Dry mortar sand.
 - 4.5 Supply of data sheets.
- 5.0 ROUNDING OF DATA
 - 5.1 Test data must be rounded according to AASHTO R11.

- 5.2 Test data and calculations are rounded to the following nearest significant digit.

Station Number	0.25 m
Offset	0.25 m
Wet Density	1 kg/m ³
Target Density	1 kg/m ³
Lift Thickness Compacted	5 mm
Relative Density	0.1%
Average Relative Density	0.1%
Average Wet Density	1 kg/m ³

6.0 STANDARDIZATION OF NUCLEAR GAUGE

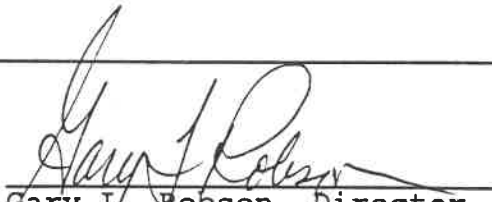
- 6.1 Warm up the gauge for 20 minutes.
- 6.2 Standardization must be performed away from metal and other objects.
- 6.3 Clean the top of the standard block and the bottom of the gauge with a cloth.
- 6.4 Make sure the gauge is turned the correct way on the block.
- 6.5 After making the necessary adjustments on the gauge for standardization, take a four minute count for density.
- 6.6 Compare the standard count to the manufacturer's standard count. The standard count must be within $\pm 2\%$ from the manufacturer's standard.
- 6.7 If the gauge is not within the specified tolerance, repeat the standardization. If the gauge will not standardize after four attempts, there is probably something wrong with the gauge. There may be electronics problems, the gauge needs calibrated, or a stability check needs to be performed. Do not use a gauge for testing which will not standardize.
- 6.8 A gauge must be standardized before testing and at least every four hours during testing.

7.0 QUALITY CONTROL TESTING

- 7.1 Record the test data on Division approved form.
- 7.2 Divide the LOT into five equal sublots.
- 7.3 Randomly locate a test site within each subplot according to MP 712.21.26.

- 7.4 Check each test site to determine if there are surface voids. Fill the voids with dry mortar sand. Avoid a build-up of fines on the surface (no more than 3 mm).
- 7.5 Take a one minute wet density reading on each test site.
- 7.6 Perform the calculations on the Division approved form.
- 7.7 Compare the relative densities to the specification requirements.
- 7.8 The results of the quality control tests should be used by the Contractor to judge if the LOT will meet specifications when acceptance tests are performed by the Division. Corrective measures are to be taken to bring the LOT into specifications if the quality control tests indicate that a nonconformance situation exists.
- 8.0 ACCEPTANCE TESTING
- 8.1 Once the Contractor offers a LOT of material to the Division for acceptance, acceptance tests are performed to determine the acceptability of the material.
- 8.2 Randomly locate a test site within the LOT.
- 8.3 Check each test site to determine if there are surface voids. Fill the voids with dry mortar sand. Avoid a build-up of fines on the surface (no more than 3 mm).
- 8.4 Take a one minute wet density reading in the backscatter position.
- 8.5 Perform the calculations on the Division approved form.
- 8.6 Compare the percent relative density to the specification range. If the value is within the range, the LOT is accepted for density.
- 8.7 When the percent relative density is outside the specification range, divide the LOT into five equal sublots and randomly locate a test site in each subplot according to MP 712.21.26.
- 8.8 Take a wet density reading at each test site.
- 8.9 Average the five wet densities.
- 8.10 Calculate the percent relative density.

- 8.11 The LOT would be acceptable if the average relative density falls within the specification range. A nonconformance situation exists if the value is outside the range.
- 9.0 COMPARISON OF GAUGES
- 9.1 The gauge used for quality control should be compared with the gauge used for acceptance testing.
- 9.2 Standardize both gauges according to 6.1 through 6.8.
- 9.3 Place the aluminum plate provided by the Division on the standard block used for acceptance testing. Place the standard block on material weighing a minimum of 1762 kg/m³. The block must not be near metal or other objects during testing and must not be moved. Keep the gauges separated a minimum of 9.1 m during testing.
- 9.4 Take 5 one minute wet density readings with each gauge in the backscatter position. The gauges are to be oriented on the block the same as for standardization.
- 9.5 Record the wet density readings exactly as shown on the gauge. The range of the five readings shall not exceed 24 kg/m³. If the readings exceed this range, perform a new set of five readings. A gauge should not be used if the repeatability of the gauge is not within this range.
- 9.6 Average the five readings for each gauge. The gauges are considered similar if the averages of the readings are within 48 kg/m³.
- 9.7 The density readings for acceptance testing will not be adjusted to compensate for any differences in readings between gauges.


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