

Colorado Procedure 76-19

Standard Practice for

Verification of Equipment Used to Field Test Bituminous Mixtures

1. SCOPE

- 1.1 This method of test covers the verification of equipment used to field test bituminous mixtures and provides documentation that the equipment verification has been done.

2. REFERENCED DOCUMENTS

2.1 *Colorado Procedures*

CP 31 Sieve Analysis of Aggregates

CP 51 Determining the Maximum Specific Gravity of Bituminous Mixtures

CP 81 Density of In-Place Bituminous Pavement by the Nuclear Method

CP 85 Asphaltic Cement Content of Asphalt Concrete Mixtures by the Nuclear Method

3. TERMINOLOGY

- 3.1 *Daily Verification* - Verification procedures which are carried out each day the laboratory equipment is used for testing. The verification is documented once per month.
- 3.2 *Weekly Verification* - Verification procedures which are carried out approximately once per week while the laboratory equipment is being used for testing. The verification is documented once per month.
- 3.3 *Monthly Verification* - Verification procedures which are carried out approximately once per month while the laboratory equipment is being used for testing. The verification is documented.
- 3.4 *Annual Verification* - Verification procedures which are carried out approximately once per year or each time the materials test trailer is moved. This may be done at the same time as the equipment is being calibrated. The verification is documented.

4. APPARATUS

- 4.1 *Thermometers* - Alcohol or mercury filled glass thermometers or calibrated digital thermometers capable of reading 250°F by 2°F (121°C by 1°C) and 77°F by 2°F (25°C by 1°C).

5. PROCEDURE

- 5.1 The following verification procedures are to be routinely carried out. If there is any question about the calibration of equipment, the verification procedures relating to the equipment must be carried out immediately.
- 5.2 If the verification procedure indicates that a problem exists, the problem must be addressed before further testing is conducted using the equipment.

6. DAILY EQUIPMENT VERIFICATION

- 6.1 Verify daily that the Nuclear Moisture/ Density (M/D) Gauge meets the standardization check on a reference standard block as specified in CP 81. Record on CDOT Form 746.
- 6.2 Verify daily that the Nuclear Asphalt Content (AC) Gauge meets the standard background test as specified in CP 85. Record on CDOT Form 772.

7. WEEKLY EQUIPMENT VERIFICATION

- 7.1 Verify weekly that the oil in the vacuum pump used in CP 51 is not contaminated with water. Examine the desiccating crystals and oven dry them when necessary.
- 7.2 Verify that the #200 (75 μ m) sieve screen used for aggregate washes in CP 31 is free from holes and is tight.
- 7.3 Verify that the sieves used for gradations in CP 31 have screen mesh that is tight, cannot move, has no permanent deformation in the screen and that there are no obvious defects, such as holes or broken solder in any of the screens. Also ensure that the nested sieves fit together tightly enough to prevent loss of material during sieving and have a reasonably easy fit with the next sieve in the nest of sieves.
- 7.4 Verify that all scales are level.

8. MONTHLY EQUIPMENT VERIFICATION

- 8.1 Verify monthly that the mercury in the manometer used to measure the vacuum applied to samples in CP 51 is free of air bubbles.
- 8.2 Oven-dry the desiccating agent in the vacuum pump setup in CP 51 (indicating silica gel, 6-16 mesh, VWR).
- 8.3 Verify the weights of the flasks used to measure the maximum specific gravity in CP 51. The weights are measured with the flasks full of $77^{\circ}\text{F} \pm 1^{\circ}\text{F}$ ($25.0^{\circ}\text{C} \pm 0.5^{\circ}$) water and covered by the same cover plate that is used during the test. If you are using temperatures other than 77°F (25°C) in the Rice test, prepare a chart of flask weight vs. water temperature containing at least 5 points, which span all of the temperatures you will be using.
- 8.4 Verify monthly that the Nuclear Asphalt Content (AC) Gauge meets the statistical stability test and the drift test as specified in CP 85.

9. ANNUAL EQUIPMENT VERIFICATION

- 9.1 Verify scale readings using a reference weight or weight set.
- 9.2 Verify the time that aggregate sieving is done by running the sieving adequacy test defined in CP 31.

CP 76 - Checklist for Field Bituminous Equipment Calibration - 2020

Photocopy this sheet and keep a dated record of each calibration procedure. Write any necessary notes on the back of this sheet or on additional sheets stapled to this one. Even though these activities are being verified daily or weekly, this checklist only needs to be completed monthly.

Tester (print name) _____ Date _____

Daily

- 6.1 Nuclear Moisture/Density Gauge Standardization Test
- 6.2 Nuclear Asphalt Content Gauge Background Test

Weekly

- 7.1 Vacuum pump oil isn't contaminated with water
- 7.2 #200 wash screen in good condition
- 7.3 Gradation screens in good condition
- 7.4 Scales level

Monthly

- 8.1 Manometer mercury free of air bubbles
- 8.2 Oven dry desiccating crystals
- 8.3 Weights of Rice flasks with water and lids
- 8.4 Nuclear Asphalt Content Gauge Statistical Stability

Annually

- 9.1 Scales accurate
- 9.2 Sieving adequacy

Notes :

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