

Colorado Procedure – Laboratory 5100-15

HMA Testing Troubleshooting Guide

1. SCOPE

- 1.1 This guide suggests some areas to investigate when various Hot Mix Asphalt (HMA) testing problems arise. This guide is not intended to be comprehensive.

2. REFERENCED DOCUMENTS

- 2.1 No documents are directly or indirectly referenced in this procedure.

3. APPARATUS

- 3.1 Thermometers- Conforming to the requirements of ASTM. The thermometers shall be capable of reading 77°F by 0.2°F, 140°F by 0.2°F, 300°F by 1°F.

4. MAXIMUM SPECIFIC GRAVITY OF HMA

- 4.1 Check temperature of water bath – required to be 77°F ± 1° (25°C ± 0.5°).
- 4.2 Make sure plastic cover of scale has not warped to where it is rubbing scale pan.
- 4.3 Make sure scale is level.
- 4.4 Make sure vacuum pump oil is clean and at proper level.
- 4.5 Make sure silica gel is dry.
- 4.6 Make sure all hose connectors are tight, including stoppers in bottles.
- 4.7 Make sure manometer has no air bubbles in the mercury column.
- 4.8 Flasks should be calibrated every month [weight filled with 77°F (25°C) water and lid].
- 4.9 Are there screens covering the openings in the stoppers to prevent crumbs from being drawn up into the vacuum system?
- 4.10 Is the filter on the pump inlet clean?
- 4.11 Was the sample split correctly, not segregated?
- 4.12 Check the valves to make sure they are open or shut as required.
- 4.13 Is agitation correct?

5. BULK SPECIFIC GRAVITY

- 5.1 Make sure suspension apparatus is not rubbing the side of the tank or the side of the opening on which the scale rests.
- 5.2 Make sure scale is level.
- 5.3 Make sure temperature of tank is $77^{\circ}\text{F} \pm 1.8^{\circ}$ ($25^{\circ}\text{C} \pm 1^{\circ}$).
- 5.4 Make sure tank is in an overflow condition.
- 5.5 Make sure the plastic cover on the scale has not warped to where it is rubbing the scale pan.
- 5.6 Make sure no dirt or foreign objects are touching the scale pan.
- 5.7 Make sure the rings at the bottom of the specific gravity (SpG) molds are clean.
- 5.8 Make sure molds are elevated in ovens and air can freely circulate under them before use for compactions.

6. STABILOMETER

- 6.1 Make sure stabilometer has sufficient oil in it.
- 6.2 Don't stop short of 100 when obtaining displacement.
- 6.3 Make sure the needle on the Ph gauge is lined up precisely.
- 6.4 Remove all air bubbles from the body of the stabilometer.
- 6.5 Is there compensation for slop between yoke guide collar and turns displacement yoke?
- 6.6 Does the handle turn smoothly when obtaining displacement?
- 6.7 Is the oven temperature $140^{\circ}\text{F} \pm 5^{\circ}$ ($60^{\circ}\text{C} \pm 3^{\circ}$)?
- 6.8 Are the specimens at the required temperature for a minimum of 2 hours for a force draft oven and 3 hours for a non-force draft oven?
- 6.9 Make sure calibration cylinder and follower have correct diameter dimensions.
- 6.10 Avoid tilting the stabilometer and make sure it is always held in the upright position.

7. RESISTANCE TO MOISTURE INDUCED DAMAGE

- 7.1 Make sure the specimen is square in the loading frame.
- 7.2 Make sure the loading blocks are clean, so that the sample does not sit off-center.
- 7.3 Make sure the samples are not removed from the water bath too early, preventing a temperature change.
- 7.4 Are the specimens at $77^{\circ}\text{F} \pm 1^{\circ}$ ($25^{\circ}\text{C} \pm 0.5^{\circ}$) for a minimum of 2 hours?
- 7.5 Is the vacuum pump oil clean, at a proper level, and the silica gel dry?
- 7.6 Is the scale level?
- 7.7 Is the 77°F (25°C) tank in an overflow condition?
- 7.8 Is the suspension apparatus free?
- 7.9 Is the manometer free of air bubbles?
- 7.10 Is the freezer temperature $0^{\circ}\text{F} \pm 5^{\circ}$ ($-18^{\circ}\text{C} \pm 3^{\circ}$)?
- 7.11 If the incubator does not have refrigeration, is it capable of maintaining a temperature of $77^{\circ}\text{F} \pm 1.8^{\circ}$ ($25^{\circ}\text{C} \pm 1^{\circ}$) when the ambient temperature is above 77°F ?

8. SUPERPAVE GYRATORY COMPACTOR

- 8.1 Make sure the rings at the bottom of the molds are clean.
- 8.2 Make sure the ram face and the height calibration cylinder are clean.
- 8.3 Make sure the turntable is fully rotated to the right when the mold is inserted.
- 8.4 Make sure the bottom disc is fully down before dumping sample into the mold.
- 8.5 Is the top of the sample level after loading it into the mold?

9. IGNITION FURNACE

- 9.1 Make sure ceramic hearth or cage is not rubbing the wall of the chamber.
- 9.2 Make sure ceramic tubes are not rubbing openings in the floor of the chamber - slamming door can cause the scale to move.
- 9.3 Make sure nothing is rubbing the pan on the external scale.
- 9.4 Make sure specimen or moisture correction sample is thoroughly dry.
- 9.5 Don't weigh specimen and moisture correction sample at widely different times - you want them to have equal percentages of moisture when initially weighed.

10. GRADATIONS

- 10.1 Make sure nothing is rubbing the scale pan.
- 10.2 Inspect the wet sieve for stretching, holes, or cracks.
- 10.3 Make sure each sieve in the stack is cleaned the same each time - don't leave different amounts of material in them each time