Section 988

GUIDELINES FOR LABORATORY MIXING OF HMA

988.01 Scope

This procedure provides guidelines for laboratory mixing of Hot Mix Asphalt for use in volumetric mix designs, Hamburg Wheel-Track Testing and any other testing performed on laboratory mixed HMA.

REFERENCES:

AASHTO STANDARDS:

R 30 Standard Practice for Mixture Conditioning of Hot Mix Asphalt (HMA)

T 255 Total Evaporable Moisture Content of Aggregates

UDOT MANUAL OF INSTRUCTION PART 8

Section 02746: Hydrated Lime

988.02

Mixing and compaction temperatures must be obtained from the Engineer.

988.03 Apparatus

- **Oven(s) –** Forced-draft, capable of maintaining temperature up to 350°F.
- **Balance or Scale –** Of sufficient capacity and readable to 0.1 g.
- **Thermometer(s)** – Having a range from 120°F to 500°F and readable to 1°F.
- **Mixer –** Of sufficient capacity and design to adequately combine all ingredients.
- **Miscellaneous** – Metal pans, metal spatulas or spoons, timer and gloves, etc.

988.04 Procedure General

Prepare a sufficient number of aggregate samples and quantity of asphalt binder to mix the required number of specimens and have one extra sample for a butter batch.

- Determine masses to the nearest 0.1 g.
- Produce a mixture that contains thoroughly coated aggregate.
- Follow the applicable steps of the procedure listed below for the initial batch to butter the bowl and paddle or whip.
- After buttering, discard the butter batch and scrape bowl and paddle or whip to remove excess material.
- Follow the procedure for each subsequent batch.
- Upon completion of the mixture conditioning, conduct testing or otherwise use the samples for their intended purpose as soon as the required procedures allow.

988.05 Mixing Procedure

1. Heat dry aggregate, asphalt binder, bowl whip and utensils in an oven regulated within the mixing temperature range until temperature has stabilized. Two to four

hours are required for aggregate to reach mixing temperature.

Note: Cover asphalt binder containers. When asphalt binder reaches mixing temperature stir it thoroughly. Asphalt binder may then be stored in an oven at mixing temperature for a short period of time, but must be adequately re-stirred immediately prior to use. Other heating apparatus may be used to maintain asphalt binder temperature provided uniformity in temperature is achieved without localized over-heating. Discard unused asphalt binder after 4 hours of achieving mixing temperature. Do not reheat asphalt binder for subsequent use.

2. Prepare, mix and discard a butter batch.
3. Record mass of buttered bowl and paddle or whip.
4. Remove paddle or whip and zero balance with empty bowl and introduce the aggregate, mix thoroughly
5. Form a crater in the center of the aggregate and determine the aggregate mass.
6. Add sufficient asphalt binder to achieve the desired asphalt binder content expressed as a percent of the total mix. Record the mass of aggregate and asphalt binder actually used for each batch.
7. Thoroughly mix for a minimum of two minutes, or until complete mixing has occurred.
8. Scrape material adhering to paddle or whip into the mixed HMA.
9. Examine the HMA for adequacy of mixing. If any aggregate has not been coated, mix by hand until HMA is properly coated.
10. Remove mix from bowl and scrape bowl, and place all HMA into a baking pan.
11. Record mass of empty bowl and paddle or whip, ensure this mass agrees with the mass of the initial buttered bowl within 0.1% of the sample mass of mixed HMA. .

    Examples:

    4700 g HMA sample, 0.1% = 4.7 grams 2100 g HMA sample, 0.1% = 2.1 grams.

    Immediately subject the HMA samples to the following mixture conditioning procedure.

12. Age according to AASHTO R 30, or other specified test procedure.

988.06 Procedures for Incorporating Hydrated Lime Slurry

Prior to heating aggregate in step 1 of 988.05, add hydrated lime slurry (3:1 water to hydrated lime) to dry aggregate, and mix until uniform (two minutes minimum). For Method A Lime Slurry Induction immediately continue with step 1; ensure aggregate has reached constant mass before mixing with asphalt binder as defined in AASHTO T 255.7.4. For Method B Lime Marination, hold for 24 hours and then continue with step 1. Section 02746: Hydrated Lime

988.07 Procedures for Incorporating Recycled Asphalt Pavement (RAP)

Thirty minutes prior to mixing dry aggregates with asphalt binder, add RAP (at room temperature) to dry aggregate in step 1 of 988.05. Return to oven for remaining 30 minutes. Continue with mixing as above.