Colorado Procedure 12A-23
Standard Practice for

Contractor's Hot Mix Asphalt
Process Control Notebook

1.   SCOPE

1.1   This Standard describes the best practice to be used when developing appropriate worksheets and forms in a Process Control (PC) notebook.

1.2   The requirements such as, but not limited to the sample size, specimen size, number of specimens, interpretation of results, reporting significant digits, and precision statements are in the specific test method.

1.3   This practice is to be used when quantities exceed 500 tons of Item 403.

2.   GENERAL PC NOTEBOOK REQUIREMENTS

2.1   The following information shall be included on each page of a worksheet or form:

1. Project number, Contract ID, and Project location
2. Item number and grading
3. Supplier's name and address
4. Name of the laboratory performing the test
5. CDOT Form 43 HMA mix design number
6. Date, location, and time the sample was taken or the beginning of the test
7. Name of the person taking the sample and performing the test
8. Test number
9. Quantity of material placed to date at the time of taking the sample
10. Type of test performed
11. Specification limits
12. Remarks area

3.   SAMPLE LOCATION WORKSHEET

3.1   The following shall be included on the sample location worksheet:

1. The temperature of the mix at the time sampled
2. Sampling method (plant, windrow, etc.)

4.   PERCENT ASPHALT CEMENT CONTENT   WORKSHEET

4.1   When using the asphalt cement (AC) content gauge [nuclear] to determine percent asphalt cement in the specimen, the following shall be included on the worksheet:

1.   Base weight
2.   HMA sample location or lift
3.   Test temperature (if applicable)
4.   Background count
5.   Measured count
6.   Gauge measured percent AC
7.   Percent moisture as determined from Subsection 5.1
8.   Corrected percent AC
9.   Dry aggregate count (if applicable)

4.2   When using the ignition oven to determine percent asphalt cement in the specimen, the following shall be included on the worksheet:

1.   Weight of the baskets
2.   Weight of each basket and HMA before ignition from both the external and internal scales
3.   Weight of each basket and HMA after ignition
4.   Weight of HMA before ignition
5.   Weight of HMA after ignition
6.   Lost HMA weight due to ignition
7.   Percent uncorrected AC in HMA
8.   Asphalt correction factor
9.   Corrected percent AC

5.   PERCENT MOISTURE WORKSHEET

5.1   When determining the percent moisture in an HMA specimen, the following shall be included on the worksheet:

1.   Weight of the tare (if applicable)
2.   Wet and dry weights of the specimen
3.   Weight of lost moisture
4.   Percent moisture

6. SIEVE ANALYSIS WORKSHEET

6.1 When performing a sieve analysis and determining the aggregate gradation, the following shall be included on the worksheet:

1. Weight of the tare (if applicable)
2. Wet weight of material before washing
3. The dry weight of material before washing
4. Weight of moisture lost due to drying
5. Percent moisture
6. Weight retained on the applicable sieve size
7. Percent retained on the applicable sieve size
8. Percent passing the applicable sieve size
9. Total weight sieved
10. Dry weight after washing
11. The percent difference between item 9 and 10

7. MAXIMUM SPECIFIC GRAVITY WORKSHEET

7.1 When determining the maximum specific gravity, the water temperature calibration for each flask shall be developed and in the contactor's files. When determining the maximum specific gravity, the following shall be included on the worksheet:

1. Weight of each flask
2. Weight of each sample and flask
3. Weight of each sample
4. Weight of each flask filled with water and the lid
5. Weight of each flask filled with the sample, water, and lid
6. The temperature of the water
7. Maximum specific gravity
8. Average maximum specific gravity

8. AIR VOIDS and VMA WORKSHEET

8.1 When determining the air voids of a laboratory compacted specimen, the following shall be included on the worksheet:

1. Total weight of the specimen in air
2. Weight of the surface-dry specimen in air
3. Weight of the specimen in water
4. Percent water absorbed by volume
5. Bulk specific gravity of the specimen
6. Average maximum specific gravity as determined from Subsection 7.1
7. Percent air voids

8.2   When determining the voids in the mineral aggregate (VMA) of a laboratory compacted HMA specimen, the following shall be included on the worksheet:

1. Bulk specific gravity of the aggregate as determined from Subsection 8.1 steps 1 through 4
2. Percent of aggregate based on the total weight of the mix
3. Percent of voids in the mineral aggregate based on bulk volume

9.   LOTTMAN WORKSHEET (when Lottman PC testing is required by the Contract)

9.1   When determining the Resistance of Compacted Bituminous Mixture to Moisture Induced Damage (Lottman Test), the following shall be included in the worksheet:

1. Specimen height
2. Theoretical maximum specific gravity of the mixture
3. Percent air voids (individual specimen)
4. Average air voids (dry specimens)
5. Average air voids (conditioned specimens)
6. The total dry weight of the specimen in air
7. Weight of the surface-dry specimen in air
8. Weight of the specimen in water
9. Percent water absorbed by volume
10. Dry Tensile Strength (individual specimen)
11. Wet Tensile Strength (individual specimen)
12. Average Dry Tensile Strength
13. Average Wet Tensile Strength
14. Maximum loading (individual specimen)
15. Percent Tensile Strength Retained (%TSR)
16. Percent saturation (individual specimen)
17. Percent swell (individual specimen)

10.   HOT MIX ASPHALT DENSITY WORKSHEET

10.1   When determining the density of the compacted HMA mat using a moisture-density gauge [nuclear], the following shall be included on the worksheet:

1. Station and distance from the centerline (right or left)
2. Daily maximum specific gravity
3. Standard count
4. Measured count or wet density for each reading
5. Average of the measured counts or wet densities
6. The ratio of the average density count and the standard count (if applicable)
7. Field-tested specific gravity
8. Correction factor determined from CDOT Form 469 (if applicable)
9. Adjusted field-tested specific gravity
10. Percent relative compaction

10.2   When determining the density of the compacted HMA mat using cores, the following shall be included on the worksheet:

1. Date specimen was retrieved
2. Dry weight in air
3. Weight of the saturated surface dried specimen
4. Weight of the specimen in water
5. Bulk specific gravity of the specimen
6. Daily maximum specific gravity
7. Percent relative compaction

11.   LONGITUDINAL JOINT WORKSHEET

11.1   When determining the longitudinal joint density of the compacted HMA mat using cores, the following shall be included on the worksheet:

1. Date the lift was placed
2. Date the specimen was retrieved
3. Average lift thickness
4. Dry weight in air
5. Weight of the saturated surface dried specimen
6. Weight of the specimen in water
7. Bulk specific gravity of the specimen
8. Maximum specific gravity per specifications
9. Percent relative compaction at the longitudinal joint

12.   FREE MOISTURE FOR PERCENT LIME WORKSHEET

12.1   When determining the percent free moisture specified for hydrated lime used in HMA, the following shall be included on the worksheet:

1. Weight of the tare
2. Wet and dry weights of the specimen
3. Weight of lost moisture
4. Percent moisture
5. Percent absorption (from the mix design)
6. Percent surface (free) moisture

13.   SUBMITTAL OF PC NOTEBOOK

Once the Contractor has completed production of all Hot Mix Asphalt on the Project the Contractor shall submit the final PC notebook to the Department in an electronic format. The document shall be in sequential order by date and shall be in PDF format. The electronic PC notebook shall be delivered to the Department within 10 working days after the end of production.

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