

400 Series Forms

**REPORT OF TEST :
CUTBACK ASPHALT
FORM MAT- 400**

DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING AND HIGHWAY OPERATIONS
DIVISION OF MATERIALS TESTING

MC-250 CUT-BACK ASPHALT (AASHTO M 82)
SPECIFIC GRAVITY (Hydr.)
(AASHTO T 227 ASTM D 1298)

KIN VISCOSITY @ 140 °F
(AASHTO T-201) (ASTM D 2171)

FLASH POINT (TOC) (AASHTO T 79)
spec 150°F (66 °C)

TEST ON
RESIDUE

PEN @ 77 °F (AASHTO T 49)
spec 120-250 (ASTM D-5)

ABSOL VISC @ 140 (BULB-B)
(AASHTO T 202 ASTM 2170)
spec 300-1200

_____ @ _____ °F

_____ @ 60 °F

X200

(ASTM D 402)
(AASHTO T
78)

DISTILLATION

Spec (%)	Temp.	Amt.	%
0	374 °F		
0-10	437 °F		
15-55	500 °F		
60-87	600 °F		
67 (min)	680 °F	/2=	
		100-	=

<u>Specification Reference</u>
Standard Specification _____
Project Special Prov. _____
Other _____
PERSON ACCEPTING TECHNICAL RESPONSIBILITY
Name: _____
Title: _____

KIND OF MATERIAL	FORM MAT-400		DATE
	STATE OF CONNECTICUT		
SOURCE OF SUPPLY	DEPARTMENT OF TRANSPORTATION BUREAU OF ENG & HWY OPERATIONS REPORT OF TEST: CUTBACK ASPHALT		LABORATORY NO.
LOCATION OF SOURCE OF SUPPLY	FLASH POINT °F		
	KINEMATIC VISC. @ 140 °F, CS		
SAMPLE TAKEN FROM	DIST.% BY VOL. OF TOTAL DIST. TO 680 °F		
	TO 374 °F		
LOCATION OF	TO 437 °F		
	TO 500 °F		
SAMPLED BY	TO 600 °F		
DATE SAMPLED	RESIDUE FROM DISTILLATION TO 680 °F		
	VOLUME PERCENT BY DIFFERENCE		
	TEST ON RESIDUE FROM DIST.		
USING AGENCY	PENETRATION AT 77 °F 100g 5 sec.		
	DUCTILITY AT 77 °F IN cm		
QUANTITY REPRESENTED	ABSOLUTE VISCOSITY AT 140 °F		
	SPECIFIC GRAVITY @ 60 °F		
MATERIAL WILL BE USED FOR	WEIGHT PER GALLON @ 60 °F		
DATE USED	RECOMMENDED FOR	REMARKS	
WHERE USED			
SAMPLE RECEIVED			
DIRECTOR OF RESEARCH & MATERIALS			

**REPORT OF TEST: ASPHALT BINDER
MAT- 401**

KIND OF MATERIAL	STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION BUREAU OF ENGINEERING & HIGHWAY OPERATIONS REPORT OF TESTS		DATE	
SOURCE OF SUPPLY	ASPHALT BINDER MAT-401		LABORATORY NO.	
LOCATION OF SOURCE OF SUPPLY	TEST	TEST TEMP	RESULTS	RECOMMENDED FOR
SAMPLE TAKEN FROM	SPECIFIC GRAVITY @ 25 C			REMARKS
LOCATION OF	FLASH POINT, C			
	VISCOSITY (Brookfield) @ 135 C Pa-s			
SAMPLED BY	VISCOSITY (Brookfield) @ 165 C Pa-s			
DATE SAMPLED	DYNAMIC SHEAR $G^*/\sin(\delta)$ kPa			
	RTFO AGED RESIDUE:			
USING AGENCY	MASS CHANGE, %			
QUANTITY REPRESENTED	DYNAMIC SHEAR $G^*/\sin(\delta)$ kPa			
	PAV AGED RESIDUE:			
PURPOSE FOR WHICH MATERIAL WILL BE USED	DYNAMIC SHEAR $G^*\sin(\delta)$ kPa			
DATE MATERIAL WILL BE USED	CREEP STIFFNESS			
	M VALUE			
SAMPLE RECEIVED	DIRECT TENSION			
	FAILURE STRAIN			
DIRECTOR OF RESEARCH & MATERIALS				

**EMULSIFIED ASPHALT
FORM MAT-402**

ANIONIC - AASHTO M-140(ASTM D-997)
CATIONIC - AASHTO M-208(ASTM D-2397)

CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING AND HIGHWAY OPERATIONS
DIVISION OF MATERIALS TESTING

% RESIDUE BY DISTILLATION
(AASHTO T-59.7-9 ASTM D-244)

SAYBOLT VISCOSITY
(AASHTO T-59.21-23)

weight after heat
+ 1.5

Tare of apparatus (all parts)
-
=====

_____ = % (by weight)
2

X _____
SUS/SFS
(corr.)

WEIGHT PER GALLON
(AASHTO T-59.75-80)

DISTILLATION RESULTS
total dist oil dist
200
- _____ = %
200
_____ = %
2

PEN. OF RESIDUE
(AASHTO T-49)

PART. CHARGE
(AASHTO T-59.18-20)

<u>Specification Reference</u>
Standard Specification _____
Project Special Prov. _____
Other _____
PERSON ACCEPTING TECHNICAL RESPONSIBILITY Name: Title:

KIND OF MATERIAL	STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION		DATE
SOURCE OF SUPPLY	BUREAU OF ENG & HWY OPERATIONS REPORT OF TEST: EMULSIFIED ASPHALT FORM MAT-402		LABORATORY NO.
LOCATION OF SOURCE OF SUPPLY	VISCOSITY, SAY. FUROL @ _____ °F., _____ SEC.		
	PARTICLE CHARGE TEST		
SAMPLE TAKEN FROM	SIEVE TEST, %		
	OIL DISTILLATE, BY VOL. OF EMULSION, %		
LOCATION OF	CEMENT MIXING TEST, %		
	TEST ON DISTILLATION RESIDUE:		
SAMPLED BY	PENETRATION 77 °F., 100 g., sec.		
	DUCTILITY 77 °F., cm.		
DATE SAMPLED	SOLUBILITY, %		
	ASH, %		
USING AGENCY	MODIFIED MISCIBILITY WITH WATER		
	SETTLEMENT, 5 DAYS, %		
QUANTITY REPRESENTED	DEMULSIBILITY, %		
	SPECIFIC GRAVITY @ 60 °F		
MATERIAL WILL BE USED FOR	WEIGHT PER GALLON @ 60 °F		
DATE USED	RECOMMENDED FOR	REMARKS	
WHERE USED			
SAMPLE RECEIVED			
DIRECTOR OF RESEARCH & MATERIALS			

Hot Storage Tanks:

- Lines to be separated or equipped with a reverse pump to eliminate contamination
- Thermostatically controlled, with a thermometer in bulkhead
- Sampling valves as specified, located in lower half of an end bulkhead

Number of storage tanks on site _____

Tank Inventory:	<u>Tank No.</u>	Capacity	Type of Asphalt

Tickets:

All vendors producing bituminous concrete for the State of Connecticut under the terms of a contract must have their truck-weighing scales, storage bin scales and mixing plant automated so as to provide a detailed ticket containing the following information:

- 1) State of Connecticut printed on ticket
- 2) Name of producer, and identification of plant or specific storage bin, if used
- 3) Date and time of day
- 4) Individual bin high/target/low batch weights
- 5) Type of material* (including RAP (dry weight) percentage and moisture content, if used)
- 6) Net weight of material
- 7) Gross weight or tare weight of truck
- 8) Project number, purchase order number, name of contractor (if contractor other than producer), whichever applies
- 9) Truck number for positive identification of truck

*NOTE: Class 3 mixture to be used for machine-placed curbing must be shown on the ticket as "curb Mix only."

Items 1 to 9 must be printed on the ticket. The time of day may be printed by a separate time clock.

Seal Dates: Plant: _____
 Truck : _____
 Storage Bin(s): _____

- Copy of Printout(s) (Plant and Truck)
- D.E.P. Operating Permit

Automation and Recordation of Bituminous Concrete Plant:

FORM 404 (REV 3-1-06) Check List for Bituminous Concrete Plants (Batch Type) Page 3 of 3

The plant shall be equipped with an automated weighing, cycling, and monitoring system approved by the Director of Research and Materials, and installed as part of the batching equipment with displays located in full view of the operator

The system shall include equipment for accurately proportioning the various components of the mixture by weight and in the proper order, controlling the cycle sequence and timing the mixing operations. The entire batching and mixing interlock cut-off circuits shall interrupt and stop the automatic batching operations whenever an error exceeding the acceptable tolerance occurs in proportioning. An asterisk (*) shall be automatically printed next to any batch weight(s) exceeding tolerances shown below.

The automatic proportioning system shall be capable of consistently delivering materials within the full range of batch sizes with the following tolerances:

Each Aggregate Component: $\pm 1.5\%$ of individual of cumulative target weight for each bin

Mineral filler: $\pm 0.5\%$ of the total batch

Bituminous Material: $\pm 0.1\%$ of the total batch

Zero Return (Aggregate): $\pm 0.5\%$ of the total batch

Zero Return (Bituminous Material): $\pm 0.1\%$ of the total batch

Tolerance controls shall be automatically or manually adjustable to provide for spans suitable for less than full size of batches.

Recording equipment shall monitor the batching sequence of each component of the mixture and produce a printed record of these operations on each truck ticket in accordance with Subarticle 4.06.03-2 and as specified herein. For each day's production, each D.O.T. project shall be provided a clear, legible copy of the recording. Provision will be made so that scales may not be manually manipulated during the printing process. In addition, the system shall be interlocked to allow printing only when the scale has come to a complete rest.

A printed character (asterisk or other shall also automatically be printed on the batch plant printout when the automatic batching sequence is interrupted or switched to auto-manual or manual during proportioning..

() Ten standard 50 lb. (22.7 kg.) test weights for checking plant scales.

Hot Storage Bins: Type of Heat: Capacity of bin(s): Number of Bin(s):

() Heated
() Unheated Brand/mfg.

Brand/Manufacture: _____

The bins shall be equipped with a light or indicator to show when the level of material reaches the top of the discharge cone.

Please note any variations in specifications below:

CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING AND HIGHWAY OPERATIONS
DIVISION OF MATERIALS TESTING

FORM 405 (REV 3-1-06) Check List For Bituminous Concrete Plants (Drum Type) Page 1 of 3

Plant: _____ Location: _____

Inspected By: _____ Date _____

Plant Size: _____ T.P.H.

– The mixing plant used in the preparation of bituminous concrete shall conform to the following requirements.

Aggregates: _____ Source of Supply: _____

- | | |
|---|------------------|
| <input type="checkbox"/> Crushed Gravel | Fine Aggregate |
| <input type="checkbox"/> Natural Stone | |
| <input type="checkbox"/> Screenings | Coarse Aggregate |
| <input type="checkbox"/> Stone Sand | |
| <input type="checkbox"/> Trap Rock | |

Mineral Filler

- Separate Bin
- Delivery System accurate to 0.1% of total weight of bituminous mixture
- 5-second interrupt interlock

Aggregate Weighing:

- Continuous weighing device
- Individual Feeders (belt type)
- 5-second interrupt device
- Moisture compensating device
- Means for diverting aggregate prior to entry into drum
- Belt scale accurate to +/-1/2 of 1% (verified by plant records)

Dust Return Type: Pneumatic Screw conveyer

Bitumen Delivery System:

- Accurate to 0.1% based on total weight of mixture
- Presetting actual Bitumen content directly as a percentage/per total mixture weight
- Interlock to halt production within 5 seconds if Bitumen flow is interrupted
- Temperature compensating device to correct quantity of asphalt to 60F (16C)
- Recordation of Proportions. The plant shall be quipped with an automatic digital recording device approved by the Director of Research and Materials, that simultaneously records the weight of each aggregate, mineral filler if added separately and bitumen a 5-minute intervals during production time and on demand. The recordation shall include the actual bitumen quantity as a percentage of the total weight. The maximum resolution shall be 0.1 tons for dry aggregate, 0.01

FORM 405 (REV 3-1-06) Check List For Bituminous Concrete Plants (Drum Type) Page 2 of 3

tons for mineral filler if added separately, 0.01 tons for bitumen and 0.1% for bitumen content. All recording shall show the date, including day, month, and year, and time to the nearest minute for each print. For each day's production, each DOT project(s) shall be provided with a clear and legible copy of the recording.

Mixing Plant and Machinery:

- A capacity of at least 125 tons (115 metric tons) per hour
- A minimum of four (4) cold-feed storage bins
- RAP capability, per specifications
- Scalping screens or other devices installed in the cold feed system to remove any debris or other foreign material in excess of 4 inches (100 mm). (Individual bins shall be labeled for the aggregate sizes being used.)
- Flights in drum checked and found in satisfactory condition.
- The plant shall have at hand the required number of 50-lb. (22.7 kg) test weights for frequent testing off all scales.
- Provisions shall be made at the drum outlet so that the pyrometer reading may be checked by means of an armored thermometer

Hot Storage Tanks:

- Lines to be separated or equipped with a reverse pump to eliminate contamination.
- Thermostatically controlled, with a thermometer in bulkhead
- Sampling valves as specified, located in lower half of an end bulkhead

Number of Storage tanks on site: _____

Tank Inventory:	<u>Tank No.</u>	<u>Capacity</u>	<u>Type of Asphalt</u>

Hot Storage Bins: Type of Heat Capacity Number of Bins

- Heated
- Unheated
- The bins shall be equipped with a light or indicator to show when the level of material reaches the top of the discharge cone

Brand/manufacturer: _____

Silo and/or Truck Scales

All vendors producing bituminous concrete for the state under the terms of a contract must have their truck-weighing scales, storage bin scales and mixing plant automated to provide a detailed ticket to accompany each load. Tickets must include the following information:

FORM 405 (REV 3-1-06) Check List For Bituminous Concrete Plants (Drum Type) Page 3 of 3

1. State of Connecticut printed on ticket
2. Name of producer, identification of plant and specific storage bin, if used
3. Date and time of day
4. Individual bin high/target/low batch weights
5. Type of material* (including RAP (dry weight) percentage and moisture content, if used)
6. Net weight of material
7. Gross weight or tare weight of truck
8. Project number, purchase order number, name of contractor (if contractor other than producer), whichever applies
9. Truck number for positive identification of truck

*NOTE: Class 3 mixture to be used for machine-placed curbing must be shown on the ticket as “curb mix only.”

Items 1 to 9 must be printed on the ticket. The time of day may be printed by a separate time clock.

The State reserves the right to have a weighman at the scales to monitor the weighing of trucks.

Plant Scales:

In addition to complying with the above requirements, the weighing equipment shall be constructed with the necessary adjustable devices that will permit any part thereof that gets out of alignment or adjustment to be easily readjusted so that the weighing device will function properly. Scales will be checked and sealed by the Weights and Measures Division at least annually and more often if deemed necessary in to insure their accuracy.

Seal Dates: _____ Plant: _____

Truck: _____

Storage Bin(s): _____

- Copy of Printout(s) (Plant and Truck)
- D.E.P. Operating Permit

Please note any variations in specifications below:

CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING AND HIGHWAY OPERATIONS
OFFICE OF RESEARCH AND MATERIALS
DIVISION OF MATERIALS TESTING

FORM MAT-406 (rev 3-06)

Page 1 of 6

FIELD LABORATORY (Mix Plant) - APPARATUS INSPECTION SHEET

Plant: _____ Inspection Date: _____

Site: _____ Inspector(s): _____

Contractor Representative: _____

FIELD LABORATORY REQUIREMENTS

At all points during the production season this lab will comply with all requirements.

GENERAL:

1. A field laboratory that is equipped for performing required tests shall be provided at each mixing plant for the use of the State's inspectors at no expense to the State.
2. The Contractor shall ensure that the State's inspectors are given priority in the use of the field laboratory.
3. The field laboratory shall be approved by the Director of Research and Materials.
4. The field laboratory shall:
 - () a. be a separate building or a separate room and shall have a minimum floor space of 89 sq. ft (7.5 m²) [100 sq. ft (9.3 m²) for laboratories constructed after January 1, 1991] with the least dimension to be 6 ft (1.8 m)
 - () b. has windows installed that allow for sufficient light and ventilation
 - () c. has a source of fresh air from a door and/or from windows that open
 - () d. have an exhaust fan located directly behind and within 2 ft (0.6 m) of both extractor and drying source, and 12m. (304 mm) from top of workbench and shall not adversely effect the room temperature
 - () f. has a telephone available within audible range of the testing area
 - () g. be equipped with a suitable heating and air conditioning cooling system able to maintain the temperature between 65°F and 80°F(18°C to 27°C)
 - () h. be clean, and be free of all materials and equipment not associated with the laboratory

EQUIPMENT:

The field laboratory shall be equipped with the following:

- () 1. Paint brush: 1 in to 1 ½ in (25 mm to 38 mm) wide
- () 2. Hand brush: suitable for cleaning sieves
- () 3. 1000 ml unbreakable wash bottle or flask.

MIX PLANT FIELD LABORATORY – APPARATUS INSPECTION SHEET (continued)

- () 4. Two, 6 in. (152 mm) spatulas, heavy enough to rod molds without bending
- () 5. Thermometer 50°F to 450°F (10°C to 230°C)
- () 6. Putty knife or scraper
- () 7. Trowel or similar tool to quarter Class 4 samples
- () 8. Eye wash station: A double (two-eye) wash station (2,000 ml minimum) capable of cleaning both eyes simultaneously, installed in the laboratory for ready access contents shall be temperproof and dated.
Solution Expiration Date: _____
- () 9. Scoop: large enough to scoop a 1200 g sample
- () 10. Heavy (Kraft) wrapping paper: 36 in. (915 mm) minimum width
- () 11. Long-handled, pointed shovel
- () 12. Six metal pie plates: 10 in. (250 mm) minimum diameter
- () 13. Five, 3 gal (12L) sample buckets. Eight, 3 gal (12L) sample buckets for Superpave Labs only. ***
- () 14. Sample splitter suitable to split aggregate samples and sand, through and including No. 4 aggregate
- () 15. Fire extinguisher: for electrical or chemical fires, effective on all solvents used in the laboratory
Date refilled or checked (within one year)
- () 16. Hot plate and infrared lamp of suitable wattage, or a vented drying oven for drying samples
- () a. Type (describe) _____
- () b. Placed within 2 ft (0.6 m) of exhaust fan
- () c. Vented to the outside (if oven)
- () 17. Oven
- () a. Thermostatically controlled so as to maintain temperature within $\pm 5^\circ\text{F}$ (3°C)
- () b. Temperature range of 104°F to 395° (40°C to 200°C)
- () c. inside dimension shall be at least 17 in W x 12 in. D x 17 in. H (432 mm/304 mm/432 mm)
- () 18. A suitable non-chlorinated solvent that has been approved by the Director of Research and Materials (Some non chlorinated solvents may require additional equipment or supplies, which shall be the responsibility of the Contractor. These may include a potable water source, a revised disposal method and other items deemed necessary for the particular solvent used.

MIX PLANT FIELD LABORATORY – APPARATUS INSPECTION SHEET (continued)

- a. Brand
- b. Solvent to be located at a reasonable distance from the laboratory –not to exceed 75 ft (25m)
- c. Materials Safety Data Sheet to be posted in the field laboratory.*

*A statement from the Department of Environmental Protection, Water Compliance Unit, reads:
Discharge of solvents into the surface or ground waters is not an acceptable method for disposal. This waste should be collected in a sealed, quality container free of leaks and held on site in a dry location for adequate disposal through a licensed waste hauler. Ground and surface water discharge require a permit under the provisions of the Connecticut General Statutes.)

19. Centrifugal Extractor. (May be waved if ignition oven is used). ***

- a. Sufficient amount of filter rings and filter paper on hand
- b. Rings and paper are at least the outside diameter of the extractor bowl
- c. Solvent disposal from the extractor is piped directly to the outside into a closed container
- d. Minus 200 (75 μ m) sieve material loss check:

Original dry weight: _____
After-wash dry weight: _____
Percent Loss: _____

20. Ignition Oven: Correction Factor: _____ Mix. _____ Agg. See Additional Sheet. ***
Date Scale last calibrated.. _____ Brand. _____

21. Truck Body Release Agent:

Brand Name: _____

22. Sieve Shaker

- a. Motorized shaker having a horizontal sieving motion and a tapping action (or one of equal performance as determined by the Director of Research and Materials Testing)
- b. Equipped with an automatic 0 to 30 minute timer capable of turning off the shaker after a predetermined 0 to 30 minute time period
- c. Brand Name: _____
- d. Shaking Action: Good Fair Unacceptable
- e. Sieve retaining & Holddown Good Fair Unacceptable
- f. Able to hold a 15 in. (380 mm) nest of sieves Yes No
- g. Timer accuracy: Acceptable Unacceptable

MIX PLANT FIELD LABORATORY – APPARATUS INSPECTION SHEET (continued)

() 23. Sieves: Set of U.S. Standard 8 in. (200 mm) or 12 in. (300 mm) sieves; minimum of one each of the following:

- () a. Pan *, cover #200 (75 μm)*, #100(150μm)*, #50(300μm)*, #30(600μm)*, #16(1.18mm)*, 8(2.36mm), #4(4.75 mm), 3/8” (6.3mm), 1/2” (9.5 mm), 3/4” (19 mm), 1” (25 mm), 1 1/2” (37.5 mm), and 2” (50mm)
*may be half-height

% Passing	Referee Sample	Plant Sieves	Acceptable Tolerance
#200 (75 μm)			0.6%
#100(150μm)			0.9%
#50 (300 μm)			1.2%
#30 (600 μm)			1.5%
#16(1.18mm)			1.7%
#8 (2.36 mm)			1.8%
#4 (4.75 mm)			2.1%
3/8” (9.75 mm)			2.4%
1/2” (12.5mm)			2.4%
3/4” (19.0 mm)			2.4%
1” (25 mm)			2.4%

() 24. Electronic Balances

- () a. 1500g capacity; 1 g sensitivity
- () b. Type: _____
- () c. Brand Name: _____

() 25. Workbench: Adequate in Size

() 26. Sampling table: Adequate size for sampling Class 4 samples and theoretical gravities 36 in. x 36 in. (914 mm x 914 mm)

() 27. Marshall Mold Block

- () a. Wood block dimensions: 8 in. x 8 in. x 18 in. (203 mm x 203 mm x 457 mm)
- () b. Steel Plate dimension: 12 in. x 12 in. x 1 in. (304 mm x 304 mm x 25 mm)
- () c. Steel plate to be plum and level
- () d. Block to be firmly attached to a concrete slab or floor

MIX PLANT FIELD LABORATORY – APPARATUS INSPECTION SHEET (continued)

28. Mechanical Marshall Hammer
- a. Automatically compacts sample and shuts off motor after desired number of strokes
 - b. Trip hammer falls the same distance for every stroke
 - c. Spring-loaded clamp ring to hold molds in position for easy insertion and removal from compactor
29. Marshall Molds
- a. Two-mold cylinders, one base plate, one extension collar, one mechanical mold extractor
 - b. A sufficient amount of 4 in. (102 min) paper disks
 - c. Molds, upper collar and base plate fit together freely
30. Sampling Platform or Catwalk (FORM 415)*
- a. Safe and adequate with step access and railing to accommodate the inspector. *If two mixing plants, one platform may be used for both plants, and the 75 ft (25m) maximum requirement may be waived. Platform must be as close to the laboratory as traffic patterns allow.
 - b. Located a safe distance from plant and a maximum of 75 ft (25 m) from the laboratory entrance.
 - c. Located so that plant traffic flow is not impeded.
 - d. Height of platform adequate to sample any size truck
 - e. Platform permanently anchored and wobbles free
 - f. Sampling Platform structure: no visible weak or rotted materials
 - g. General Condition: Acceptable Unacceptable
 - h. Sufficient lighting for night work – Describe: _____

For plants doing Superpave, the following equipment shall also be required:

- () 300 ft² minimum floor space and 20 ft² of counter space.
- () Balance with 20kg. (42 lbs) capacity, and sufficient sensitivity to read to ± 0.1 grams. For the bowl determination method the balance shall be equipped with a suitable suspension apparatus and holder to permit weighing the sample while suspended from the center of the scale pan or balance.
- () Thermometers: Calibrated liquid-in-glass, total immersion type, of suitable range with gradations at least over 0.1° (0.2F) and a maximum scale error of 0.1° (0.2F) as prescribed in ASTM Specification E2.
- () Vacuum Pump or Water Aspirator: For evacuation of air from the container: The vacuum pump or water aspirator shall be equipped with a needle valve to maintain constant vacuum. ***
- () Water bath: Shall be capable of maintaining constant temperature and constant suitable water level.
- () Manometer and Residual Pressure Manometer. Two (2) Meeting contract requirements and NIST traceable per ASSHTO T-209 (6.4-5). *** (Mercury Manometers will be band in 2007).
- () Superpave Gyrotory Compactor: capable of providing a consolidation pressure of 600 ± 18 kPa, an angle of gyration of 1.25 ± 0.02 degrees, and a speed of gyration of 30 ± 0.5 rpm. Gyrotory shall be directly connected to printer.
- () Three (3) cylindrical molds: large enough to accommodate the following specimen requirements: 150 mm diameter, 150 mm maximum heights, and 90 mm minimum height.
- () Extrusion jack or arbor press: capable of extruding compacted specimens from molds without distortion or damage.
- () 12 Cu. ft forced draft oven capable of being controlled to $\pm 3^\circ\text{C}$ as a minimum of 104°C to 395°C (40°C to 200°C)
- () Timer: Accurate to one minute increments and capable of measuring from 1 min. to 60 min. timer shall have audible alert when the time has expired.
- () Pans: Four (4) metal pans of adequate size to hold 5000 grams of material, for reheating gyrotory sample to compaction temperature.
- () The field laboratory shall include a PC, printer and dedicated phone/modem suitable to run software and perform all necessary computations, as directed by the Director of Research and Materials Testing. This equipment shall be maintained in good working order and be made available for use by State inspectors.
- () The field laboratory shall have potable source and drainage for use with testing equipment.

*** Specifications that have been upgraded 2/06

**FIELD REPORT:
LABORATORY-PLANT DEFICIENCY
FORM MAT-407**

CONNECTICUT DEPARTMENT OF TRANSPORTATION
OFFICE OF RESEARCH AND MATERIALS
DIVISION OF MATERIALS TESTING

Date _____

Producer _____ Location _____

On the above date, the following deficiencies were found in your Plant/Laboratory

Item	Deficiency
1. _____	_____
2. _____	_____
3. _____	_____
4. _____	_____
5. _____	_____
6. _____	_____
7. _____	_____
8. _____	_____
9. _____	_____
10. _____	_____

Please make the necessary corrections as soon as possible.

Failure to correct the indicated deficiencies may results in loss of State approval.

Inspector
Connecticut Department of Transportation
Division of Research and Materials

**FIELD REPORT
INSPECTION OF
IN-PLACE HMA
FORM MAT-410**

CONNECTICUT DEPARTMENT OF TRANSPORTATION
OFFICE OF RESEARCH AND MATERIALS
DIVISION OF MATERIALS TESTING

Class of material: _____
Producer: _____
Inspection Date: _____
Placement Date: _____
Material usage: _____
Material depth: _____

Inspection requested by: _____
Weather conditions at time of placement: _____
Air temperature _____
Base Temperature _____
Mix placement Temperature: _____
Laboratory Test Report No. _____

PROJECT NO. _____

1. General appearance of
 - a. Satisfactory _____
 - b. Dry _____ Wet _____
 - c. Open _____ Tight _____
 - d. Boney _____
 - e. High dust _____
 - f. Porous _____
 - g. Inconsistent Mixture _____
 - h. Fat spots _____
 - i. Hairline-type cracks _____
 - j. Larger cracks _____

2. Apparent Pavement Defects: None _____
Bleeding _____ Stripping _____ Cracking _____ Rutting _____
Smearing _____ Raveling _____ Other: _____

3. After-paving traffic Data: Closed _____ Open immediately _____
Open after final rolling _____ Open after cooled _____
Durational pavement: open to traffic (days-weeks-months) _____

4. Paving/rolling equipment and procedures: _____

5. Field personnel educated comments on mix: _____

6. Laboratory personnel comments and recommendations: _____

Inspector: _____

MAT- 411 CODING SHEET: NCS TRANS-OPTIC EP-30-6404-321 (BUBBLE SHEET)

ConnDOT Data Sheet

Date: _____ Project: _____ Class: _____ Design Level _____

Vendor Location: _____ Tech Name(s): _____

VENDOR CODE	SAMPLED DATE	MIX CODE	PROJECT NUMBER	SAMPLE NUMBER	DATE RECEIVED	TONS USED	TECH ID	AUTHORIZED CERT. NO.
0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0
1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1
2 2 2 2	2 2 2 2	2 2 2 2	2 2 2 2	2 2 2 2	2 2 2 2	2 2 2 2	2 2 2 2	2 2 2 2
3 3 3 3	3 3 3 3	3 3 3 3	3 3 3 3	3 3 3 3	3 3 3 3	3 3 3 3	3 3 3 3	3 3 3 3
4 4 4 4	4 4 4 4	4 4 4 4	4 4 4 4	4 4 4 4	4 4 4 4	4 4 4 4	4 4 4 4	4 4 4 4
5 5 5 5	5 5 5 5	5 5 5 5	5 5 5 5	5 5 5 5	5 5 5 5	5 5 5 5	5 5 5 5	5 5 5 5
6 6 6 6	6 6 6 6	6 6 6 6	6 6 6 6	6 6 6 6	6 6 6 6	6 6 6 6	6 6 6 6	6 6 6 6
7 7 7 7	7 7 7 7	7 7 7 7	7 7 7 7	7 7 7 7	7 7 7 7	7 7 7 7	7 7 7 7	7 7 7 7
8 8 8 8	8 8 8 8	8 8 8 8	8 8 8 8	8 8 8 8	8 8 8 8	8 8 8 8	8 8 8 8	8 8 8 8
9 9 9 9	9 9 9 9	9 9 9 9	9 9 9 9	9 9 9 9	9 9 9 9	9 9 9 9	9 9 9 9	9 9 9 9

- Use a No. 2 pencil only.
- Do not use ink, ballpoint, or felt tip pens.
- Make solid marks that fill the oval completely.
- Erase cleanly any marks you wish to change.
- Make no stray marks on this form.
- Do not fold, tear, or mutilate this form.
- PROTECT THIS FORM FROM DIRT AND ASPHALT SMUDGES.

#200 (0.075 mm)	#100 (0.150 mm)	#50 (0.300 mm)	#30 (0.600 mm)	#16 (1.18 mm)	#8 (2.36 mm)	#4 (4.75 mm)	#3/8" (9.5 mm)	#1/2" (12.5 mm)	#3/4" (19.0 mm)	#1" (25.0 mm)	TEST MODULE
0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	
1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	
2 2 2 2	2 2 2 2	2 2 2 2	2 2 2 2	2 2 2 2	2 2 2 2	2 2 2 2	2 2 2 2	2 2 2 2	2 2 2 2	2 2 2 2	
3 3 3 3	3 3 3 3	3 3 3 3	3 3 3 3	3 3 3 3	3 3 3 3	3 3 3 3	3 3 3 3	3 3 3 3	3 3 3 3	3 3 3 3	
4 4 4 4	4 4 4 4	4 4 4 4	4 4 4 4	4 4 4 4	4 4 4 4	4 4 4 4	4 4 4 4	4 4 4 4	4 4 4 4	4 4 4 4	
5 5 5 5	5 5 5 5	5 5 5 5	5 5 5 5	5 5 5 5	5 5 5 5	5 5 5 5	5 5 5 5	5 5 5 5	5 5 5 5	5 5 5 5	
6 6 6 6	6 6 6 6	6 6 6 6	6 6 6 6	6 6 6 6	6 6 6 6	6 6 6 6	6 6 6 6	6 6 6 6	6 6 6 6	6 6 6 6	
7 7 7 7	7 7 7 7	7 7 7 7	7 7 7 7	7 7 7 7	7 7 7 7	7 7 7 7	7 7 7 7	7 7 7 7	7 7 7 7	7 7 7 7	
8 8 8 8	8 8 8 8	8 8 8 8	8 8 8 8	8 8 8 8	8 8 8 8	8 8 8 8	8 8 8 8	8 8 8 8	8 8 8 8	8 8 8 8	
9 9 9 9	9 9 9 9	9 9 9 9	9 9 9 9	9 9 9 9	9 9 9 9	9 9 9 9	9 9 9 9	9 9 9 9	9 9 9 9	9 9 9 9	

#200 (0.075 mm)	#100 (0.150 mm)	#50 (0.300 mm)	#30 (0.600 mm)	#16 (1.18 mm)	#8 (2.36 mm)	#4 (4.75 mm)	#3/8" (9.5 mm)	#1/2" (12.5 mm)	#3/4" (19.0 mm)	#1" (25.0 mm)	TEST MODULE
0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	
1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	
2 2 2 2	2 2 2 2	2 2 2 2	2 2 2 2	2 2 2 2	2 2 2 2	2 2 2 2	2 2 2 2	2 2 2 2	2 2 2 2	2 2 2 2	
3 3 3 3	3 3 3 3	3 3 3 3	3 3 3 3	3 3 3 3	3 3 3 3	3 3 3 3	3 3 3 3	3 3 3 3	3 3 3 3	3 3 3 3	
4 4 4 4	4 4 4 4	4 4 4 4	4 4 4 4	4 4 4 4	4 4 4 4	4 4 4 4	4 4 4 4	4 4 4 4	4 4 4 4	4 4 4 4	
5 5 5 5	5 5 5 5	5 5 5 5	5 5 5 5	5 5 5 5	5 5 5 5	5 5 5 5	5 5 5 5	5 5 5 5	5 5 5 5	5 5 5 5	
6 6 6 6	6 6 6 6	6 6 6 6	6 6 6 6	6 6 6 6	6 6 6 6	6 6 6 6	6 6 6 6	6 6 6 6	6 6 6 6	6 6 6 6	
7 7 7 7	7 7 7 7	7 7 7 7	7 7 7 7	7 7 7 7	7 7 7 7	7 7 7 7	7 7 7 7	7 7 7 7	7 7 7 7	7 7 7 7	
8 8 8 8	8 8 8 8	8 8 8 8	8 8 8 8	8 8 8 8	8 8 8 8	8 8 8 8	8 8 8 8	8 8 8 8	8 8 8 8	8 8 8 8	
9 9 9 9	9 9 9 9	9 9 9 9	9 9 9 9	9 9 9 9	9 9 9 9	9 9 9 9	9 9 9 9	9 9 9 9	9 9 9 9	9 9 9 9	

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Note: This Form is two-sided. Reverse side is for test modules three, four and five which identical to test modules one and two.

**REPORT OF TEST
BITUMINOUS MARSHALL QUALITY
FORM MAT- 412 Rev 10/03**

Connecticut Department of Transportation
Division of Materials Testing

_____ of _____

Contract No. / Federal Aid No.
Source of Supply
Location
Sample Taken From
Location of
Kind of Material
Material Number

Sample No.	Quantity of Material Represented	Date Sampled		
Vendor Number	Purpose	Date Received		
Using Agency	Weather	Air Temperature		
Where material will be used		Sample by		
Test #	Time	Temp	Lab Number	Item Number
1				
2				
3				
4				
5				

THEORETICAL SPECIFIC GRAVITY

MOLD #	MOLD #	MOLD #	MOLD #
TEMP.	TEMP.	TEMP.	TEMP.
BOWL#	BOWL#	BOWL#	BOWL#

1.) Weight of Bitumonus Concrete plus jar in air					
2.) Weight of jar	-	-	-	-	-
3.) Weight of Bitumonus Concrete in air					
4.) Weight of HMA plus jar in water *					
5.) Weight of jar filled with water	-	-	-	-	-
6.) Weight of HMA in water *					
3.) Weight of Bitumonus Concrete in air					
6.) Weight of HMA in water *	-	-	-	-	-
7.) Volume of HMA					
8.) Theoretical gravity	3.)				
	7.)				
9.) Weight of mold in air (SSD)					
10.) Weight of mold in water	-	-	-	-	-
11.) Volume of mold					
12.) Actual gravity of mold	9.)				
	11.)				

Theoretical Gravity					
Actual Gravity					
Difference.					
% voids					
% voids asphalt	+	+	+	+	+
Total Voids (VMA)					
%voids filled by ASP					
FLOW					
Stability, dial reading					
Stability X corr factor	X	X	X	X	X
Corrected Stability					

Remarks	Automation [1] Total Batch = _____ lbs.
	Check from [2] Total AC = _____ lbs. %AC
	Batch ticket [3] Approved Production _____ %AC

* (after 20 minutes under vacuum)

Form 412 (Reverse side)

1 _____

2 _____

% Passing			
200			
50			
30			
8			
4			
3/8"			
1/2"			
3/4"			
1"			
1-1/2"			
Mold #			

Mold #			

JMF

AC	
200	
50	
30	
8	
4	
3/8"	
1/2"	
3/4"	
1"	
1-1/2"	

3 _____

4 _____

5 _____

% Passing			
200			
50			
30			
8			
4			
3/8"			
1/2"			
3/4"			
1"			
1-1/2"			
Mold #			

Mold #			

Mold #		

Report of Test Form 412S

FORM MAT 412S rev. 3-1-06

Sampling Determine or Paving Materials ARSHO- T188	Project Number			Gyrations:			Material Code:			Production Date			
	Vendor Number			Mix Time (Dry- Weight)			NETTCP ID #:			Contract			
	Plant			Technician Name/Print						Departure Tonnage			
	Location			Test Time (AM/PM)			Test Time (AM/PM)			Test Time (AM/PM)			
Ignition Oven Method for Determining Rapport Gradation	Mix Size:		Level		Truck Number			Truck Number			Truck Number		
	Percent RAP:			Truck Temp.			Truck Temp.			Truck Temp.			
	Production AC			Minimum AC Information			Sublot Number			Sublot Number			
	J.M.F. AC			Tel. 814			Syro Temp. (1)-(2)			Syro Temp. (1)-(2)			
	Legal only one order for each level below (0.075)			Structure Marx after B			Structure Marx after B			Structure Marx after B			
	Correction Factor / Ignition Oven Ticket Information			Moisture mass on Sieke			Moisture mass on Sieke			Moisture mass on Sieke			
	Test			Wt. Lurr			Wt. Lurr			Wt. Lurr			
	Test 1			% Lurr			% Lurr			% Lurr			
	Test 2			Temp Comp			Temp Comp			Temp Comp			
	Test 3			Pk kg Ignition oven			Pk kg Ignition oven			Pk kg Ignition oven			
Sieve Analysis of Fine and Coarse Aggregates ARSHO- T28	Gradation			Moisture mass Change			Moisture mass Change			Moisture mass Change			
	Gradation Sieve Size			mass			mass			mass			
				X Fed.			X Fed.			X Fed.			
	mm			passing			passing			passing			
	0.075			2									
	0.150			3									
	0.300			3									
	0.600			4									
	1.18			4									
	2.36			6									
	4.75			6									
	9.5			6									
	19.0			6									
	37.5			6									
	75.0			6									
150.0			6										
Prepared Specimens by Gradation Sample Method Specific Gravities ARSHO- T488	Pwa			Pwa JMF									
	Gsa			Specimen			Average			Average			
	Gsb			Bowl			Results			Results			
	Specimens mass in air												
	Submerged specimens mass in air [H]												
	Less mass of specimens in water [J]												
	Value of specimens [I-J]												
	Gmb @ Mass [42a - 8.828]												
	Mass of NMR plus bowl in air [A]												
	Less mass of bowl in air												
Maximum Specific Gravities ARSHO- T283	Mass of NMR in air												
	Mass of NMR plus bowl in water												
	Less mass of bowl in water												
	Mass of NMR in water												
	Value of NMR												
	Gmm [42a - 8.811]			0.020									
	VAC_{MA}			1.0			4.0						
	VMA_S			1.0									
	VMA_N			1.0									
	G_w			0.030									
D_f			0.05										
VFA - [(100)(VMA-VA)/(VMA) (Min.-Max.)]													
HEIGHT [R] @ Min													
HEIGHT [R] @ Max													
DENSITY @ Mass - [Gmb @ Mw / Gmm] * 100			max			98.0							
DENSITY @ Mass - [Gmb @ Mw / Gmm] * 100			1.0			96.0							
DENSITY @ Min - [Gmb @ M / Gmm] * 100			max										
DUST/ ASPHALT - [(1.075mm / P_s)]			0.3			0.3							
Hot Bin Pollr From Plant %									Aggregate Source:				
J.M.F. DATE									CA -				
Change									FA -				
Temp / Weather									FA -				
Pk													
Gk [Gravities of Diodes]						1.033			1.033				
Gkb [Gravities of Aggregate Diodes]													

Page 1

**REPORT OF TEST
HMA
FORM MAT- 413**

PROJECT		FED AID NO.		STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION					
Sample No.		BUREAU OF ENGINEERING & HWY OPERATIONS REPORT OF TEST of HMA MAT 413 Rev 10-03							
Kind of Material		PASSING SIEVE	Percent			M.F.	MARSHALL TESTS		
Source of Supply		#200					VOIDS		
		50					STABILITY		
LOCATION OF		30					FLOW		
		8					Theo. Gravity		
Sample Taken from		4					Status Assigned Accepted (A) Rejected (R) Pending (P) Penalty (D)		
		3/8							
Location of		1/2							
		3/4							
Sampled By		1							
		1-1/2							
Date Sampled		ASPHALT							
		TEMP OF MIX ° F							
Using Agency		TIME OF TEST							
Quantity Represented		REMARKS STANDARD SPECIFICATION _____ SUPPLEMENTAL SPECIFICATION _____ PROJECT SPECIAL PROVISION _____ OTHER _____ PERSON ACCEPTING TECHNICAL RESPONSIBILITY NAME _____ TITLE _____							
Purpose									
Where Material Will be used (Town)									
Sample Received at Testing Site									
Director of Research and Materials									

GUIDELINE: HOT MIX ASPHALT SAMPLING PLATFORM (OSHA REG. 1910.24) FORM MAT- 415

Excerpt from OSHA Regulation 1910.24:

(d) *Stair width.* Fixed stairways shall have a minimum width of 22 inches.

(e) *Angle of stairway rise.* Fixed stairs shall be installed at angles to the horizontal of between 30° and 50°. Any uniform combination of rise/tread dimensions may be used that will result in a stairway at an angle to the horizontal within the permissible range. Table D-1 gives rise/tread dimensions which will produce a stairway within the permissible range, stating the angle to the horizontal produced by each combination. However, the rise/tread combinations are not limited to those given in Table D-1.

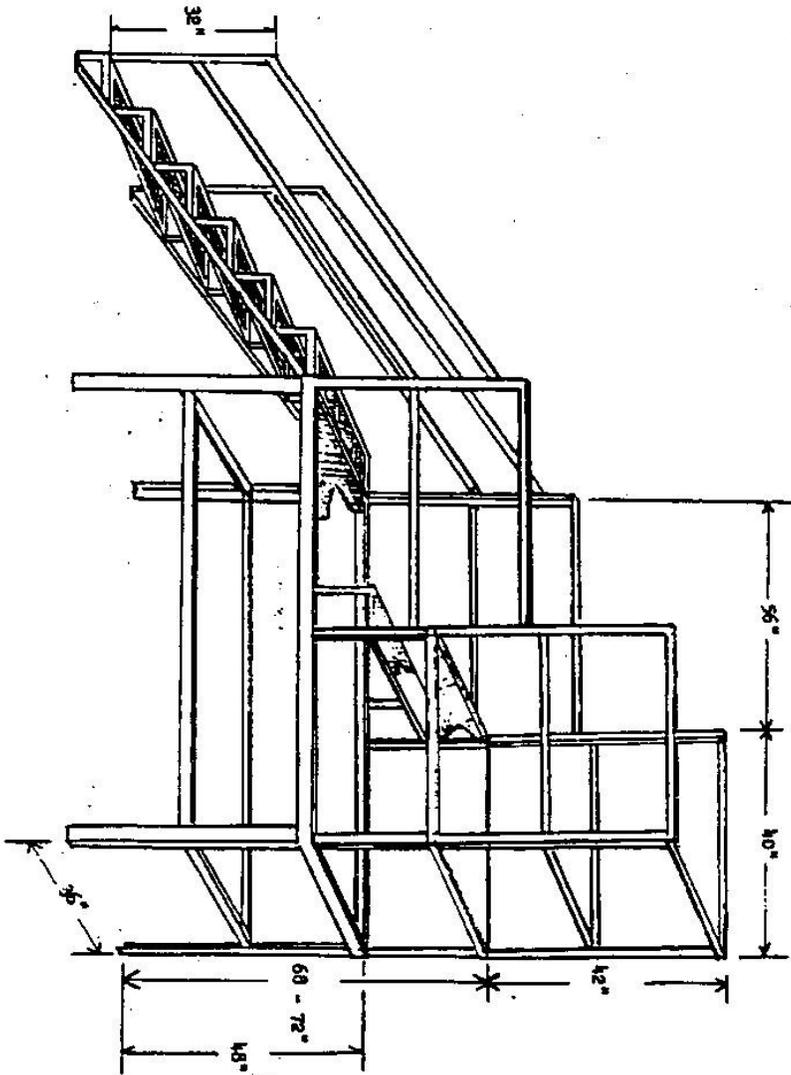
(f) *Stair Treads.* Each tread and the top landing of a stairway where risers are used, should have a nose which extends one-half inch to one inch beyond the face of the lower riser. Noses should have an even leading edge. All treads shall be reasonably slip-resistant and the nosings shall be of nonslip finish. Welded bar grating treads without nosings are acceptable providing the leading edge can be readily identified by personnel descending the stairway and provided the tread is serrated or is of definite nonslip design. Rise height and tread width shall be uniform throughout any flight of stairs including any foundation structure used as one or more treads of the stairs.

TABLE D-1

Angle to horizontal	Rise (in inches)	Tread run (in inches)
30°-35°	6 1/2	11
32°-00'	6 3/4	10 3/4
33°-41'	7	10 1/2
35°-16'	7 1/4	10 1/4
36°-52'	7 1/2	10
38°-29'	7 3/4	9 3/4
40°-08'	8	9 1/2
41°-44'	8 1/4	9 1/4
43°-21'	8 1/2	9
45°-00'	8 1/4	8 3/4
46°-38'	9	8 1/2
48°-16'	9 1/4	8 1/4
49°-54'	9 1/2	8

(g) *Railings and handrails.* Standard railings shall be provided on the open sides of all exposed stairways and stair platforms. Handrails shall be provided on at least one side of closed stairways, preferably on the right side descending. Stair railings and handrails shall be installed in accordance with provisions of section 1910.23.

SAMPLING PLATFORM, TYPICAL



**WORKSHEET:
ASH CONTENT OF
HMA
FORM MAT-416**

CONNECTICUT DEPARTMENT OF TRANSPORTATION
OFFICE OF RESEARCH AND MATERIALS
DIVISION OF MATERIALS TESTING

				PG Binder	# 200
Date Sampled			Field		
Sampled by			Corrected AC		
Ash by			Difference		

a) Sample Weight _____

d) Wt. of extracted Agg _____ Dish No. _____

Wt. of mineral matter & filter paper

Original wt. of filter paper

-
c =

c) Increase in wt. of paper (0.1g)

b) Total wt. of mineral matter in extract (0.1g)

V_1 (total volume) ml $V_1 =$ _____

Wt. of ignition dish & ash (0.0001g)

V_2 (volume after removing aliquot) ml $V_2 =$ _____

Original wt. of ignition dish (0.0001g)

$V_1 - V_2 =$ _____

g) Wt. of ash

-
g =

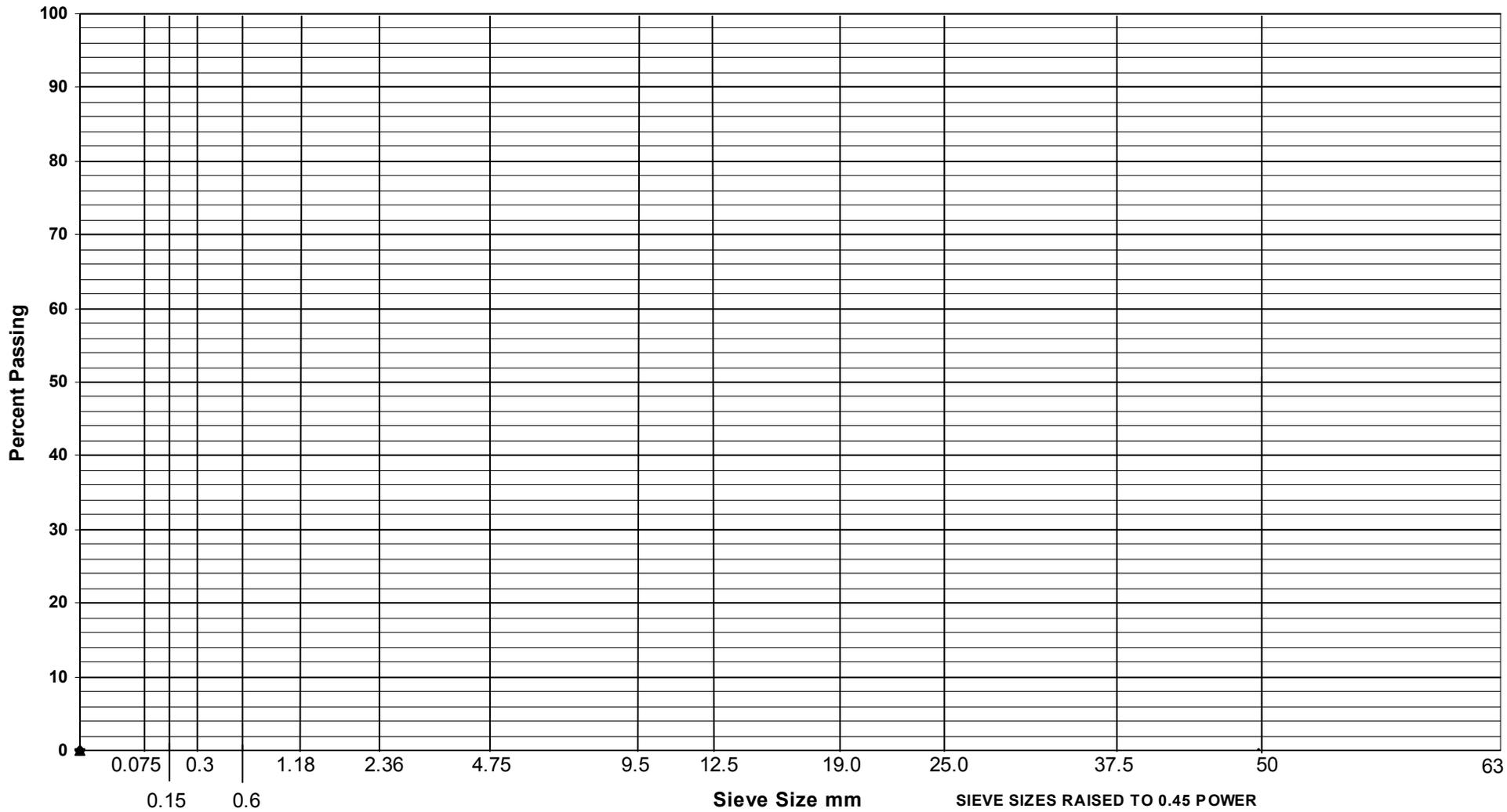
$$b = g \left(\frac{V_1}{V_1 - V_2} \right) \quad b =$$

e) Total wt. of extracted Agg. (0.1g)

$e = b + c + d$ _____ $e =$ _____

Percent Asphalt = $100(a-c)/a$ (0.01%) = _____

**WORKSHEET:
HMA GRADATION GRAPH (0.45 POWER)
FORM MAT-417**



**Field Report : Cleaning and
Sealing Joints & Cracks in
Pavement
Form MAT- 418**

**Connecticut Dept. of Transportation
Division of Materials Testing
Rev 11/03**

Date:

Materials Investigator(s):

Subject:

**Project
Details:**

- Placement of materials under maintenance contract number : _____
- Project No: _____
- Date of application: _____
- Weather: _____
- Contractor _____

Remarks:

Quality Control Plan for Fine Aggregates used in HMA

QCPFA(revised 10-03)

1. Basic Information and Personnel

a. Name and address of property owner or lessee:

b. Name, title, and telephone number of company contact person:

c. Name, title, telephone number, and certifications, if applicable, of the person(s) responsible for the QCPFA:

d. Name and affiliation of the geologist(s) familiar with the operation:

2. Controls implemented during excavation

a. Overburden removal

1. To what depth is overburden removed?

2. What is the minimum separation between the edge of overburden stripping and the production face?

3. How will sloughed overburden be avoided?

4. Will the overburden be stored within the area to be mined?

b. Mining controls

1. Describe how excavation will be performed so that intended materials are being mined?

2. Who will make the determination?

3. How will clean-out materials from old ramps, overlying lifts, stripping, or floor leveling be handled?

4. What tests are used to verify that intended materials are being mined?

5. How will it be assured that your material meet all specifications as required by the latest ConnDOT M.04 criteria before it is shipped?

c. Product uniformity controls

1. Describe the method for loading out shot rock or sand & gravel from a face to minimize non-uniformity.

2. Describe any other procedure(s) used to minimize non-uniformity.

3. Processing controls

a. Describe how non-uniformity will be minimized during aggregate processing.

b. Describe how aggregate quality will be improved by processing.

4. Stockpiling

a. Describe how non-uniformity will be minimized in stockpiling.

b. Describe how contamination will be minimized in stockpiles.

c. Describe how stockpiles will be monitored for non-uniformity and contamination:

1. How will non-uniformity and contamination be visually monitored, and by whom?

2. What physical tests will be employed to monitor quality of fine aggregate?

3. What is the minimum testing frequency?

4. Who will do the tests?

5. What actions will be taken when material does not meet requirements?

5. Records

a. What quality monitoring records are maintained?

b. Where are the quality monitoring records kept?

c. Who is responsible for maintaining these records?

CONNECTICUT DEPARTMENT OF TRANSPORTATION
DIVISION OF MATERIAL TESTING

**2005 REQUESTED DISTRICT PROCEDURES FOR HOT MIX ASPHALT (HMA)
IN CONSTRUCTION, SITE MANAGER, CMR/NON CMR, AND MUNICIPAL PROJECTS**
(Page 1 of 2 rev. 2/14/05)

1. PRODUCTION CALL-INS: All user agencies are to call in all production orders of hot-mix asphalt (HMA), *one working day prior* to scheduled pick up or delivery, to the applicable District Project Coordinator listed below. If unable to contact the District personnel and/or when any cancellations or changes occur, please notify the Central Laboratory as soon as possible by calling Jonathan Whitbeck or Andy Bednar at **(860) 258-0325/0708**. Any HMA not called in cannot be provided test coverage, in accordance with standard specifications.

To report production orders, notify your respective District personnel listed below from 8:00 a.m. to 2:30 p.m. and give them the following information, in the order listed below: (Please be as accurate as possible when reporting the estimated amount of material to be used)

- a. Plant and location.
- b. Estimated amount of material (tons).
- c. Class (es) of materials to be used.*
- d. Project number.
- e. Time material will be picked up from plant.
- f. Is density testing required?

*SUPERPAVE MIXES MUST INCLUDE MIX SIZE AND LEVEL (i.e., 12.5 L2 for 12.5 Level 2)

<u>DISTRICT 1</u> Paul Carl (860) 258-4660	<u>DISTRICT 2</u> Robert Dumas (860) 823-3268	<u>DISTRICT 3</u> Mary Spring (203) 389-3179	<u>DISTRICT 4</u> Tom Weldon (860) 585-2742
---	--	---	--

IMPERATIVE: The Central Laboratory must be notified *immediately* of cancellations or of any changes from the call in as soon as they occur.

2. NIGHTWORK AND WEEKEND: Paving scheduled at night and weekends must be called in as soon as possible (preferably 2 or 3 working days prior) in order to provide production coverage.

3. HMA USAGE: Due to QC data requirements for contractors, the Lab must have daily material totals. Project personnel should provide District Coordinators with updates daily.

4. MAT-100 CG: Computer Generated MAT-100: Construction Management Reporting (CMR) systems users and Site Manager users have the ability to generate and print MAT-100's at their terminal. Hand written MAT-100's are discouraged. MAT 100's are required for HMA production, Density (HMA and Soils), and Density Assurance Testing. **MAT-7's are no longer to be used.** Each day's production will require one MAT-100 per class of material.

5. HMA MIX DEFICIENCY AT PLANT: In the event that a deficiency situation has occurred at the HMA plant, you will be notified of the time period in which the deficiency occurred. You will be required to submit a production quantity of material used during the deficiency period and also the quantity of material for the acceptable portion. This data must be reported back to the Central Laboratory as soon as possible in order to process the deficient production. A separate B# and MAT-100 CG will be required for the deficient tonnage. The Laboratory will provide the dollar amount of the deficiency to be assessed.

**2005 REQUESTED DISTRICT PROCEDURES FOR HOT-MIX ASPHALT
IN CONSTRUCTION, SITE MANAGER, CMR/NON CMR, AND MUNICIPAL PROJECTS**
(Page 2 of 2)

6. DENSITY DEFICIENCY AT PROJECT: All density testing is required to be submitted to the Division of Materials including Consultant and/or Private Testing Labs within 48 hours of completion. If the days testing indicating a deficiency or possible deficiency (borderline results), the lab shall be notified within 24 hours and an electronic copy, sent to David Howley Fax (860) 258-0399 or email david.howley@po.state.ct.us immediately with the stated payable tons. A memorandum will then be sent to the project engineer recommending a payment percentage within two days of receiving all applicable information. The appropriate individuals will be on the cc list.

7. BOX SAMPLES: The user agency should obtain boxed samples whenever the material is questionable. They may also request additional testing to be performed by the Central Laboratory. Materials found to be obviously defective at the job site by the user agency should not be accepted and the Central Laboratory should be contacted immediately. You will be informed as to when a Laboratory representative can be available. Please submit three (3) boxed samples of the questionable material, along with all applicable information, to the Central Laboratory for analysis. The sample size of each sample should contain 5,000 grams (11.0 lbs.) of HMA and be submitted in either of the standard containers available from Stores as follows:

Stock Number: 349-02-0031 Box: Paper, reinforced, with covers, 6" x 6" x 3".

Stock Number: 349-02-0023 Box: Corrugated paper, 6" x 6" x 8".

NOTE: Notify the Central Laboratory immediately of HMA rejected at the job site and returned to the plant so that if a plant problem is the cause, the situation can be corrected and the correct quantities will be shown for that day's production.

Samples submitted in UNAUTHORIZED CONTAINERS, without a MAT-100, or without prior notification will be returned to the project with no testing being performed.

8. THEORETICAL DENSITY DATA BY VENDOR: A list of the average of the 10 previous theoretical density entries for each class of material from each plant will be sent to each District Project Coordinator on a weekly basis. Each project requiring this information should call their respective Project Coordinator.

**CONNECTICUT DEPARTMENT OF TRANSPORTATION
DIVISION OF MATERIAL TESTING**

2005 REQUESTED DISTRICT PROCEDURES OF HMA FOR MAINTENANCE AND PERMITS

1. PRODUCTION CALL-INS: All user agencies are to call in all production orders of hot-mix asphalt (HMA), *one working day prior* to scheduled pick up or delivery, to the applicable District personnel listed below. If unable to contact the District personnel and/or when any cancellations or changes occur, please notify the Central Laboratory as soon as possible by calling Jonathan Whitbeck or Andy Bednar at (860) 258-0325/258-0708. Any HMA not called in cannot be provided test coverage, in accordance with standard specifications.

The Central Laboratory, at the beginning of each production year, performs production trials to approve HMA plants and mixes for State production. Initially, all production orders must be called in. Beginning with the month of June, only production orders of 25 tons or more need to be called in.

To report production orders, notify your respective District personnel listed below from 8:00 a.m. to 2:30 p.m. and give them the following information, in the order listed below: (Please be as accurate as possible when reporting the estimated amount of material to be used)

- | | |
|--|---|
| <ul style="list-style-type: none"> a. Plant and location. b. Estimated amount of material (tons). c. Class(es) of material to be used.* d. Project number and letter(s). | <ul style="list-style-type: none"> e. Purchase Order number. f. Location where material will be used (both route and town). g. Hauling agency; Vendor in place (VIP), State hauled, etc... h. Time material will be picked up from <u>plant</u>. I. Is density testing required? |
|--|---|

*SUPERPAVE MIXES MUST INCLUDE MIX SIZE AND LEVEL (i.e., 12.5 L2 for 12.5 Level 2)

<u>DISTRICT 1</u>	<u>DISTRICT 2</u>	<u>DISTRICT 3</u>	<u>DISTRICT 4</u>
Section 11 Louis Maffessoli (860) 875-4993	Tim Yuhas (860) 823-3247	Section 31 Jane Yost (203) 265-2246	Cliff Henderson (860) 585-2800
Section 13 Bonnie Weller (860) 529-7411		Section 33 Karen Hussey (203) 972-5098	

2. IMPERATIVE: The Central Laboratory must be notified *immediately* of cancellations or of any changes from the call-in as soon as they occur.

3. NIGHTWORK & WEEKENDS: Paving scheduled at night and weekend must be called in as soon as possible, (preferably 2 or 3 working days prior), in order to provide production coverage.

4. HMA USAGE: At the conclusion of each V.I.P. project, submittal of total tonnage itemized by class and vendor is requested.

5. DEFICIENCIES:

- A. Plant Deficiencies: In the event that a deficiency situation has occurred at the HMA plant, you will be notified of the time period in which the deficiency occurred. You will be required to submit the following:
 - 1) A production total is needed for material used during the penalty period. This data must be reported back to the Central Laboratory immediately in order to notify State Purchasing of the deficiency;

2005 REQUESTED DISTRICT PROCEDURES OF HMA FOR MAINTENANCE AND PERMITS

2) A total of *two* (2) MAT-100's will be required. One MAT-100's is to be used with the accepted portion of material meeting state specifications and a second MAT-100's used to represent the deficiency amount of HMA produced. The Laboratory will provide the dollar amount of the deficiency to be assessed.

B. Density Deficiencies: Necessary items required by outside Agencies/Industries in order to process reports are:

- 1) HMA Plant Report – Provided by HMA producer/QC representative to Lab by electronic mode (email, fax transmittal) within 2 working days of completion of work.
- 2) Density Report (CON-133) – Provided by the District/Laboratory technician within 2 working days of completion of work (Attachment 2).
- 3) HMA Payable Tons – Provided by the Maintenance Garage clerk within 4 working days of completion of work (upon notification of penalty).

Procedures to be followed:

- 1) As soon as a density report is finalized with the actual Gmm, Laboratory personnel will verbally notify the appropriate supervisory planner and garage clerk in the District Maintenance Office.
- 2) A memorandum will then be prepared that indicates all pertinent information and payment recommendations after the clerk has provided the tonnage to the Laboratory. This memorandum concerning a density penalty will be mailed to the applicable supervisory planner within the District Maintenance Office with a carbon copy to the Accounts Payable Office and the pavement advisory team supervisor. The District notifies the contractor.

6. MAT-100's: All HMA production orders of 25 tons or more are required to be submitted for testing by a MAT-100. MAT-100's are also required when **DENSITY** of HMA is specified. Mat-100's are to be submitted to the Laboratory only after the days final payable quantity is totaled. **MAT-7's will not be used in lieu of MAT-100's in 2005.**

7. BOX SAMPLES: The user agency should obtain boxed samples whenever the material is questionable. They may also request additional testing to be performed by the Central Laboratory. Materials found to be obviously defective at the jobsite by the user agency should not be accepted and the Central Laboratory should be contacted immediately. You will be informed as to when a Laboratory representative can be available. Please submit three (3) boxed samples of the questionable material, along with all applicable information, to the Central Laboratory for analysis. The sample size of each sample should contain 2,500 grams of HMA and be submitted in either of the standard containers available from Stores as follows:

Stock Number: 349-02-0031 Box: Paper, reinforced, with covers, 6" x 6" x 3".

Stock Number: 349-02-0023 Box: Corrugated paper, 6" x 6" x 8".

NOTE: Notify the Central laboratory immediately of HMA rejected at the jobsite and returned to the plant so that if a plant problem is the cause, the situation can be corrected and that the correct quantities are shown for that day's production.

Samples submitted in UNAUTHORIZED CONTAINERS, without a MAT-100's, or without prior notification will be returned to the project with no testing being performed.

MAT-422	Project			
ASH Correction	Date Sampled			
	Sample Number			
	Sampled By			
	Ash tested By			
	Extractor type/model # utilized			
	Location			
			Crucible #	Crucible #
HMA Extraction by Solvent	tag	Formula		
HMA sample mass	a			
Mass of extracted aggregate	b			
Mass of binder (uncorrected)	c	a - b		
Percent binder (uncorrected)	d	(c/a)*100		
Filter Paper Masses				
Mass of mineral agg. + filter paper	e			
Mass of filter paper	f			
Mass of mineral aggregate on filter paper	g	e - f		
Effluent Volumes				
Total solvent + binder volume (ml)	h			
Volume of sample taken (ml)	i			
Sample volume multiplier	j	h / i		
Crucible masses (utilized 10 ml)				
Mass of crucible after ignition	k			
Tare mass of crucible	l			
Mass of mineral aggregate after ignition	m	k - l		
Calculated mass of mineral aggregate				
Sample volume multiplier	j			
Mass of mineral aggregate after ignition	m			
Calculated mass of mineral agg. in sample	n	j * m		
Correction for extracted sample				
Calculated mass of mineral agg. in sample	n			
Mass of mineral aggregate on filter paper	g			
Mass of extracted aggregate	b			
Corrected mass of extracted aggregate	o	n + g + b		
Determination of correct Percent Binder				
HMA sample mass	a			
Corrected mass of extracted aggregate	o			
Mass of binder (corrected)	p	a - o		
Percent binder (corrected)	q	(p/a)*100		
Ash Correction Factor	r	d-q		
Summary of Procedure				
Step 1:				
▫ Perform extraction in accordance with AASHTO T-164.				
▫ Record original HMA mass (a) & extracted agg. mass (b).				
Step 2:				
▫ Record filter paper masses (e) & (f) before and after use.				
Step 3:				
▫ Measure volume of Effluent in ml to the nearest 0.1ml and record volume (h).				
▫ Stir effluent vigorously and sample 10 ml using an pipette and record volume (ii). Take sample from middle of cylinder				
Step 4:				
▫ Tare a clean crucible and record mass (l).				
▫ Pour the complete portion of effluent into a tared crucible.				
▫ Place onto a hot plate set preheated to 125 C.				
▫ Evaporate solvent using a simmer, being careful the sample never boils (± 20 minutes).				
▫ Place on a Bunsen burner to complete evaporation (± 5 minutes).				
▫ Place in muffle set at 600 C (± 30 minutes).				
▫ Cool in dessicator .				
▫ Weight to nearest 0.001g and record as mass (k).				
Step 5:				
▫ Perform calculations to determine corrected Percent Binder and Ash correction factor.				
<i>Note: Post extraction total time: approximately 1 hour.</i>				

FIELD REPORT: Storage Bin Testing				STATE OF CONNECTICUT			
FORM MAT-423				DEPARTMENT OF TRANSPORTATION			
				BUREAU OF ENGINEERING AND HIGHWAY OPERATIONS			
				DIVISION OF MATERIALS TESTING			
PLANT				LOCATION			
CLASS OF MIX				DATE SAMPLE			
LAB NUMBER				SAMPLED BY			
A/C 10 SAMPLE DATA							
DATE		SOURCE OF SUPPLY		SAMPLE TAKEN FROM		ORIGINAL VISCOSITY	ORIGINAL PENETRATION
OUT-of-SILO SAMPLES (3 Samples)							
Sample No.	Time	Temperature	Tonnage	Truck No.	Viscosity	Penetration	
				Average			
ON-PROJECT SAMPLES (3 Samples)							
Sample No.	Time	Temperature	Tonnage	Truck No.	Viscosity	Penetration	
				Average			
TIME IN SILO SAMPLES (3 samples)				RESULTS of THIN FILM OVEN TEST			
Sample No.	Hours	Minutes		% Loss on Heating			
				Penetration			
				Penetration X 0.8			
				Viscosity			
Average				Viscosity X 1.2			

**JOINT SEALANTS- HOT POURED
FOR PAVEMENTS
FORM MAT-424**

CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING AND HIGHWAY OPERATIONS
DIVISION OF MATERIALS TESTING

AASHTO M-173M-301

<u>BONDING TEST</u>				<u>FLOW TEST</u>
DATE	#1	#2	#3	
1				
2				
3				<u>PENETRATION</u>
4				
5				

<u>Specification Reference</u>	
Standard Specification _____	
Project Special Prov. _____	
Other _____	
PERSON ACCEPTING	
TECHNICAL RESPONSIBILITY	
Name:	
Title:	

KIND OF MATERIAL	FORM MAT-424 STATE OF CONNECTICUT	DATE
SOURCE OF SUPPLY	DEPARTMENT OF TRANSPORTATION BUREAU OF ENG & HWY OPERATIONS REPORT OF TEST: HOT POURED JOINT SEALANTS	LABORATORY NO.
Location of SOURCE	SAFE HEATING TEMPERATURE	
SAMPLE TAKEN FROM	PENETRATION @ 77 °F	
LOCATION OF Sample	FLOW @ 140 °F	
SAMPLED BY	BOND (FIVE CYCLES)	
DATE SAMPLED		
USING AGENCY		
QUANTITY REPRESENTED		
MATERIAL WILL BE USED FOR		
DATE USED	RECOMMENDED FOR	REMARKS
WHERE USED		
SAMPLE RECEIVED		

DIRECTOR OF RESEARCH & MATERIALS

**JOINT SEALANTS- COLD APPLIED
BIT. SEALER/SEWER JOINTS
FORM MAT-425**

CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING AND HIGHWAY OPERATIONS
DIVISION OF MATERIALS TESTING

<u>LOSS ON HEAT (5hr @ 325 F)</u> AASHTO T-47 ASTM D-6		<u>PEN.(CONE w/150gm @ 77 F)</u>	

ASH OPEN CUP (1hr @ 1100 F) AASHTO T-111		SOLUBILITY & ORG. INSOLUBLE AASHTO T-44 ASTM D-2042	

Specification Reference
 Standard Specification _____
 Project Special Prov. _____
 Other _____

PERSON ACCEPTING
 TECHNICAL RESPONSIBILITY
 Name: _____
 Title: _____

KIND OF MATERIAL	FORM MAT-425 STATE OF CONNECTICUT		DATE
SOURCE OF SUPPLY	DEPARTMENT OF TRANSPORTATION BUREAU OF ENG & HWY OPERATIONS REPORT OF TEST: COLD APPLIED BIT. JOINT SEALANTS		LABORATORY NO.
Location of SOURCE	PENETRATION		
SAMPLE TAKEN FROM	LOSS ON HEAT		
LOCATION OF Sample	SOLUBILITY		
SAMPLED BY	ORGANIC INSOL		
DATE SAMPLED	ASH CONTENT		
USING AGENCY			
QUANTITY REPRESENTED			
MATERIAL WILL BE USED FOR			
DATE USED	RECOMMENDED FOR	REMARKS	
WHERE USED			
SAMPLE RECEIVED			

DIRECTOR OF RESEARCH & MATERIALS

SILO STORAGE TESTING REPORT rev(3/01/6) Form MAT-426

Plant						
Plant				Location		
Class of Mix				Date Sampled		
Lab. Number				Sampled By		
% Rap						
Binder						
Date	Source of Supply	Sample Taken From		Original Viscosity	G*/sin(delta)	
Out of Silo Samples (3 Samples)						
Sample No.	Time	Temperature	Tonnage	Truck No.	Viscosity	G*/sin(delta)
			Average			
Silo						
Silo No.		Type of Heat		Cone	Gate	Side Wall
			Average			
Time In Silo Samples (3 samples)						
Sample No.		Hours	Minutes			
Average						

Form 427: Scale Check Form

Form MAT-427 Revised 3-1-06

SCALE CHECK FORM

INSPECTOR _____
PLANT _____
LOCATION _____
TRUCK # _____

DATE _____

SCALE CALIBRATION DATES

PLANT _____
SILO _____
SCALE HOUSE _____

TRUCK GROSS WEIGHT _____
TRUCK LIGHT WEIGHT _____
TRUCK NET WEIGHT _____

TICKET NET WEIGHT _____
TRUCK NET WEIGHT _____
DIFF= _____
% DIFF= _____

Attach copy of truck ticket.
Be consistent when weighing truck.(Driver in, Driver out)

DESCRIBE SCALES THAT ARE BEING COMPARED:

S_t = tensile strength (kPa) (psi) t = specimen thickness, mm (in)
 P = maximum load (Newton) (lb_f) x 4.448 = D = specimen diameter, mm (in)
Newtons

ATS CS = Average Tensile Strength of Conditioned Specimens
ATS UCS = Average Tensile Strength of Unconditioned Specimens

Form MAT 429: JMF Summary Sheet

Form MAT-429 SUMMARY SUPERPAYE MIX DESIGN - rev (3/1/06)

Plant		Project	
Location		Level	
Plant Type/Capac		Grations	
Date Submitted		Revision Date:	

Descripti	Size/Type of Aggregate	Source of Supply	end Percen
CA-Aggregate 1			
CA-Aggregate 2			
CA-Aggregate 3			
CA/RAP-Aggreg			
FA-Aggregate 5			
FA-Aggregate 6			
FA-Aggregate 7			

Nom. Size	Contractor Data							Calc.	Specifications		Contractor	
	Agg 1	Agg 2	Agg 3	Agg 4	Agg 5	Agg 6	Agg 7		JMF	Coat. pt		Rest. Zone
	CA	CA	CA	CA/RAP	FA	FA	FA	JMF	Comp.			Submitted
Description												
Lead Percent												<i>Info Only</i>
0.075												
0.150												
0.300												
0.600												
1.18												
2.36												
4.75												
9.5												
12.5												
19.0												
25.0												
37.5												
50.0												
Pb					Production Pb (w/ RAP)						JMF Pb	
Pwa												
Gsa												
Gsb												

Test Results	
Gmm	
Gmb - Nma	
Gmb - Nde	
Height-Nma	
Height-Nde	
Height-Nm	
Gse	
Va - Ndes	
VMA - Nde	
VFA - Nde	
Pba	
Pbe	
Dust/Pbe	

User Notes:

- White cells to be completed by the contractor
- Production Pb (w/ RAP) = The total production binder in the HMA
- Contractor JMF should reflect extracted asphalt and washed sieved an

Remarks:

Form MAT 430: Nuclear Inspector Checklist

Project #: _____
Date: _____
Route/Town: _____
Announced Arrival/Departure Time: _____

Traffic Pattern Used (1-15): _____ Number of Paving Lanes: _____
Number of Lanes Closed: 0, 1, 2, 3, etc. _____ Posted Roadway Speed Limit: _____
Number of Flagmen: _____ Location of Flagmen: _____
Number of Policemen: _____ Location of Police officers: _____
Traffic Cones: yes or no _____ If Yes Spacing: _____
Did Traffic Breech Pattern: yes or no _____ Did Traffic Drive on Hot Mat: yes or no _____

At any time did you have to be your own traffic control: yes or no

Was traffic control/pattern adequate throughout operation: yes or no
If no briefly describe issues or incidents: Did you notify DOT Crew Leader: yes or no

Did traffic control pattern change: yes or no

Were you notified prior to pattern being pulled or changed: yes or no If no did you tell the Crew Leader: yes or no
Did Crew Leader address the problem: yes or no

Did you have adequate time to finish testing before pattern pulled or swapped: yes or no If no did you tell the Crew Leader: yes or no
Did Crew Leader arrange for you to finish testing: yes or no

If compaction readings are below specifications, when did you notify the DOT crew Leader and or Paving Foreman: _____

DOT Crew Leader: _____ Paving Foreman: _____

Maintenance Garage: _____

Form MAT 431: ConnDOT Quality Control Plan Outline for HMA

This outline of the ConnDOT Quality Control Plan for HMA is provided as a guideline for the Prime Contractor to follow. The Quality Control (QC) Plan shall indicate detailed specific information requested in the categories listed relating to the principle parts of the Construction of the Project, including but not limited to:

- Inspection and approval of the HMA plant
- The HMA Mix Design and Source Aggregate information
- QC plant HMA inspection and testing services

NOTE: The Prime Contractor (as defined in section 1.01 of the 816) shall be solely responsible for the development and submission of this quality control plan. When Sub-Contractors are designated to perform some of the contractual items, it remains the responsibility of the Prime Contractor to provide the necessary information required herein.

1. Title Page

- Project Information
- Plant Information

2. Table of Contents

3. QC Personnel Issues

- Responsibilities under the quality control plan
- Plan Administrator
- Plant and Field Process Control Technician (PCT)
- Plant and Field Quality Control Technician (QCT)

4. Plant Issues (may be inspected separately by ConnDOT)

- Mixing Plant Make, model, and capacity (including silo information)
- Plant Laboratory equipment inventory and calibration records

5. Material Issues

- Material source(s) of supply
- Minimum schedule of component material(s) sampling and testing

6. Mix Design Issues

- Superpave Mix design
- Pre-production inspection & trials

7. QC Plant Process Control during production

- Providing Minimum Process/Quality Control in accordance with Contract
- Determination of Lot and Sub-lot Sizes
- Visual Inspection as Part of Quality Control
- Frequency of sampling and testing HMA materials
- Documentation of all sampling and testing results
- Immediate Response to out-of-spec Test Results

8. Troubleshooting for out of specification materials

- Process Balance
- Transportation of Mixtures
- Material Transfer Vehicle (if applicable)
- Paving Equipment (make, model and size)
- Longitudinal Joints
- Preparation of transverse joint during start and finish of paving
- Establishing and maintaining rolling and compaction patterns
- Visual Inspection as Part of Quality Control

9. Other Project Issues

- Trench steel plating
- Smoothness issues
- Sealing of all saw cuts

10. Acceptance and IA Program

- QC, A and IA Program Coordination
- Access by Agency for comparison of Quality Control, Acceptance, and/or Independent Test Results

11. Dispute Resolution

- Development of written action plan and timetable for potential disputes

Form 432: Inspector Duties Guide and Field Procedure Form

rev 3-1-06

1. HMA Plant Rankings and operating status protocol:

“A” – Approved ranking: Given to a material class from a producer with a current ranking of 70% or better based on specification compliance for

1. (Grad): Gradation (all applicable sieves for the class)
2. (Pb): binder content
3. (Va): Air Voids
4. (VMA): Voids in Mineral Aggregate
5. (Gmm): Maximum Theoretical Gravity
6. (Gse): Effective Specific Gravity
7. (P_{Ni}): Percent Density at Initial gyrations, and
8. (P_{Nm}): Percent Density at maximum gyrations.

Ranking is the average of the 10-test running average for that class of material. For a test to be deemed acceptable, every single item of the above 8 criteria must meet specifications for each test. An “A” will also be given to a supplier after successfully completing a PT test on that material. Materials ranking an “A” will be permitted to be shipped to Department projects with no interruption provided that they continue to meet all specifications.

“PT” – Production Trial ranking: Given to a class of material from a producer with a current ranking of 69% or less based on specification compliance for Grad, Pb, Va, VMA, Gmm, Gse, P_{Ni}, and P_{Nm}. Ranking is also the average of the 10-test running average for that class of material. A “PT” is also the first test status after a successful “PPT” is obtained. Materials ranking an “PT” will be permitted to be shipped to Department projects with no interruption provided they continue to meet all specifications but will be subject to more inspection, IA testing and oversight by Department inspection personnel.

“PPT” – Pre-Production Trial ranking: Given to a class of material from a producer with no prior production history or has a change in one or more component aggregate from the JMF on record with the DRM. “PPT” status will also be given to a class that:

- from an “A” ranking, has been ordered to “cease production” due to two consecutive tests not meeting specifications for gradation or Pb specification in a single day, or
- from a “PT” ranking, has been ordered to “cease production” due to one single test not meeting specifications for gradation or Pb specification in a single day, or
- has four consecutive tests not meeting Va, VMA, Gmm, Gse, P_{Ni}, or P_{Nm} for multiple days of production.

HMA materials ranked with a “PPT” shall not be permitted to be shipped to CTDOT projects. PPT testing shall be performed on that class of material by the HMA producer and meet all specifications before production shipment may be resumed. At no time shall material ranked PPT be shipped to CTDOT projects.

Contractors that have mix classes ranked a PPT may use one of the following methods to change the ranking. When option (A) is used and PPT meets all specifications for above items 1-8, the PPT is considered a passing test and the class is rated a PT. When the DRM is not onsite to witness the PPT, the PPT option (B) procedure must be followed and materials with test results delivered to the DRM and meet the “B” tolerances shown on table 1, as determined by the DRM.

Option A: Schedule a day when the DRM can be at the HMA facility to witness a passing test or,

Option B: Notify the DRM that a trial will be conducted by the Contractor or their representative, perform needed testing and submit the passing test results along with 2 gyratory molds, 2,500 grams of boxed HMA for binder and gradation determination and 2,500 grams of cooled, loose HMA for Gmm determination.

2. HMA Mixture JMF changes procedure:

JMF changes for Grad, Pb, Gmm, and Gse will be approved by the DRM subject to the following requirements. JMF changes are permitted on HMA materials provided that:

- they are requested and pre-approved by the DRM,
- changes do not exceed 50% of the tolerances for that item,
- they are based on a two test trend,
- they are documented with a promptly submitted revised JMF,

- request for JMF changes are received to the DRM prior to the second test of the day for Superpave materials,
- request for JMF changes are received to the DRM prior to the third test for Marshall materials, and request for JMF changes are received to the DRM prior to any production for either Marshall or Superpave materials.

Repeated JMF requests for a mix or JMF requests to avoid a monetary disincentive or cessation of supply will be denied and HMA materials subject to applicable cessation and/or monetary disincentives or rejection.

JMF changes to the component or mix Gsa, Gsb, Pwa, or aggregate consensus properties will only be approved with proper documentation that the test results were obtained and performed by an AMRL accredited Laboratory and be submitted with proper detailed and summary documentation to the DRM for approval. JMF changes for these items will only become effective the next production day after the DRM has reviewed and accepted the JMF request for change. There will be no retroactive determinations made.

3. Cessation of Supply and Disincentive procedure:

A class of mix is subject to "cessation of supply" when the production testing is not in conformance with the specifications, rankings fall below a PT, as stated herein and in the specifications, or it has been determined by the DRM that the production facility, the field laboratory, testing personnel or materials are in non-compliance with the specifications. "Cessation of supply" status may be cause for a monetary disincentive and/or PPT trials as follows:

Superpave: Monetary Disincentive and PPT trials for HMA materials:

- When two consecutive tests from a batch, drum, or silo do not meet specifications for gradation or Pb for a mix with an "A" ranking in a single day, or
- When a single test from a from a batch, drum, or silo does not meet specifications for gradation or Pb for a mix with a "PT" ranking in a single day.

Marshall: Monetary Disincentive and PPT trials for HMA materials:

- When two consecutive tests from a batch, drum, or silo do not meet master range specifications for gradation or Pb for a mix in a single day, or
- When three consecutive tests from a batch, drum, or silo do not meet JMF specifications for gradation or Pb for a mix in a single day, or

Superpave cessation and PPT trials only (no monetary disincentive) for HMA mixtures:

1. batch or drum plant: when four consecutive tests do not meet specifications for volumetrics (Va, VMA, Gmm, Gse, P_{Ni}, and P_{Nm}), for a mix with an "A" ranking regardless when taken, or
2. batch or drum plant: when two consecutive tests do not meet specifications for volumetrics, for a mix with a "PT" ranking regardless when taken, or
3. Silo: when two consecutive tests do not meet specifications for volumetrics, regardless when taken, or
4. Silo: when a single test does not meet specifications for gradation or Pb, or
5. Batch, drum plant, or Silo: when two consecutive PT tests fails volumetrics, or
6. Batch, drum plant, or Silo: when two tests for Gse is greater than the JMF Gsa or less than the JMF Gsb for that class.

4. Verification Testing Procedure and Tolerances:

Verification (V) testing will be selected by the DRM at a typical frequency of (1 to 6) to the Contractor QC testing. (V) samples will be randomly obtained by Department personnel from among the QC samples produced by QC contractor or their representative. The (V) samples will be tested by the DRM at the Central Laboratory and compared to the Tolerances shown in Table 1. Sample comparisons between QC and (V) samples will be considered acceptable when the difference falls within the tolerances shown in column "C" of Table 1. Samples will also be tabulated using columns "A" and "B" for internal ranking purposes.

5. PRODUCTION INSPECTION AT HOT MIX ASPHALT PLANTS

The purpose of production inspection is not only to check on the operations for compliance to the specifications, but also to insure the best possible quality product with the available materials and equipment. The primary goal during production is to maintain a certain degree of uniformity not only daily but also throughout the life of the contract. The aggregate in each stockpile must be of uniform quality and gradation; the materials must be fed into the plant in a uniform, controlled manner; the heating and drying of the aggregates must be uniform; the separation of the aggregates into their various bin sizes must be uniformly controlled; and the aggregates and the asphalt cement must be combined and mixed in a uniform, consistent manner. For these reasons, the inspector must be thoroughly familiar with all phases of the manufacturing process, be a well-qualified and conscientious inspector by being alert, knowledgeable, and persuasive. Production inspection at the HMA plant is divided into four main categories:

- a. **Process Control (PC):** *Typically performed by the HMA producer prior to production and shipment*
 - i. Tests component aggregates for consistency and conformance to JMF
 - ii. Ensures stockpiles are source approved, uniform and free from contamination
 - iii. Tests for moisture of each component prior to start up daily

- b. **Quality Control (QC):** *Typically performed by the HMA producer during production*
 - i. Ensure proper HMA JMF and settings of Plant are as needed
 - ii. Tests HMA for conformance to JMF
 - iii. Analyzes test data, investigates causes of non-conformance, defines assignable cause(s), and takes immediate corrective action, as needed
 - iv. Reports findings to appropriate party
 - v. Oversees the activities of the PC personnel

- c. **Verification (V):** *Typically performed by the State Highway Agency (SHA) and uses split or independent samples to the QC samples to verify test data.*
 - i. Performs testing and oversight at HMA plant to validate or verify QC test data
 - ii. Prepares daily inspector reports of contract compliance items
 - iii. Performs investigations when (V) tests do not compare to QC test data
 - iv. Orders necessary mix adjustments to ensure mixture quality and specification compliance, as needed

- d. **Acceptance (A):** *Typically performed by the State Highway Agency (SHA) or their representative*
 - i. Performs testing of HMA for payment
 - ii. Orders cessation of supply or recommends disincentives for non-conforming materials
 - iii. Approves new and revisions to JMF
 - iv. Oversees the activities of the QC personnel

- e. **Independent Assurance (IA):** *Typically performed by a separate SHA unit to ensure conformity of testing proficiency, personnel and equipment consistency.*
 - i. Performs split or independent testing at HMA facility
 - ii. Evaluates QC and (A) personnel for protocol compliance and condition of testing equipment
 - iii. Analyzes test data and compares to QC and (A) test results to detect malfunctioning, non-calibrated equipment, test errors or other sources of variability beyond the permissible tolerances stated in the specification

6. DUTIES OF THE HMA PLANT INSPECTOR

The duties listed here are minimum requirements to be performed by all types of Inspectors (i.e., PC, QC, (A), and IA). The daily responsibilities of an HMA inspector shall be for elements and frequency, as specified in the contract, and will typically include but is not limited to the following items.

A. PC and QC duties prior to HMA production:

- ___ 1. Check for the proper operation of the HMA plant drum/batch machinery (belts, sensors, silos, etc.)
- ___ 2. Obtain proper samples of aggregate components and RAP for gradation, binder content to compare against the latest JMF and perform moisture(s) to be supplied to the plant operator for proper plant adjustments, as specified in the contract
- ___ 3. Inspect component aggregates for consistency, quality, cleanliness and approved source of supply according to JMF requirements
- ___ 4. Ensure no segregation and contamination between stockpiles or cold-feed bins has occurred
- ___ 5. Discuss any findings and communicate any concerns with pay loader operator
- ___ 6. Ensure that field laboratory sampling, testing and safety equipment inventory is in strict compliance with contract specifications
- ___ 7. Turn on & preheat laboratory testing equipment one hour prior to use (Ignition ovens, heating ovens, controlled water baths, etc.)
- ___ 8. Check laboratory testing equipment & calibrations (gyratory, thermometers, scales, manometer, etc.) and record in on-site Calibration Records Manual
- ___ 9. Turn on PC, printer, modem and prepare specified software forms and spreadsheets and ensure ample paper is available
- ___ 10. Ensure proper latest JMF and HMA laboratory correction factors are available and accurate for the material being tested
- ___ 11. Ensure appropriate PG binder grade to be used for the day's production and document all deliveries with bill of lading, source of supply, delivered ground tank and sample for DRM use, as specified

- ___ 12. Prepare proper testing form(s) with date, project class, NETTCP certification #, and facility ID
- ___ 13. Select appropriate random numbers for sampling and testing based on estimated call in production and contract test frequency
- ___ 14. Ensure copy of all proper AASHTO and ASTM sampling and testing protocols and contract documents are available for reference
- ___ 15. Maintain and review test data charts, past technician notes and copies of past testing reports to spot potential problems or trends that may be avoided or minimized
- ___ 16. Confirm assignment with Plant operator and ensure class(es) to be produced are ranked with proper (A) or PT status.
- ___ 17. Perform needed PPT testing prior to production and report test results, as specified in contract
- ___ 18. Perform and review all above stated testing to ensure accuracy and compliance to contract specifications
- ___ 19. Inspect all Haul units for proper canvas cover and ensure they are free of contaminating materials and fuel oil
- ___ 20. Take immediate action to report and document any issue of non-compliance and what corrective action(s) were taken, when needed
- ___ 21. Perform other duties as ordered or required

B. PC and QC duties during HMA production:

- ___ 1. Inspect the physical characteristics of the HMA mixture in the haul unit for appearance of a lean or dry mix deficiency or an excess of asphalt, too coarse or too fine, uncoated particles, mix segregation or non-uniform appearance.
- ___ 2. Check the temperature of the mix for conformance to specifications and obtain proper HMA sample from haul unit
- ___ 3. Record sample number, time, truck, class, temperature and plant/silo location with any observed comments on software form
- ___ 4. Reduce sample to appropriate size(s) to prepare mixture for gyratory specimens, Gmm and binder content and label accordingly
- ___ 5. Perform laboratory testing on gyratory specimens, Gmm, and binder content and check for conformance with specifications
- ___ 6. Collect copy of truck ticket sampled, ignition oven ticket, gyratory specimen printouts and attach with test report for DRM
- ___ 7. Maintain all test data on approved software and save/archive and printout test data for records. Submit results to DRM within 24 hrs.
- ___ 8. Place properly labeled gyratory specimens and store for DRM retrieval a maximum of 15 days
- ___ 9. Order a "cease production" and necessary PPT trials, as appropriate, and immediately report all failing tests to DRM
- ___ 10. Take immediate corrective action, determine assignable causes and make needed modifications any time a test is in non-conformance with required specifications and report to the DRM
- ___ 11. Inspect the process of the Batch and Drum plant operations from the mixing control house for proper aggregate and mixture temperatures, cold-feed and hot bin function, aggregate and asphalt scale weights, State seal dates, full automatic batching sequence
- ___ 12. Check printouts on each truck ticket for requested ticket data for mix proportion, class, RAP content, moisture, target component weights and related information compliance are included
- ___ 13. Check that over or under pulls beyond allowable tolerances of aggregate proportions or double bin pulling do not occur and that HMA plant is running only on full automatic (not auto –manual or manual), and that all information is indicated on truck tickets or plant printouts, as required by specifications.
- ___ 14. Take immediate action and document any issue of non-compliance and what corrective action(s) were taken, when needed
- ___ 15. Perform other duties as ordered or required

C. Verification (V) and Acceptance (A) duties during HMA production:

- ___ 1. Confirm estimated call-in details with QC personnel
- ___ 2. Inspect HMA Plant and field laboratory for deficiencies
- ___ 3. Review that PC/QC personnel have performed 6A & 6B items thoroughly and results are in compliance with contract specifications
- ___ 4. Perform selective laboratory test equipment calibration check, review all prior and current test results and calibration records
- ___ 5. Perform selective items from 6A & 6B to ensure compliance with contract specifications
- ___ 6. Oversee the Contractor PC and QC testing personnel sampling and testing procedures for proper test protocol compliance and contract testing frequency
- ___ 7. Consult with Central office with any issues relating to PC/QC personnel, HMA production, mixture compliance, cessation of supply, improper operations, JMF revisions or other immediate issues of concern
- ___ 8. Orders cessation of supply and PPT testing, as needed
- ___ 9. Prepare and submit Daily Inspector Reports

- ___ 10. Retrieve all QC test samples and proper documentation
- ___ 11. Perform verification testing of QC samples at Central Laboratory and check compliance with table 1
- ___ 12. Immediately investigate assignable cause(s) of QC technicians, laboratory equipment and mixture to determine source of non-compliance and direct corrective action
- ___ 13. Other related inspection and oversight duties, as required.

D. Independent Assurance duties during HMA production:

- ___ 1. Review that PC/QC/V/A personnel have performed 6A thru 6C items thoroughly and results are in compliance with contract specifications
- ___ 2. Obtain independent assurance samples and observe QC and V personnel sampling and testing compliance to AASHTO/ASTM and NETTCP protocol
- ___ 3. Assist with investigations of failed V testing
- ___ 4. Assist with troubleshooting, mixture compliance, test error, equipment and plant difficulties and recommend solutions
- ___ 5. Other related inspection and oversight duties, as required

TABLE 1: QUALITY VERIFICATION & ACCEPTANCE TOLERANCES				
Properties	Tolerance (maximum)	Tolerance (maximum)	Tolerance (maximum)	Tolerance
	A (C x 0.25)	B (C x 0.5)	C	D (>C)
#200	0.18	0.35	0.7	> 0.7
#100	0.5	1.0	2.0	> 2.0
#50	0.5	1.0	2.0	> 2.0
#30	0.5	1.0	2.0	> 2.0
#16	0.5	1.0	2.0	> 2.0
#8	0.5	1.0	2.0	> 2.0
#4	0.5	1.0	2.0	> 2.0
3/8"	1.0	2.0	4.0	> 4.0
1/2"	1.0	2.0	4.0	> 4.0
3/4"	1.0	2.0	4.0	> 4.0
1"	1.0	2.0	4.0	> 4.0
1 1/2"	1.0	2.0	4.0	> 4.0
2"	1.0	2.0	4.0	> 4.0
Pb	0.06	0.12	0.25	> 0.25
Va	0.18	0.35	0.71	> 0.71
VMA	0.18	0.35	0.71	> 0.71
VFA	3.5	3.5	3.5	> 3.5
Gmm	0.005	0.009	0.018	> 0.018
Gmb	0.003	0.006	0.011	> 0.011
Pbe	0.06	0.12	0.25	> 0.25
Pba	0.06	0.12	0.25	> 0.25
PD@Ni	0.18	0.35	0.71	> 0.71
PD@Nd	0.18	0.35	0.71	> 0.71
PD@Nm	0.18	0.35	0.71	> 0.71
Gse	0.005	0.009	0.018	> 0.018
#200/Pbe	0.15	0.15	0.15	> 0.15
Masses (% of total mass)	0.025%	0.05%	0.1%	> 0.1%
Heights (average of 4) (mm of final height)	0.5	1.0	2.0	> 2.0

Form MAT 433: Ignition Oven Correction Factor

State of Connecticut

Department of Transportation

Division of Materials Testing

Ignition Oven Correction Factor work sheet Form Mat-433 Revised 3/1/06

COMPANY		PLANT / LOCATION		
MATERIAL	MIN SAMPLE SIZE	MAXSAMPLE SIZE	SOURCE	CORRECTION FACTORS
1 1/4	3500 g	4000 g		
1	3000 g	3500 g		
3/4"	2000 g	2500 g		
1/2"	1500 g	2000 g		
3/8"	1200 g	1700 g		
1/4"	1200 g	1700 g		
S. Sand	1200 g	1700 g		
Screenings	1200 g	1700 g		
Blend	1200 g	1700 g		
N. Sand	1200 g	1700 g		
N. Sand	1200 g	1700 g		
RAP	1200 g	1700 g		

DATE

STATE INSPECTOR

CONTRACTOR REP

ALL AGGREGATES SHALL BE BURNED AT 538° C FOR 45 MINUTES EACH

Form 434: Outline of Quality Control Plan for Density of HMA Pavements

Rev. 3-07

Online resources and guidelines on the WEB:

http://www.cflhd.gov/design/documents/material/qc_plans.pdf

<http://www.fhwa.dot.gov/construction/cpmi04b2.htm>

Introduction:

This Quality Control Plan Outline for Density of HMA Pavements is a suggested outline of the QC plan that is required by specifications to be submitted by the Contractor. This outline is intended to assist the Contractor in providing minimum information required by the specifications to assess the process and organization performing the HMA paving and compaction.

This Quality Control Plan Outline for Density of HMA Pavements is required by contract specifications to be submitted by the DRM prior to the beginning of any paving. It must be on record if the Contractor is to have the right to dispute any acceptance density testing performed by the DRM. The absence of an approved Quality Control Plan Outline for Density of HMA Pavements or the lack of QC data for any day a deficiency occurs will be evidence to the DRM that the contractor does not have the ability to dispute any density deficiency with cores, as permitted in the Contract.

This document is intended to provide guidance to the Department, Prime Contractors, subcontractors, and other suppliers as to what is expected from the HMA paving contractor. The Quality Control Plan Outline for Density of HMA Pavements is a framework for the contractor's quality process for the loading, transportation, delivery, placement and density of HMA pavements. This plan and the contract specifications define the expected results and how those results will be achieved and make it possible for DRM to verify that the contractor, as an organization, has addressed the basic elements of its pavement density quality processes and responsibilities.

The Contractor shall provide inspection staff to perform and record density test. Acceptance of this plan by DRM and the adherence to this plan by the Contractor will not absolve the contractor, in any way, from the responsibility of meeting all contract specifications.

Suggested Quality Control Plan Outline Elements for Density of HMA Pavements:

1. List what type of density testing device and calibration/standardization procedure to be followed.
2. State that QC testing and its related process control procedures are to provide the Contractor needed data that the placement process is in compliance with contract specifications. Payment will be determined solely from acceptance testing performed by the DRM. State QC processes.
3. List procedure of what steps will be taken when non-compliance density test data is found.
4. State number of rollers, roller setting (amplitude & frequency) and speed/impacts per foot (ipf) in plan. Shall include when vibratory and non-vibratory rolling will be used, in conformance with specifications.
5. Statement of which best paving practices employed with paver operations to obtain density.
6. Statement of how road grade and profile will be maintained and in conformance with contract plans. Include source of references, how transitions, longitudinal joints will be constructed and what steps will be taken to ensure no damage comes to pavement structures drainage fixtures and other existing roadway items.