

Section 12

RECORDS AND REPORTS

12.1 RECORDS AND REPORTS – GENERAL

One of the most important functions of both QC and QA Technicians is to keep accurate records and reports. Records and reports are necessary to determine compliance with contract requirements and to document payments to the Contractor.

The Technician is furnished standard forms for routine reporting which may require daily, weekly, or monthly reporting, depending on the data to be submitted. These reports must always be completed in entirety. In addition to the standard forms, the Technician, both QA and QC should keep a written narration in a permanent field record (diary) of the principal activities that occur. The record should contain all information concerning the work being inspected, including information such as weather conditions, important conversations, visitors on site, verbal orders received, unusual incidents, equipment breakdowns, length of work stoppages, number of personnel and types of equipment affected by work stoppages. If an item seems unusually important, it should be recorded and analyzed in sufficient detail to make it fully understandable at some later date.

The importance of entries listed on records and reports or in the Technician's diary cannot be over-emphasized. The information recorded may never be needed or reviewed, but, if it is ever needed, it will be extremely useful. This information may serve as a reference for performance of similar future work, a reference in the event of legal action or litigation by any affected party, and, possibly most important, a source of clues for investigators in the event the job fails.

Most forms and reports will be assigned a QC, QA, QA/QC or QMS form number. QC forms will be used only by the Contractor's quality control personnel, QA forms only by the Department's quality assurance personnel, QA/QC and QMS forms will be used at times by both parties. The Department will furnish all QC, QA, QA/QC and QMS forms. The Division QA Supervisor is responsible for distributing all needed forms to the Contractor and maintaining a reasonable supply at the Division QA Lab.

The Contractor's QC data must be submitted on Department approved forms. The data may be in printed or handwritten form.

Beginning in 2010, QA and QC data was entered into a Quality Assurance Program (QAP). The data was logged into a database within the Department's Hicams application. There is now a web interface for the Contracting Industry to access this application to enter their "raw" test data from each QC Laboratory. During 2010 transition period, the QA Laboratories submitted QC and QA Test results just as they had with the previously used QMS Spreadsheets.

Beginning with 2011, QC & QA Laboratories will have to submit their test results into the QAP database via the web interface. This web interface is found at the following web address:

<https://connect.ncdot.gov/resources/Materials/Pages/QualityAssurance.aspx>

There is also a link from the Materials & Tests Unit's website which is found at:

<https://connect.ncdot.gov/resources/Materials/Pages/QMSAsphaltTrainingSchool.aspx>

In order to access this portal, you have to register and receive an NCID and password.

Once the test data / results are submitted into the QAP, test reports and graphs will be available for viewing and / or printing.

12.2 RECORDS AND REPORT DOCUMENTATION

The Contractor shall document all observations, records of inspection, samples taken, adjustments to the mix, and test results on a daily basis. Results of observations and records of inspection shall be noted as they occur in a permanent field record. Adjustment to mix production and test results shall be recorded on forms provided by the Engineer. The Contractor shall maintain on a daily basis copies of all test worksheets, the "Moving Average Calculation Sheet" for gradation, % AC, and mix properties and all control charts as specified in the "Quality Management System, Asphalt Plant Mix Pavements" Specification. **There should be no erasures, whiteout or other similar means used to correct an error on any field record entries, test worksheets, or any other QMS forms. Entries that have been made in error on any QMS form should be struck through with a single line and the initials of the individual voiding the entry noted. Corrected entries should be placed immediately above the voided entry.**

All such records shall be made available to the Engineer, upon request, at any time during project construction. All QC records and forms shall be completed and distributed in accordance with the most current edition of the Department's "HMA/QMS Manual". The Contractor shall maintain all required QC records by day's production for each plant site in a well-organized manner such that these records may be easily reviewed.

Failure to maintain QC records and forms as required, or to provide these records and forms to the Engineer upon request, may result in production stoppage until the problem is resolved.

12.3 RETENTION OF QMS FORMS

All QMS forms and reports shall be completed and distributed in accordance with the following detailed instructions for each form. The Contractor's QC forms, with required supporting documents, shall be retained by the Contractor for at least three (3) years after completion of the forms. For required supporting documentation, reference should be made to the instructions for each individual form contained in the remainder of this section. The Department's QA forms shall be stored indefinitely by the QA Labs unless permission is given otherwise. The Materials & Tests Asphalt Lab may be contacted for any questions and/or guidance concerning retention time for each individual form.

12.4 FALSIFICATION OF RECORDS

Falsification of test results, documentation of observations, records of inspection, adjustments to the process, discarding of samples and/or test results, or any other deliberate misrepresentation of the facts will result in the revocation of the applicable person's QMS certification. In addition, state and/or federal authorities may also pursue criminal charges. The Engineer will determine acceptability of the mix and/or pavement represented by the falsified results or documentation. If the mix and/or pavement in question is determined to be acceptable, the Engineer may allow the mix to remain in place at no pay for any asphalt mix, binder, or other mix components. If the mix and/or pavement represented by the falsified results is determined not to be acceptable, it shall be removed and replaced with mix that meets the Specifications. In this case, payment will be made for the actual quantities of materials required to replace the quantities represented by the falsified results or documentation, not to exceed original quantities of the mix removed.

12.5 FORMS AND INSTRUCTIONS

The following pages are copies of all forms and reports to be used, along with detailed instructions on how to complete each form or report. Also included are approved mix design forms and supporting mix design data forms for the Contractor's use in preparing and requesting mix designs. These mix design forms are pre-approved by the Department. Computer generated forms that are the exact same as these are also acceptable. The Department also has available, at no charge, a Mix Design spreadsheet that will generate these forms. If a copy of this spreadsheet is desired, contact the Asphalt Design Engineer, M&T Unit, 1801 Blue Ridge Rd., Raleigh, N.C., or phone (919) 329-4060 or also maybe downloaded from the web site:

<https://connect.ncdot.gov/resources/Materials/Pages/QMSAsphaltTrainingSchool.aspx>

SUMMARY OF ALL QMS FORMS WITH INSTRUCTIONS

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**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
HOT MIX ASPHALT QUALITY CONTROL TEST WORKSHEET**

Type Mix: [1] QC Sample Date: [4] JMF Pba: [7] MD Gb: [10]
 Plant Location: [2] QC Sample No.: [5] JMF Gse: [8] Calculated Gse: [11]
 Plant Cert No: [3] JMF No.: [6] JMF Gsb: [9] Corrected Gsb: [12]

Dry & Pan Weights	Pan Wt.
Agg Wt after Ignition [13]	<0.2% of Dry Wt [14]
Dry Wt after Wash [15]	Dry Wt After Sieving? [17]
Pan Weight [16]	
% Loss from Sieving [16]	

Furnace Weights	Furnace Scale
Basket + Mix [18]	Within [19]
Basket Wt. [19]	5.0 grams? [20]
Total Mix Wt. [20]	
Furnace Readout [21]	[22]

% Binder (Pb)
JMF %Binder [23]
% Binder from Burn [24]

Moisture Content
Mix Sample Weight [25]
Mix Dry Weight [26]
Mix % Moisture [27]

VMA [51]
VFA [52]
%Gmm@Nini [53]
P0.075 / Pbe Ratio [54]

Gradation Data (all weights are after burn weights)			
SIEVE	Accumulated Weight	Percent Retained (A)	% Pass (A)
37.5 mm	[28]	[29]	[30]
25.0 mm			
19.0 mm			
12.5 mm			
9.5 mm			
4.75 mm			
2.36 mm			
1.18 mm			
.600 mm			
.300 mm			
.150 mm			
.075 mm			
PAN			Constant = [34]

Hot Bin Weights (Batch Plant)	#1 [35]	#2	#3	#4	#5
Cold Feed(materials)	[36]				
Percentages	[37]				

Gmm (Rice) Test Data	
A. Weight of Container	[38]
B. Weight of Container + Mix	[39]
C. Weight of Container + Mix In Water	[40]
D. Weight of Container (hanging in water)	[41]
E. Uncorrected Maximum Specific Gravity (B - A) - (C - D)	[42]
F. Weight of Pan + Final Weight	[44]
G. Weight of Pan	[45]
H. Max Specific Grav (F - G) - (C - D)	[46]
I. Dry Back Correction Factor	[47]
J. (E) - (I) = Corrected Value	[48]
K. Reheat Correction Factor	[49]
L. (H) x (K) Corrected Max Specific Gravity	[50]

Gyratory Compacted Specimen Test Data

Specimen Number	A). Height @ Nini		B). Height @ Ndes		C). Dry In Air		D). SSD In Air		E). Weight In Water		F). Gmb @ Ndes' Measured		G). Gmb @ Ndes' Estimated		H). @ Nini		I). @ Ndes		J). Correction Factor		K). Gmb @ Nini Estimated		L). Gmb @ Nini Corrected		M). Gmm Rice Grav Measured		N). VTM @ Ndes	
	Measured	[55]	Measured	[56]	Measured	[57]	Measured	[58]	Measured	[59]	C/(D-E)	[60]	C/I	[61]	Ax17.6715	[62]	Bx17.6715	[63]	F/G	[64]	C/H	[65]	J x K	[66]	Measured	[67]	(#P1/M x 100)	[68]
1																												
2																												
3																												
AVERAGES																												

*NOTE: BY PROVIDING THIS DATA UNDER MY SIGNATURE AND/OR HICAMS CERTIFICATION NUMBER, I ATTEST TO THE ACCURACY AND VALIDITY OF THE TEST DATA CONTAINED ON THIS FORM AND CERTIFY THAT NO DELIBERATE MISREPRESENTATION OF TEST RESULTS, IN ANY MANNER, HAS OCCURRED

[72]
 * PRINT NAME LEGIBLY w/ HICAMS #
 [73]
 QA/QC TECHNICIANS SIGNATURE

INSTRUCTIONS
FOR
QA/QC-1 Rev
HOT MIX ASPHALT QA/QC TESTS WORKSHEET
(Gmm by Rice Test Method)

GENERAL NOTE: This form may be used by either QA or QC personnel when determining binder content, recovered aggregate gradations, maximum specific gravity by Rice Test Method, and Gyratory test data for mix samples compacted to Ndes gyrations. QC is required to attach the following to this QA/QC Form:

1) a copy of the weigh ticket for the mix sample load; and

2) the ignition furnace printout for the binder content test. This form, with these attachments, shall be maintained in the appropriate QC files for a period of (3) years after completion of the form. QA shall maintain their QA/QC-1 forms indefinitely unless permission is given otherwise.

1. Type mix being produced and tested; i.e, SF9.5A, I19.0C, etc.
2. Actual location of plant site (Site shown on JMF)
3. Current asphalt plant HiCAMS certification number.
4. Date mix is tested by QA/QC personnel
5. Consecutive QC sample number, i.e., 09-1, 09-2, 09-3, etc.
6. Actual Job Mix Formula Number of mix tested.
7. Percent Absorption (Pba) value from the Job Mix Formula.
8. Effective Specific Gravity (Gse) value from the Job Mix Formula
9. Bulk Specific Gravity (Gsb) value from the Job Mix Formula.
10. Binder specific gravity from actual mix design being used.
11. Calculated effective specific gravity from the Rice Test from this mix sample. See Section 7.16.3 of this manual for formula.
12. Corrected bulk specific gravity. See Section 7.16.4 Step 1 of this manual for formula.
13. Weight of recovered aggregate after ignition furnace burn.
14. Weight of dry recovered aggregate after washing aggregate sample.
15. Weight of material in pan after sieving (See PAN weight under Block 28).
16. Percent loss after sieving. See Section 7.9.4(G) for formula
17. YES if No. 16 above is 0.2% or less. NO if it exceeds 0.2%.
18. Weight of ignition furnace basket + mix.
19. Weight of ignition furnace basket.
20. No. 18 minus No. 19 = Total weight of mix.
21. Combined weight of mix sample and ignition furnace basket shown on ignition furnace readout.
22. YES if weight difference between Nos. 18 and 21 is within 5.0 grams. No if the difference is not w/in 5.0 grams.
23. Percent binder from Job Mix Formula being produced.
24. Percent binder from ignition furnace burn ticket.

INSTRUCTIONS
FOR
QA/QC-1 Rev
(Continued)

Note: Nos. 25, 26, and 27, to be used when checking moisture in the completed mix when required by or instructed by QA personnel.

25. Mix sample weight before drying.
26. Mix sample weight after drying. (Mix should be dried at 325°F +/- 25°F to a constant weight in oven.)
27. % Moisture in Mix. $(\text{Original mix sample weight (25)} - \text{Dry mix sample weight (26)}) \div \text{Original mix sample weight (25)} \times 100$
28. Accumulated weight of aggregate retained on each sieve/pan.
29. Percent retained. $\text{Cumulative Wt. Retained} \div (\text{Pan Wt.} + \text{Wt. Loss from Washing}) \times 100$. See Section 7.9.4(G) of this manual for formula and example calculation of constant.
30. Total Percent passing $[100 - \% \text{ Retained (\#29)}]$.
31. [ITEM DELETED]
32. [ITEM DELETED]
33. Target values for each sieve from JMF.
34. Optional constant for computing percent retained. (See Section 7.9.4(G) of this manual for formula and example calculation of constant).
35. Actual aggregate weights pulled from each hot bin being used (Batch Plant Only).
36. Type aggregate in each cold feed bin being used in mix; i.e., 78M, screenings, sand, etc.
37. Actual percent aggregate from each cold feed bin being used for in mix.
38. Weight of container (Rice Pot).
39. Weight of container + mix.
40. Weight of container + mix w/ both suspended under water.
41. Weight of empty container suspended under water.
42. Uncorrected Maximum Specific Gravity (Rice Gravity). Use formula on form.
43. Weighing interval, only if dry back test is required. Dry back required if any aggregate in mix has absorption of 1.5% or greater.
44. Final weight of pan and mix sample.
45. Weight of Pan.
46. Maximum Specific Gravity calculation (Nos. 43 thru 46 completed only if dry back is performed).
47. Dry back correction factor, if applicable. Difference in blank (42) and blank (46).
48. Corrected Gmm value, only if dryback correction factor is used. [Blank (42) minus blank (47)]
49. Reheat correction factor, if applicable.
50. Corrected Maximum specific gravity (if reheat correction factor used). Blank (46) minus (48).
51. Calculated VMA from test data (See calculation formula in Section 7.16.4)
52. Calculated VFA from test data (See calculation formula in Section 7.16.5)
53. Calculated % Gmm@ Nini from test data (See calculation formula in Section 7.16.7)
54. Calculated P0.075/Pbe Ratio from test data (See calculation formula in Section 7.16.6)

INSTRUCTIONS
FOR
QA/QC-1 Rev
(Continued)

55. Height (mm) of Gyratory specimens at Nini taken from computer printout.
56. Height (mm) of Gyratory specimens at Ndes taken from computer printout.
57. Unsuspended dry weight of each Gyratory specimen to nearest 0.1 gram (x.x).
58. Unsuspended saturated surface dry weight of each Gyratory specimen to nearest 0.1 gram (x.x).
59. Suspended weight in 77 degree (F) water for 3-5 minutes for each Gyratory specimen to nearest 0.1 gram (x.x).
60. Bulk specific gravity of each specimen (Gmb @Ndes, measured to nearest 0.001 (x.xxx)).
61. Bulk Specific Gravity of each specimen (Gmb @Ndes, estimated)
62. Sample volume @ Nini expressed in $\text{cm}^3 \left(\frac{\pi d^2 \times h}{4} @\text{Nini} \right) \div 1000$ **or** $h@Nini \times 17.6715$
63. Sample volume @ Ndes expressed in $\text{cm}^3 \left(\frac{\pi d^2 \times h}{4} @\text{Ndes} \right) \div 1000$ **or** $h@Ndes \times 17.6715$
64. Correction factor determined by dividing Gmb@Ndes (measured) by Gmb @Ndes (estimated). (Calculated to 0.001)
65. Bulk Specific Gravity (Gmb @Nini Estimated) $\frac{\text{Mass (Gms)}}{\text{Volume (Cm}^3\text{)}}$
66. Bulk Specific Gravity (Gmb @Nini Corrected) Correction Factor x Gmb @Nini (estimated).
67. Gmm (Rice Test specific gravity) from blank 42, or blank 46 if dry back is required.
68. Percent voids in total mix (VTM) from test data (See calculation formula in Section 7.16.2)
69. Average Gmb @ Ndes. [Total of specimen Gmbs \div 3 (nearest 0.001)]
70. Average Gmb @ Nini [Total of Gmbs @ Nini \div 3 (nearest 0.001)]
71. Average VTM @ Ndes [Total of VTMs \div 3 (nearest 0.1%)]
72. Printed name and HiCams certification number of QA/QC technician performing test
73. Signature of QA/ QC technician performing test

NOTE : All volumetric properties (VMA, VTM, VFA) are calculated using Gmb @ Ndes(meas).

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION HOT MIX ASPHALT QUALITY CONTROL TEST WORKSHEET

6/18/2008

QA/QC-1A Rev

Type Mix: [1]
 Plant Location: [2]
 Plant Cert No.: [3]

QC Sample Date: [4]
 QC Sample No.: [5]
 JMF No.: [6]

JMF Pba: [7]
 JMF Gse: [8]
 JMF Gsb: [9]

MD Gb: [10]
 Calculated Gse: [11]
 Corrected Gsb: [12]

Dry & Pan Weights		Pan Wt.
Agg Wt after Ignition	[13]	<0.2% of
Dry Wt after Wash	[14]	Dry Wt
Pan Weight	[15]	After Sieving?
% Loss from Sieving	[16]	[17]

Furnace Weights		Furnace
Basket + Mix	[18]	Scale
Basket Wt.	[19]	Within
Total Mix Wt.	[20]	5.0 grams?
Furnace Readout	[21]	[22]

% Binder (Pb)	
JMF %Binder	[23]
% Binder from Burn	[24]

Moisture Content	
Mix Sample Weight	[25]
Mix Dry Weight	[26]
Mix % Moisture	[27]

VMA	[46]
VFA	[47]
%Gmm@Niri	[48]
P0.075 / Pbe Ratio	[49]

Gradation Data (all weights are after burn weights)				JMF
SIEVE	Accumulated Weight	Percent Retained	TOTAL % PASSING	JMF
37.5 mm	[28]	[29]	[30]	[33]
25.0 mm				
19.0 mm				
12.5 mm				
9.5 mm				
4.75 mm				
2.36 mm				
1.18 mm				
.600 mm				
.300 mm				
.150 mm				
.075 mm				
PAN				
			Constant =	[34]

Hot Bin Weights (Batch Plant)	#1 [35]	#2	#3	#4	#5
Cold Feed (materials)	[36]				
Percentages	[37]				

Gmm (CoreLok) Test Data	
A. Weight of Empty Bag	[38]
B. Weight of Rubber Sheets	[39]
C. Weight of Sample in air	[40]
D. Weight of Bag + Sample in Water	[41]
E. Total Volume (A+B+C)-D	[42]
F. Bag & Sheet Volume (AVC)+(B/Rc)*	[43]
G. Sample Volume (E-F)	[44]
H. Gmm (C/G)	[45]

* (Vc = 903g/cm3) Rc (value on sheets) g/cm3 =

Gyratory Compacted Specimen Test Data

Specimen Number	A). Height @ Niri		B). Height @ Ndes		C). Dry In Air		D). SSD In Air		E). Weight In Water		F). Gmb @ Ndes' Measured		G). Gmb @ Ndes' Estimated		H). @ Niri		I). @ Ndes		J). Correction Factor		K). Gmb @ Niri Estimated		L). Gmb @ Niri Corrected		M). Gmm Corelok Gravity		N). VTM @ Ndes	
	Measured	[50]	Measured	[51]	Measured	[52]	Measured	[53]	Measured	[54]	C / I	[55]	C / I	[56]	Ax17.6715	[57]	Bx17.6715	[58]	F / G	[59]	C / H	[60]	J x K	[61]	Measured	[62]	(M-F)/M x 100	[63]
1																												
2																												
3																												
AVERAGES																												

*NOTE: BY PROVIDING THIS DATA UNDER MY SIGNATURE AND/OR HICAMS CERTIFICATION NUMBER, I ATTEST TO THE ACCURACY AND VALIDITY OF THE TEST DATA CONTAINED ON THIS FORM AND CERTIFY THAT NO DELIBERATE MISREPRESENTATION OF TEST RESULTS, IN ANY MANNER, HAS OCCURRED

[67]
 * PRINT NAME LEGIBLY w/ HICAMS #
 [68]
 QA/QC TECHNICIANS SIGNATURE

INSTRUCTIONS
FOR
QA/QC-1A Rev
HOT MIX ASPHALT QA/QC TESTS WORKSHEET
(Gmm by CoreLok Test Method)

GENERAL NOTE: This form may be used by either QA or QC personnel when determining binder content, recovered aggregate gradations, maximum specific gravity by CoreLok Test Method, and Gyratory test data for mix samples compacted to Ndes gyrations. QC is required to attach the following to this QA/QC Form : 1) a copy of the weigh ticket for the mix sample load; and 2) the ignition furnace printout for the binder content test. This form, with these attachments, shall be maintained in the appropriate QC files for a period of (3) years after completion of the form. QA shall maintain their QA/QC-1 forms indefinitely unless permission is given otherwise.

1. Type mix being produced and tested; i.e, SF9.5A, I19.0C, etc.
 2. Actual location of plant site (Site shown on JMF)
 3. Current asphalt plant HiCAMS certification number.
 4. Date mix is tested by QA/QC personnel
 5. Consecutive QC sample number, i.e., 09-1, 09-2, 09-3, etc.
 6. Actual Job Mix Formula Number of mix tested.
 7. Percent Absorption (Pba) value from the Job Mix Formula.
 8. Effective Specific Gravity (Gse) value from the Job Mix Formula
 9. Bulk Specific Gravity (Gsb) value from the Job Mix Formula.
 10. Binder specific gravity from actual mix design being used.
 11. Calculated effective specific gravity from the Rice Test from this mix sample. See Section 7.16.3 of this manual for formula.
 12. Corrected bulk specific gravity. See Section 7.16.4 Step 1 of this manual for formula.
 13. Weight of recovered aggregate after ignition furnace burn.
 14. Weight of dry recovered aggregate after washing aggregate sample.
 15. Weight of material in pan after sieving (See PAN weight under Block 28).
 16. Percent loss after sieving. See Section 7.9.4(G) for formula
 17. YES if No. 16 above is 0.2% or less. NO if it exceeds 0.2%.
 18. Weight of ignition furnace basket + mix.
 19. Weight of ignition furnace basket.
 20. No. 18 minus No. 19 = Total weight of mix.
 21. Combined weight of mix sample and ignition furnace basket shown on ignition furnace readout.
 22. YES if weight difference between Nos. 18 and 21 is within 5.0 grams. No if the difference is not w/in 5.0 grams.
 23. Percent binder from Job Mix Formula being produced.
 24. Percent binder from ignition furnace burn ticket.
- Note :** Nos. 25, 26, and 27, to be used when checking moisture in the completed mix when required by or instructed by QA personnel.
25. Mix sample weight before drying.
 26. Mix sample weight after drying. (Mix should be dried at 325°F +/-25°F to a constant weight in oven.)
 27. % Moisture in Mix. (Original mix sample weight (25) – Dry mix sample weight (26)) ÷ Original mix sample weight (25) x 100)

INSTRUCTIONS
FOR
QA/QC-1A Rev
(Continued)

28. Accumulated weight of aggregate retained on each sieve/pan.
29. Percent retained. Cumulative Wt. Retained ÷ (Pan Wt. + Wt. Loss from Washing) x 100.
See Section 7.9.4(G) of this manual for formula and example calculation of constant.
30. Total Percent passing [100 – % Retained (#29)].
31. [ITEM DELETED]
32. [ITEM DELETED]
33. Target values for each sieve from JMF.
34. Optional constant for computing percent retained.(See Section 7.9.4(G) of this manual for formula and example calculation of constant).
35. Actual aggregate weights pulled from each hot bin being used (Batch Plant Only).
36. Type aggregate in each cold feed bin being used in mix; i.e., 78M, screenings, sand, etc.
37. Actual percent aggregate from each cold feed bin being used in mix (nearest whole percentage).
38. Weight of empty test sample bag.
39. Weight of rubber sheets.
40. Weight of mix sample in air.
41. Weight of bag plus mix sample in water.
42. Total volume (A+B+C) – (D)
43. Sample bag and rubber sheet volume. (A/Vc) + (B/Rc)
44. Mix Sample Volume. (E – F)
45. Maximum Specific Gravity [Specific Gravity of Sample to nearest 0.001 (C / G)]
46. Calculated VMA from test data (See calculation formula in Section 7.16.4)
47. Calculated VFA from test data (See calculation formula in Section 7.16.5)
48. Calculated % Gmm@ Nini from test data (See calculation formula in Section 7.16.7)
49. Calculated P0.075/Pbe Ratio from test data (See calculation formula in Section 7.16.6)
50. Height (mm) of Gyratory specimens at Nini taken from computer printout.
51. Height (mm) of Gyratory specimens at Ndes taken from computer printout.
52. Unsuspended dry weight of each Gyratory specimen to nearest 0.1 gram (x.x).
53. Unsuspended saturated surface dry weight of each Gyratory specimen to nearest 0.1 gram (x.x).
54. Suspended weight in 77 degree (F) water for 3-5 minutes for each Gyratory specimen to nearest 0.1 gram (x.x).
55. Bulk specific gravity of each specimen (Gmb @Ndes, measured to nearest 0.001 (x.xxx)).
56. Bulk Specific Gravity of each specimen (Gmb @Ndes, estimated)
57. Sample volume @ Nini expressed in $\text{cm}^3 \frac{(\pi d^2 \times h @Nini)}{4} \div 1000$ **or** $h@Nini \times 17.6715$
58. Sample volume @ Ndes expressed in $\text{cm}^3 \frac{(\pi d^2 \times h @Ndes)}{4} \div 1000$ **or** $h@Ndes \times 17.6715$
59. Correction factor determined by dividing Gmb@Ndes (measured) by Gmb @Ndes (estimated). (Calculated to 0.001)
60. Bulk Specific Gravity (Gmb @Nini Estimated) $\frac{\text{Mass (Gms)}}{\text{Volume (Cm}^3\text{)}}$

INSTRUCTIONS
FOR
QA/QC-1A Rev
(Continued)

61. Bulk Specific Gravity ($G_{mb @ Nini}$ Corrected) Correction Factor x $G_{mb @ Nini}$ (estimated).
62. G_{mm} (Rice Test specific gravity) from blank 42, or blank 46 if dry back is required.
63. Percent voids in total mix (VTM) from test data (See calculation formula in Section 7.16.2)
64. Average $G_{mb @ Ndes}$. [Total of specimen $G_{mbs} \div 3$ (nearest 0.001)]
65. Average $G_{mb @ Nini}$ [Total of $G_{mbs @ Nini} \div 3$ (nearest 0.001)]
66. Average VTM @ $Ndes$ [Total of VTMs $\div 3$ (nearest 0.1%)]
67. Printed name and HiCams certification number of QA/QC technician performing test
68. Signature of QA/ QC technician performing test

NORTH CAROLINA DEPARTMENT of TRANSPORTATION

DETERMINATION of ASPHALT DRAINDOWN CHARACTERISTICS

DATE: _____ [1]	SAMPLE NUMBER: _____ [2]
PROJECT NO. _____ [3]	COUNTY: _____ [4]
JMF NUMBER: _____ [5]	MIX TYPE: _____ [6]
BINDER CONTENT: _____ [7]	FIBER PERCENT: _____ [8]
FIBER TYPE: _____ [9]	FIBER SOURCE: _____ [10]

CURING TIME:	TEMPERATURE:
TIME IN: _____ [11 A]	MIXING: _____ [12]
TIME OUT: _____ [11 B]	CURING: _____ [13]

WEIGHT OF EMPTY PAN:	[A] _____	[14]	gms.
WEIGHT OF EMPTY BASKET:	[B] _____	[15]	gms.
WEIGHT OF BASKET & MIX:	[C] _____	[16]	gms.
WEIGHT OF SAMPLE:	[D] = (C - B)	[17]	gms.
WGT. OF PAN & DRAINDOWN:	[E] _____	[18]	gms.
WEIGHT OF DRAINDOWN:	[F] = (E - A)	[19]	gms.
PERCENT DRAINDOWN:	(F / D) x 100	[20]	%

COMMENTS: _____ [21]

TEST PERFORMED BY: _____ [22]

SIGNATURE AND QMS CERTIFICATION NO.: _____ [23]

* NOTE: BY PROVIDING THIS DATA UNDER MY SIGNATURE AND/OR HICAMS CERTIFICATION NUMBER, I ATTEST TO THE ACCURACY AND VALIDITY OF THE TEST DATA CONTAINED ON THIS FORM AND CERTIFY THAT NO DELIBRIATE MISREPRESENTATION OF TEST RESULTS IN ANY MANNER HAS OCCURRED.

**INSTRUCTIONS
FOR
QA/QC-3
DETERMINATION of ASPHALT DRAINDOWN**

GENERAL NOTE: This form to be used by both QA and QC Technicians when determining the percent draindown in certain asphalt mixtures. This form with any attachments shall be maintained in the appropriate QC Lab for a period of three (3) years after completion of the form. QA shall maintain this form indefinitely unless permission is given otherwise.

1. Date mix was produced and draindown test performed
2. Sample number of mix being tested
3. Project number on which the mix was placed
4. County in which project is located
5. Job Mix Formula for mix type
6. Type of mix being produced
7. Percent binder shown on the current job mix formula
8. Percent fiber in the mix (from JMF)
9. Type of fiber being used
10. Source of fiber being used
11. CURING TIME:
 - a. Time mix started curing
 - b. Time mix came out of curing
12. Mixing temperature of mix (from JMF)
13. Temperature of mix during curing
14. Empty pan weight
15. Empty basket weight
16. Basket and mix weight
17. Sample weight
18. Pan and draindown weight
19. Draindown weight
20. Percent drain down to nearest (0.00 %)
21. Comments or observations made by Technician during testing
22. Printed name of QA or QC Technician performing test
23. Signature and certification of Technician performing test

INSTRUCTIONS
FOR
QA/QC-4
RICE TEST DRYBACK CORRECTION FACTOR WORKSHEET

GENERAL NOTE: This worksheet may be used by either QC or QA personnel to establish Rice dry back correction factors. While the use of a dry back correction factor is an option and is acceptable, it is not required. Dry backs may be performed on any or all Rice Test if desired.

QA/QC-4 forms shall be maintained in the QC lab files for a minimum of one three (3) years after completion of the form. QA shall maintain its forms indefinitely unless permission is given otherwise.

1. Type mix being produced.
2. Appropriate job mix formula number.
3. Contractor producing mix.
4. Actual location of plant site.
5. QC sample number.
6. Uncorrected maximum specific gravity from top portion of Rice worksheet, (QA/QC-2).
7. Corrected maximum gravity from bottom portion of Rice worksheet (QA/QC-2).
8. Difference $Z = (X) - (Y)$ to the nearest 0.001 (x.xxx). (See Note 1 at bottom of this worksheet)
9. Refer to Note 2 at bottom of this worksheet for specific instructions for determining dry back correction factors.
10. QA or QC Technician's signature certifying that all data entered on this form is true and correct

INSTRUCTIONS
FOR
QA/QC-5

**ROADWAY CORE SAMPLE DENSITY DETERMINATION AND COMPARISON
WORKSHEET**

GENERAL NOTE: This worksheet is to be completed and maintained on a daily basis by QA/QC personnel when checking percent compaction of density core samples. This worksheet is to be kept on file in the appropriate QC Lab files for minimum of three (3) years after completion. The QA Lab shall maintain its QA/QC-5 forms indefinitely unless permission is given otherwise. Required data is to be transferred to Form QC-5 or QA-5, whichever is applicable. The QC worksheet is to be faxed to the appropriate QA Lab daily. When QA personnel are checking percent compaction on comparison cores, verification cores, or retest of QC cores, a copy will be faxed to the appropriate QC Lab upon completion. Report only one type mix per QA/QC-5 Form.

1. Prime project number from which core samples were taken.
2. Type mix being tested for compaction.
3. Minimum % compaction required by the Specifications.
4. Name of Contractor placing mix.
5. Actual location of plant site producing mix.
6. Actual date that mix was placed and compacted.
7. Appropriate JMF number for mix type being placed.
8. Core sample number: Assigned by QC roadway technician if a QC core sample.
Assigned by QA roadway technician if either a comparison or verification sample.
(See Section 10 of this Manual for numbering procedures.)
9. Actual thickness of core sample. (measured to the nearest 1/16")
10. Dry specimen weight to the nearest 0.1 gram.
11. Specimen saturated surface dry weight to the nearest 0.1 gram.
12. Specimen weight suspended in 77 degree water for 3-5 minutes to the nearest 0.1 gram.
13. Actual specific gravity of core sample when tested by QA personnel.
14. Actual specific of core sample when tested by QC personnel.
15. Use the appropriate average density control specific gravity at the end of each days production until a moving average of four specific gravities is attained. Once a moving average density control specific gravity is attained, the last moving average at end of the day will be used thereafter.
16. Actual QA percent compaction to the nearest 0.1%.
17. Actual QC percent compaction to the nearest 0.1%.
18. Mark "Y" for Yes or "N" for No according to whether or not results are within acceptable limits of precision. See Section 609-6 of the January 2002 Standard Special Provision.
19. Signature of QA or QC Technician performing tests certifying that all data entered on this form is true and correct.

**INSTRUCTIONS
FOR
QA/QC-5A
COREDRY CORE SAMPLE DENSITY DETERMINATION WORKSHEET**

GENERAL NOTE: This worksheet is to be completed and maintained on a daily basis by QA/QC personnel when checking percent compaction of density core samples. This worksheet is to be kept on file in the appropriate QC Lab files for minimum of three (3) years after completion. The QA Lab shall maintain its QA/QC-5A forms indefinitely unless permission is given otherwise. Required data is to be transferred to Form QC-5 or QA-5, whichever is applicable. The QC worksheet is to be faxed to the appropriate QA Lab daily. When QA personnel are checking percent compaction on comparison cores, verification cores, or retest of QC cores. Report only one type mix per QA/QC-5A Form.

1. Prime project number from which core samples were taken.
2. Type mix being tested
3. Actual date cores are tested
4. Name of Contractor placing mix
5. Actual location of plant site producing mix
6. Actual date that mix was placed and compacted
7. Appropriate JMF number for mix being placed
8. Core sample number: Assigned by QC Roadway Technician if a QC core sample.
Assigned by QA Roadway Technician if either a comparison or verification sample.
(See Section 10 for numbering procedures)
9. Initial specimen weight to the nearest 0.1 gram (A)
10. Initial specimen weight times .0005 = maximum grams difference to achieve constant weight (B)
11. Record weight after 1st core dry series (C)
12. Subtract weight after 1st core dry series from initial specimen weight (A-C)
13. Record weight after 2nd core dry series (E)
14. Subtract weight after 2nd core dry series from weight after 1st core dry series (C-E)
15. Run 3rd core dry series if loss is not equal to or less than column B must be repeated until constant weight is achieved
16. Subtract 3 core dry series weight from 2nd core series weight. If loss is not equal to or less than column B
17. Initials or QA or QC Technician performing test
18. Printed name of QA/QC Technician performing test certifying that all data entered on this form is true and correct. Also enter Hicams number
19. Technician signature

**INSTRUCTIONS
FOR
QA/QC-5B
OVEN DRY CORE SAMPLE DENSITY DETERMINATION WORKSHEET**

GENERAL NOTE: This worksheet is to be completed and maintained on a daily basis by QA/QC personnel when checking percent compaction of density core samples. This worksheet is to be kept on file in the appropriate QC Lab files for minimum of three (3) years after completion. The QA Lab shall maintain its QA/QC-5B forms indefinitely unless permission is given otherwise. Required data is to be transferred to Form QC-5 or QA-5, whichever is applicable. The QC worksheet is to be faxed to the appropriate QA Lab daily. When QA personnel are checking percent compaction on comparison cores, verification cores, or retest of QC cores. Report only one type mix per QA/QC-5B Form.

1. Prime project number from which core samples were taken.
2. Type mix being tested
3. Actual date cores are tested
4. Name of Contractor placing mix
5. Actual location of plant site producing mix
6. Actual date that mix was placed and compacted
7. Appropriate JMF number for mix being placed
8. Core sample number: Assigned by QC Roadway Technician if a QC core sample.
Assigned by QA Roadway Technician if either a comparison or verification sample.
(See Section 10 for numbering procedures)
9. Specimen dried overnight (Yes/No)
10. Initial Specimen weight to the nearest 0.1 gram (A)
11. Initial Specimen weight times .0005 equals maximum grams difference to achieve constant weight (B)
12. Record weight after 1st 2 hr. interval (C)
13. Subtract 1st 2 hr. interval weight from initial specimen weight (A-C)
14. Continue the 2 hr. drying process as needed to achieve constant weight
15. [See number 13]
16. [See number 12]
17. [See number 13]
18. Initials or QA or QC Technician performing test
19. Printed name of QA/QC Technician performing test certifying that all data entered on this form is true and correct. Also enter Hicams number
20. Technician signature

INSTRUCTIONS
FOR
QA/QC-6
HOT MIX ASPHALT QUALITY CONTROL CHART

GENERAL NOTE: Control charts shall be maintained by QC personnel at the QC Lab Site during production. Control charts shall be plotted and maintained for each mix design produced at each plant site on a daily basis. Different JMF numbers based on the same mix design may be plotted on one graph, provided the JMF change location is noted. The following mix parameters shall be plotted on these control charts: Aggregate washed gradation (for each mix type, one sieve size smaller than the mix nominal maximum size, and for all mixes, the 2.36mm and 0.075mm sieves); % binder content, Pb (control method only); Gyratory bulk specific gravity, (Gmb); maximum specific gravity, (Gmm); % air voids, (VTM); voids in mineral aggregate, (VMA); $P_{0.075}/P_{be}$ Ratio; and %Gmm @Nini.

Both the individual test value and the moving average of the last four (4) data points will be plotted on each chart. The QC's individual test data will be shown in black and the QC moving average in red. The QA's comparison split sample test data will be plotted in blue at the same location on the chart as the comparable QC results. The QA verification test data shall be plotted in purple and should be plotted at a location on the chart as close as possible to where other relative QC test data is located. The moving average limits shall be drawn with a dash green line and the individual test limits with a dash red line. These control charts may be computer generated by use of the current NCDOT spreadsheet. Forms to be maintained in the QC lab files for a period of three (3) years after completion.

1. Calendar year for data plotted.
2. Mix Type represented on chart.
3. Contractor producing mix.
4. Applicable job mix formula number.
5. Site of plant producing mix (Shown on JMF).
6. Mix parameter being tested, such as % binder, Gyratory bulk specific gravity (Gmb), Etc.
7. Appropriate mix parameter target value will be placed adjacent to dark center line.
Moving Average and Individual Limits will be plotted as described in second paragraph above.
The control limit increments scale may be established by personnel plotting data, but should be such that information is legible.
8. Enter appropriate sequential QC sample numbers at each line increment.
9. QA or QC Technician's printed name and HiCAMS certification number. This should be the technician verifying that the data plotted is true and correct, which may or may not be the technician that actually plotted the data.
10. QA or QC Technician's signature certifying that all data entered on this form is true and correct.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
N.C. Hearne Straightedge Summary

Project No.: 1 Route: 2 Division: 3
 Type Mix: 4 Lane: 5 Profile Location: 6
 Paving Contractor 7 S.E. Operator 8

Date	T.S. #	Beg. Station No.	End. Station No.	S.E.I.	0.4" Dev	Retest SEI	Comments
9	1	10	11	12	13	14	15
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						
	24						
↓	25	↓	↓	↓	↓	↓	↓

C.S.I. 16 C.S.I. 17

Note 1:

Resident Engineer to furnish gold copy to M&T Unit upon completion of Federal Aid Projects only.

***Note 2:**

Contractor Must be notified by letter of any Pay Adjustments or Corrective Actions.

CC:

- White: Resident Engineer
- Yellow: Pavement Construction Engineer
- Pink: Division Engineer
- Gold: Resident Engineer(See Note 1)

*Print Name Legibly: _____ 18

*Evaluators Signature: _____ 19

*BY PROVIDING THIS DATA UNDER MY SIGNATURE AND/OR HICAMS NUMBER, I ATTEST TO THE ACCURACY AND VALIDITY OF OF THE DATA CONTAINED ON THIS FORM AND CERTIFY THAT NO DELIBERATE MISREPRESENTATION OF TEST RESULTS, IN ANY MANNER, HAS OCCURRED.

Resident/District Engineers Certification	
Check One Block	
\$300 Incentive	<input type="checkbox"/>
\$100 Incentive	<input type="checkbox"/>
Acceptable	<input type="checkbox"/>
*\$300 Disincentive	<input type="checkbox"/>
*\$600 Disincentive	<input type="checkbox"/>
*Unacceptable/Correction Required	<input type="checkbox"/>

20

Resident/District Engineer: _____ 21

Remarks: _____ 22

INSTRUCTIONS
FOR
FORM QA/QC-7
NC HEARNE STRAIGHTEDGE SUMMARY

GENERAL NOTE: The QA/QC-7 Form is to be used to evaluate the daily graphs and summarize all final surface testing data and other pertinent information from a project which has the "Final Surface Testing" special provision in the contract. The form shall be completed by the Contractor for QC evaluation and by the Department for QA evaluation. The graphs shall be evaluated and this form completed by the Contractor and furnished to the Engineer within 24 hours after profiles are completed each day. The Engineer will then perform the final acceptance evaluation and furnish these results back to the Contractor within 48 hours of receiving the graphs. The Engineer will retain all graphs and forms. Two copies shall be retained by the Resident Engineer; one copy for the Project Files and one copy to be furnished to M&T upon completion of Federal Aid Projects. Copies shall also be furnished to the Pavement Construction Engineer and the Division Engineer. Copies not required to be attached to Roadway Inspectors Daily Report but may be distributed individually.

1. Master Project Number for Contract being tested.(Normally 1st. Proj. No. on Contract)
2. Route No. of Project being tested, i.e., US-17, I-440, SR 1550, etc.
3. Division in which the Contract is located.
4. Type HMA being tested, i.e., S4.75mm, S 9.5mm, S 12.5mm, etc.
5. Location of Lane being tested, i.e., NBL RT., EBL, RT. Lane, etc.
6. Should be the wheel path tested according to the project stationing; i.e. outside wheelpath, inside wheelpath, etc. Testing will always be in performed on the right wheel path in direction of paving which may or may not be the same as above.
7. Name of Contractor paving the project.
8. Name of person who operated the Straightedge (Name is shown on the Graph).
9. Date Test Section was tested.(May not be same date mix was placed.)
10. Station testing Began for each Test Section.
11. Station testing Ends for each Test Section.
12. SEI Number for each Test Section as determined from the Graph by the Evaluator.
13. Number of Deviations that exceed 0.4" within each Test Section. (Any Test Section with a 0.3" deviation but no 0.4" deviation, a zero shall be entered.)
14. SEI Number for each Test Section retested due to Corrective Actions. New entries need to be made for any retested Sections with all other Test Sections within the lot maintaining the initial SEI Number.
15. Any comments concerning each Test Section, i.e., Manhole, Water valve, Intersection, locations, etc.
16. Cumulative Straightedge Index (CSI). This is the total of all SEI's for the lot.
17. CSI number if / when lot is retested after "Allowed" or "Required" corrective actions are taken.
18. Printed name of QC person evaluating Hearne straightedge tape
19. Signature of QC evaluator certifying that data entered on this form is true and correct
20. Resident/District Engineers Certification. Check appropriate box. **(Partial lots with incentive payments shall be prorated. Partial lots with disincentive payments shall not be prorated but applied in full.)**
21. Resident/District Engineers Signature certifying that data entered on this form is true and correct.
22. Any comments concerning Operation or Evaluation of this Lot. If there are deviations that exceed the 0.4" blanking band, the station number(s) should be shown here.

North Carolina Department of Transportation Roadway Technician's Daily Paving Operation Evaluation Form

Date: 1

Type Mix: 3

Contractor: 2

Project No: 4

	CIRCLE	REMARKS / COMMENTS	
1. Is tack being applied uniformly? Verify proper rate? Application Temp?	Yes No		<u> 5 </u>
2. Is stringline being placed for alignment?	Yes No		
3. Are haul trucks raising bed before releasing gate?	Yes No		
4. Are trucks cleaning out in front of paver?	Yes No		
5. Is paver engaging truck - not trucks bumping paver?	Yes No		
6. Is paver folding hopper wing only when the hopper is relatively full?	Yes No		
7. Is hopper remaining 1/3 full?	Yes No		
8. Is paving at consistent speed to match delivery rate?	Yes No		
9. Is head of material kept level w/ auger shaft (+/- 1")?	Yes No		
10. Is segregation observed in delivery and placement of material?	Yes No		
11. Are automatic controls used properly to provide grade and cross-slope?	Yes No		
12. Is smoothness and texture of mat acceptable?	Yes No		
13. Is mat thickness appropriate for type mix (3:1 ratio minimum)?	Yes No		
14. Is overlap on longitudinal joint adequate and straight?	Yes No		
15. Rolling pattern: Are rollers going slow, mat temp. being considered?	Yes No		
16. Paving equipment working properly? Any leaks?	Yes No		
17. Compaction method? Core, nuclear, or non-nuclear?	Yes No		
18. Is MTV being used on this Map?	Yes No		
19. Does this map have Warm Mix? What technology?	Yes No		↓

Plans for tomorrow (or next work day) to address any problems encountered today:

 6

 7

QA Roadway Technician Name and Hicams No.

 8

Signature

Note: It is suggested that the Contractor's representative initial or acknowledge items were reviewed together.

**INSTRUCTIONS
FOR
QA/QC-8
DAILY PAVING OPERATION EVALUATION FORM**

GENERAL NOTE: This form to be used to evaluate general daily paving operations and assist with communications between Department and Contractor Roadway personnel in addressing any items that may need more attention or correction in the following day(s) paving operations.

1. Date mix was placed
2. Contractor placing asphalt mix
3. Mix Type being placed
4. Project asphalt mix is being placed
5. Individual paving operation items evaluated today
6. Comment section to note any corrections involving above items. Should also be used to note any other changes not listed above to be performed to improve asphalt laydown operations
7. Name of Departments Certified Roadway Technician and Hicams Number (Printed)
8. Signature of Departments Certified Roadway Technician

TENSILE STRENGTH RATIO (TSR) TEST WORKSHEET

Gyratory Compactive Method

Mix Design #:

Date Mix Produced:	Mix Type:	JMF No.: Pending
Contractor:	Plant Location:	Plant Cert. No.:
Additive Supplier:	Additive Grade:	Additive Dosage:
Date Compacted:	No. Gyration: To height	Date Test Completed:

SPECIMEN NUMBER	1	2	3	4	5	6	7	8
DIAMETER(mm) (a)								
THICKNESS(mm) (b)								
DRY MASS IN AIR (c)								
SSD MASS IN AIR (d)								
MASS IN WATER (e)								
VOLUME (d-e) (f)								
BULK SP. GR. (c + f) (g)								
MAX. SP. GR. (Optimum Binder Content Rice Test) (h)								
% AIR VOIDS (100 X (h - g) ÷ h) (i)								
VOLUME AIR VOIDS (i X f) ÷ 100 (j)								
PEAK LOAD (Newton's) (k)								
DRY TS(kPa) (2000 X k) ÷ (a X b X 3.1416) (l)								
CALC. SSD AT 70% SAT. (0.70 X j) + c								
CALC. SSD AT 80% SAT. (0.80 X j) + c								

SATURATED	MINUTES @	"Hg						
Date and Time in:	11/16/99 1:00 PM	Date and Time out:	11/17/99 1:00 PM					
SSD MASS (m)								
MASS IN WATER (n)								
VOLUME (m - n) (o)								
VOL. ABS. H2O (m - c) (p)								
% SATURATION 100 X (p ÷ j)								

CONDITIONED 24 HOURS IN 140 DEGREE WATER

SSD MASS (q)								
MASS IN WATER (r)								
VOLUME (q - r) (s)								
VOLUME ABS. H2O (q - c) (t)								
% SATURATION 100 X (t ÷ j)								
PEAK LOAD (Newton's) (u)								
WET TS(kPa) (2000 X u) ÷ (a X b X 3.1416) (v)								
INTERNAL SPECIMEN TEMPERATURE (°F.)								

	Aver. VTM	Aver. Saturation	Aver. Temp	Median TS	QA/QC Joint Test?	TESTED BY:
Dry Subset					Test?	CERT. NO.:
Wet Subset					Circle One	TESTED BY:
					(Yes) No	CERT. NO.:
TENSILE STRENGTH RATIO						LAB LOCATION:
QA/QC COMPARATIVE TSR						LAB CERT NO.:
Visual Stripping: place x in appropriate box						Comments:
None		Minor		Moderate		Severe

Note: Attach proposed M&T 601 form when TSR specimens are being submitted to QA

**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
HOT MIX ASPHALT QUALITY CONTROL CERTIFICATION**

Contractor: [1] _____ Plant Location: [2] _____

Plant Cert: [3] _____

SAMPLING INFORMATION AND TONNAGES							DATE SAMPLED: [4]		
Project No. [5]	Type Mix [6]	JMF No. [7]	QC Sample No. [8]	Tons @ Sample Time [9]	Time From Ticket [10]	Invoice No. [11]	PROJECT TONNAGES		Sample Taken By [15]
							Previous [12]	Today [13]	
↓	↓	↓	↓	↓	↓	↓	↓	↓	↓

MOISTURES

Material [16]			
Wet Wt. _____	Wet Wt. _____	Wet Wt. _____	Wet Wt. _____
Dry Wt. _____	Dry Wt. _____	Dry Wt. _____	Dry Wt. _____
% Moist. _____	% Moist. _____	% Moist. _____	% Moist. _____

MIX TEST RESULTS					DATE TESTED: _____									
QC SAMPLE NO. [17]	Gmb @ Ndes (Measured) [18]	VTM @ Ndes [18]	VMA @ Ndes [18]	VFA @ Ndes [18]	%Gmm @ Nini	25 mm	19 mm	12.5 mm	9.5 mm	4.75 mm	2.36 mm	0.075 mm (CONTROL)	% Binder Ratio	Dust / Binder Ratio
↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓

Anti-Strip Totalizer Flowmeter Readings Begin [19] _____ End [20] _____ Gallons of Anti-Strip Used Today [21] _____

Remarks: [22] _____

I certify that all Quality Control Tests were performed on this mix and the results listed above are correct. [23] _____

* Print QC Technician's Name and Hicams # [24] _____

* BY PROVIDING THIS DATA UNDER MY SIGNATURE AND / OR HICAMS #, I ATTEST TO THE ACCURACY AND VALIDITY OF THE DATA ON THIS FORM AND CERTIFY THAT NO DELIBERATE MISREPRESENTATION OF TEST RESULTS, IN ANY MANNER HAS OCCURRED.

INSTRUCTIONS
FOR
QC-1(Rev.)
DAILY HMA QUALITY CONTROL CERTIFICATION

GENERAL NOTE: This form is a general summary of all daily QC test results, tonnage produced, anti-strip additive used, and also serves as a log of all samples taken. This form may be used for more than one project number, different type mixes and different job mix formulas. The form **including all data and mix test results** is to be completed by Contractor's QC personnel and shall be faxed to the appropriate Division QA Lab no later than the beginning of the following work day, not to exceed 3 calendar days (**Except maintenance version sample information shall be faxed no later than 1 calendar day after sample is taken**). This form is to be maintained in the QC lab files for a minimum of three (3) years after the date the form is completed. QA personnel will maintain their copy of this form indefinitely unless permission is given otherwise.

1. Name of Contractor producing mix.
2. Actual site of plant producing mix.
3. Current HiCAMS asphalt plant certification number (Example: AS-111).
4. Date mix produced and sampled
5. Project number for which mix is produced and placed.
6. Type mixes produced and placed.
7. Appropriate job mix formula number.
8. QC sample number for mix being sampled.
9. Accumulated daily mix design tonnage at which sample was taken.
10. Actual time on load ticket that sample was taken.
11. Preprinted number on load ticket for truck from which sample was taken.
12. Accumulated project tonnage prior to this date.
13. Project tons of appropriate JMF produced this date.
14. Accumulated project tonnage including this date's tonnage.
15. Initials of QC technician that took sample from sample load.
16. Daily Moistures – (*Wet Wt. minus Dry Wt divided by Dry Wt. x 100 = % Moisture*)
17. Appropriate QC Sample Number.
18. Appropriate mix test data. Enter all required test data for type mix tested

NOTE : If anti-strip additive is introduced into the asphalt binder at the asphalt plant site, blank nos. 19,20& 21 must be completed. If anti-strip additive is added at the binder terminal site, there will be no entries in these blanks.

19. Totalizer flowmeter reading at the beginning of the production day.
20. Totalizer flowmeter reading at the end of the production day.
21. Gallons of anti-strip additive used this production day (#22 - #21).
22. Any pertinent remarks (include any changes made to control mix properties).
23. Printed name and HiCAMS certification number of technician entering test results on this form
24. Signature of technician certifying that mix test data is true and correct.

INSTRUCTIONS
FOR
FORM QC-2

RECORD OF CALIBRATION TEST ON WEIGHING EQUIPMENT AT ASPHALT PLANTS

GENERAL NOTE: This form is to be completed by QC personnel at frequencies described below. This form is to be verified and signed by the Contractor's QC Level II personnel with a copy to be forwarded to the Division QA Lab. Minimum calibration frequency for binder and aggregate scales at a batch plant is quarterly. Minimum calibration frequency at a drum mix plant for aggregate scales and binder meters is quarterly. Additive meters shall be calibrated monthly at both batch and drum mix plants. RAP/RAS scales shall be calibrated at the same frequency as aggregate scales, which is quarterly. For the purpose of these scales calibrations, quarterly is defined as once per calendar quarter not to exceed 90 calendar days. QC personnel must give QA personnel at least two days advance notification of all scheduled scale calibrations. QC shall maintain this form in the QC Lab files for at least three (3) years after completion of the form. QA will maintain their copy of this form indefinitely.

1. Name of Contractor producing mix.
2. Site of plant producing mix.
3. Date calibration performed.
4. Number of test increment.
5. Weight readout prior to adding weight to the weigh hopper/asphalt bucket.
6. Weight added at each increment.
7. Actual weight on scales. {A}+{B}.
8. Actual scale reading.
9. Scale error in Lbs. {D} - {C}.
10. Percent scale error $\{E\} \div \{C\} \times 100$.
11. Net scales weight from DOA approved scales.
12. Actual scales readout.
13. Percent error $\{A\} - \{B\} \div \{A\} \times 100$ to nearest 0.1 percent (x.x).
14. Printed name and HiCAMS certification number of QC Level II Technician
15. Signature of QC Level II Technician certifying that all data entered on this form is true and correct

INSTRUCTIONS
FOR
FORM QC- 3
ANTI-STRIP ADDITIVE LOG

GENERAL NOTE :This form is used by QC Technicians on a daily basis to record totalizer flowmeter readings when anti-strip additive is introduced into the asphalt binder at the plant site. Readings shall be taken before beginning of production, during mid-production and at the end of production each day. This form is to be maintained in the QC Lab files for at least three (3) years after completion of the form.

1. Name of Contractor producing mix
2. Plant certification number displayed on plant certification in asphalt plant control room (i.e. DM-001)
3. Actual site on which plant is located
4. Size of anti-strip tank in gallons (i.e. 1500 gal)
5. Type of anti-strip being used (i.e. ARR-MAZ LOF 6500)
6. Percent of anti-strip shown on job mix formula
7. Date totalizer flowmeter is being read
8. Time totalizer flowmeter is being read
9. Actual meter reading
10. Signature of QC Technician reading meter and certifying that all data entered on this form is true and correct
11. Any remarks technician deems necessary
12. Consecutive series of numbers for log sheets

INSTRUCTIONS
FOR
QC-4 (SP)
MOVING AVERAGE CALCULATION WORKSHEET FOR GRADATION

GENERAL NOTE: This form to be completed by Contractor's QC personnel and maintained at the QC Lab site. The moving average calculation worksheets are used to determine the moving average of the last four applicable test results. This moving average figure(s) shall then be plotted on the appropriate standardized control charts. A computer generated moving average worksheet may be utilized instead of the paper QC-4 Form. This computer worksheet must be backed up so if equipment failure occurs, this information will still be available for review. This form shall be maintained in the QC lab files for a minimum of three (3) years after the last entry date.

1. Type mix produced.
2. Appropriate job mix formula number.
3. Date QC sample taken.
4. QC sample number.
5. All column (5's) will be entries for individual test results of the specified test for this column. All sieves, except the 0.075mm, will be entered to the nearest whole number. The 0.075mm sieve will be entered to the nearest 0.1.
6. All column (6's) will be an average of the last four individual test entries. Moving averages will not be established until the fourth test entry. The averages for all sieves, except the 0.075mm, will be to the nearest whole number. The averages for the 0.075mm sieve will be to the nearest 0.1.

INSTRUCTIONS
FOR
FORM QC-5
DAILY CORE SAMPLE LOCATION AND LOT SUMMARY

GENERAL NOTE: Only results for one density acceptance lot shall be shown on each QC-5 form. "New" and "Other" construction, separate paving operations, different map numbers, different layers of same mix, and core sample control strips constitute separate lots therefore must be shown on separate QC-5 forms. This form shall be initiated by the Contractor's certified QC Roadway Technician or certified Nuclear Gauge Operator by completing blanks numbered 1-22 & 31 at the roadway paving site. The QC core samples and Form QC-5 will be taken to the appropriate QC Lab by QC personnel. When compaction results have been determined, the QC Plant Technician will complete lines 23 - 26A & 29 - 30. QC should maintain a copy for a minimum of three years. The original is returned to the DOT's Roadway Technician as soon as test results are known by the QC Lab Technician. The DOT's Roadway Technician will attach the form to that day's daily roadway report (M & T 605) & forward to the Resident Engineer.

1. Date pavement was placed and compacted.
2. Prime project number from which density core samples were taken.
3. Map or route number mix on which mix is placed; i.e., Map No. 13, SR 1440, etc.
4. Name of Contractor placing and compacting pavement.
5. Location of the asphalt plant producing the mix.
6. Type of base on which asphalt layer is being placed; i.e., existing pavement, ABC, new asphalt layer, subgrade, milled pavement, etc.
7. Location of lane being paved, i.e., Rt. NBL, Lt. EBL, Lt -Y²-, Rt. Detour 1, etc.
8. Reference base line for use in determining transverse location of density core samples; i.e., Rt. E.P., Centerline E.P., etc.
9. Type mix from which density samples are taken; i.e., S 4.75A, S 9.5B, I 19.0B, etc. Only density samples for one density lot and type mix should be recorded on the QC-5 Form.
10. Job Mix Formula number for mix type being placed and compacted.
11. Name of Project Engineer assigned to contract on which mix is being placed.
12. Sequential core sample nos. per mix type per day assigned by QC Roadway Technician.
 - a. QC core samples will have a sequential series of numbers; i.e., 1,2,3,4, etc. These sequential numbers restart each day core samples are taken. If a 2nd paving operation of the same mix type on the same contract occurs on the same day, those QC cores shall be numbered consecutively also except have an "A" suffix ; i.e., 1A, 2A, 3A, 4A, etc.
 - b. QC control strip core samples will have a sequential base number with the suffix "QC:" i.e., 1QC, 2QC, 3QC, 4QC, 5QC, etc., for Control Strip No. 1. These sequential numbers will be consecutive for each type mix throughout the life of a contract, i.e., control strip No. 2, 6QC, 7QC, 8QC, 10 QC, etc.
 - c. QC check core samples will use the same base numbers of the original core samples being checked except it will have the suffix "C" with a subscript of 1, 2 , 3, i.e., check samples for QC sample no. 4 would be 4C₁, 4C₂, 4C₃.
13. Sequential test section nos. by mix type assigned by Contractor's Roadway Technician.
 - a. 2000 L.F. or fraction thereof per day of pavement placed to be numbered as test sections.
 - b. QC test sections will have a sequential series of numbers each day; i.e., 1,2,3,4.
 - c. These sequential numbers will start over each day pavement is placed.

(Continued)
INSTRUCTIONS
FOR
QC-5

14. Actual length of density test section. Normally test sections are 2000 L.F. unless a partial test section occurs. Pavement less than 2000 L.F. placed in a day or less than 2000 L.F. left over at the end of the day's paving will constitute partial test sections. If the fraction of a test section remaining at the end of a day is less than 100 linear feet, it is recommended that the density be represented by the results of the previous section provided approved compaction equipment and procedures are used. All pavement placed which is 2000 feet shall be tested as full test sections and should not be divided into lesser lengths unless pre-approved by the Engineer.
15. Actual width of compacted pavement; i.e, 12', 10', 4', etc.
16. Random number used to compute length from beginning of the test section. This random number comes from the random numbers tables in Section 10 of this manual
17. Random number used to compute distance from reference base line to sample location. This random number comes from the random numbers tables in Section 10 of this manual
18. Random number times test section length. (Column A times Column C)
19. Random number times lane width. (Column B Times Column D)
20. Beginning station number of each test section
21. Actual station that core will be placed.(Column E length plus Column G station no.)
22. Distance over from reference baseline to core sample location.(Transfer from Column F)
23. Average core sample thickness measured to the nearest 1/16". (Measured by Contractor's QC plant technician)
24. Actual percent compaction of core samples to the nearest 0.1 % . (Transferred from the QA/QC-5 form by the Contractor's QC plant technician)
25. Average of all the test sections within this one lot. (Shown to the nearest 0.1%)
26. Mark "X" if lot passes. (If the average for the lot meets the minimum density requirement for this mix type, the lot passes.)
- 26A. Mark "X" if lot fails. (If the average for the lot does not meet the minimum density requirement for this mix type, the lot fails.)
27. Printed name and HiCAMS certification number of any certified QMS Technician initiating form
28. Signature of any technician initiating form, certifying that all data entered in columns 1 - 22 on the form is true and correct
29. Printed name & HiCAMS certification number of certified QC plant technician completing form.
30. Signature of the plant technician completing form, certifying that all data entered in columns 23 - 26A on the form is true and correct.
31. Mark "X" in the appropriate block for "NEW" or "OTHER". To qualify as "NEW" construction, the pavement placed must meet all three of the requirements listed above these blocks. If it fails to meet any of these three requirements, it will then be considered in the "OTHER" category.

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INSTRUCTIONS
FOR
QC-6 (SP)
MOVING AVERAGE CALCULATION WORKSHEET FOR MIX PROPERTIES

GENERAL NOTE: This form to be completed by Contractor's QC personnel and maintained at the QC Lab site. The moving average calculation worksheets are used to determine the moving average of the last four applicable test results. This moving average figure(s) shall then be plotted on the appropriate standardized control charts. A computer generated moving average worksheet may be utilized instead of this paper QC-6 Form. This computer worksheet must be backed up so if equipment failure occurs, this information will still be available for review. This form shall be maintained in the QC lab files for a minimum of three (3) years after the last entry date.

1. Type mix produced.
2. Appropriate job mix formula number.
3. Method that Contractor elects to determine binder content; i.e., ignition furnace, extraction, etc.
4. Date QC sample taken.
5. QC sample number.
6. All column (6's) will be entries for individual test results of the specified test for that column. All test results to be entered to the significant decimal as specified in Section 7 of this Manual.
7. All column (7's) will be an average of the last four individual test entries. Moving averages will not be established until the fourth test entry. All moving averages will be entered to the same significant decimal as the corresponding individual test result entries.

QC-7

Rev. 12-2002

NCDOT
HOT MIX ASPHALT
QUALITY MANAGEMENT SYSTEM
SAMPLE TAG

CONTRACTOR: ____ (1) ____ QC SAMPLE DATE: ____ (2) ____

PLANT LOCATION: ____ (3) ____ PLANT CERT. NO.: ____ (4) ____

PROJECT NO.: ____ (5) ____ JMF NO.: ____ (6) ____

TYPE MIX: ____ (7) ____ TYPE SAMPLE: ____ (8) ____

QC SAMPLE NO.: ____ (9) ____ QC SAMPLE TONNAGE: ____ (10) ____

QC TECH'S PRINTED NAME W/ HiCAMS CERT.# ____ (11) ____

*QC TECH'S SIGNATURE ____ (12) ____

* By providing this data under my signature and or HiCAMS certification number, I attest to the accuracy an validity of the data contained on this form and certify that no deliberate misrepresentation in test results , in any manner , has occurred.

INSTRUCTIONS
FOR
QC-7
HMA QMS SAMPLE TAG

GENERAL NOTE: This sample tag will be completed by QC personnel and attached to each sample bag immediately after the sample is taken. White colored tags will be attached to the Department's portion of the split sample and orange colored tags will be attached to the retained portion (referee sample) of the Contractor's sample. Samples shall then be stored as required by Subarticle 609-5(D) of the Standard Specifications.

1. Name of Contractor producing mix.
2. Date QC sample taken.
3. Specific site where plant is located.
4. Current NCDOT certification number.
5. Project number from ticket for load sampled.
6. Appropriate job mix formula number.
7. Type of mix being produced.
8. Type of sample being taken. (Mix type, blended aggregate, etc.)
9. Sequential sample number per type mix by year.
10. Accumulated yearly mix design tonnage at which sample was taken. (This is not total ticket tonnage for the project but accumulated plant tonnage for a mix design for that year's production.)
11. Printed name and HiCAMS certification number of QC plant technician taking sample and completing form.
12. Signature of plant technician certifying that the data entered on this form is true and correct

INSTRUCTIONS
FOR
FORM QC-9 (Rev)
QC RANDOM MIX SAMPLE LOCATION WORKSHEET

GENERAL NOTE: This form will be used by QC personnel to calculate all regularly scheduled random sample locations for each mix design at a plant site for a calendar year's production. A new form, beginning with zero accumulated tonnage, will start over each calendar year. A separate form must be used for different mix designs. Random samples for different job mix formula numbers based on the same mix design may be entered on a single form. All tonnage produced, including partial test samples, must be reported to the nearest whole ton on this form. QC technicians shall determine the regularly scheduled random sample location of each 750 ton increment prior to beginning production of that increment. The regular scheduled sample for the current increment shall be taken before determining the next increment's random sample location. The only acceptable method of determining random numbers is by the use of ASTM D3665, Alternative 2, Table 1, in this manual. This form shall be faxed to the appropriate QA Lab prior to production of each mix design each day. Original is retained in QC Lab files for review by QA personnel for a minimum of three (3) years after last sample date entered on each form.

1. Contractor producing mix.
2. Asphalt plant location or site.
3. Type of mix being produced.
4. Mix design number (only one MD number per form).
5. Date of this entry.
6. Number of tons of this mix that Contractor anticipates producing this date.
7. Sequential sample number for mix design being produced.
 - a. Full Test Series: First two digits will be last two nos. of the current year followed by a dash (-), followed by a sequential no. beginning with one and progressing up as samples are taken.
 - b. Partial Test Series (taken after 100 tons daily if regular sample is not reached): Will be same no. as the full test series no. for that increment, except will be followed by the suffix P1, P2, P3, etc.
8. Random number QC Technician obtains from ASTM D3665 Random Numbers Tables or from the NCDOT's computer spreadsheet program.
9. Increment tonnage (Normally will always be 750 tons)
10. Increment tons times random number .
11. Ending tonnage of previous increment from which sample was taken (Should normally be the end of a 750 ton increment; such as: 0, 750, 1500, 2250, 3000, etc.).
12. Calculated accumulated tonnage at which sample should be taken. Sample should be taken within the same truckload as this calculated tonnage.
13. Accumulated yearly tonnage of this mix design for this plant at the end of the last production day prior to this day's production.
14. If the next regularly scheduled sample tonnage for an increment is not reached, this will be the tonnage remaining from the end of the last day's production to the first sample tonnage the next production day.
15. Date the QC sample (full and/or partial) was actually taken.
16. Accumulated yearly tonnage of this mix design for this plant at the end of date of entry. This blank will only be completed for the last sample entered each day. It then will be transferred to Column (F) for the next production day. Each new year's accumulated tonnage begins at zero.
17. Signature of QC Technician determining random sample tonnage location and certifying that the data entered on this form is true and correct.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
QMS MIX VERIFICATION CHECKLIST

Contractor: _____ [1] Date: _____ [5]
Plant Site: _____ [2] Date of Mix Verification: _____ [6]
Type Mix: _____ [3] Date of Last Production of Mix: _____ [7]
JMF No.: _____ [4]

REQUIRED DOCUMENTATION FOR VERIFICATION

(Each Checked Item Must Be Attached)

MIX TEST DATA

- ____ [8] Binder Content (Attach QA/QC-1)
- ____ [9] $P_{0.075} / AC_{EFF}$ Ratio (Attach QA/QC-1)
- ____ [10] Blended Aggregate Gradation (Attach QA/QC-1)
- ____ [11] Superpave Gyratory Test Data (Attach QA/QC-1)
- ____ [12] % VTM, % VMA, % VFA (Attach QA/QC-1)
- ____ [13] Rice Test (With Dryback, if required) (Attach QA/QC-2)
- ____ [14] % G_{mm} @ N_{ini} \longrightarrow (Attach Gyratory printout for Ndes specimens to QA/QC-1)
- ____ [15] Retained Split Sample (Attach Copy of Sample Tag)

MATERIALS TEST DATA

- ____ [16] Aggregate Stockpile Gradations (Check if current and on file at QC Lab.)
- ____ [17] RAP Gradations & % Binder (Check if current and on file at QC Lab.)
- ____ [18] Moisture Content (Drum Plant Only, Attach Calculations)

PLANT CHECKS /CALIBRATIONS

- ____ [19] Cold Feed Calibration (Attach Calibration Worksheet)
- ____ [20] Plant Scales Check Current (Check if current and on file at QC Lab.)
- ____ [21] AC Meter Calibration Current (Check if current and on file at QC Lab.)
- ____ [22] Anti-Strip Meter Calibration (If applicable; Check if current and on file at QC Lab.)

****MIX VERIFIED BY**

****APPROVED BY**

QC Level II Technician: _____ [23]
HiCAMS Certification No: _____ [24]

_____ [25]
QA Supervisor

*Documentation of all tests and calibrations must be attached to this checklist and provided to the QA Supervisor within 1 working day after beginning production of mix.

**BY PROVIDING THIS DATA UNDER MY SIGNATURE AND /OR HiCAMS CERTIFICATION NUMBER, I ATTEST TO THE ACCURACY AND VALIDITY OF THE DATA CONTAINED ON THIS FORM AND CERTIFY THAT NO DELIBERATE MISREPRESENTATION OF TEST RESULTS, IN ANY MANNER, HAS OCCURRED.

INSTRUCTIONS
FOR
QC-11 (SP)
QMS MIX VERIFICATION CHECKLIST

GENERAL NOTE: This form is a checklist to be used by QC personnel to insure that all mix verification tests, plant checks, and calibrations are performed or current, whichever is applicable. The Contractor's Level II Technician may verify these mix test results for the purpose of beginning production, however documentation of all required tests and calibrations must be attached to or faxed with this checklist to QA Supervisor for review and approval within one working day after beginning production of the mix. Failure by the Contractor to fully comply with these mix verification requirements will result in immediate production stoppage by the Engineer. Normal production of that mix shall not resume until all mix verification sampling and testing, calibrations, and plant inspections have been performed and approved by the Engineer. No test or calibration data is to be shown on the QC-11 form. All data will be shown on the appropriate attached forms. Mix verification shall be performed on all mixes within 30 days prior to beginning mix production. Should a lapse of 30 days or more occur prior to initial production and quality control testing, the mix must be reverified. Mix obtained from NCDOT or non-NCDOT work may be used for this purpose provided it is sampled, tested, and the test data handled in accordance with current procedures in this manual. If non-NCDOT mix is used for this purpose, the appropriate QA Lab should be notified prior to performing the sampling and testing.

1. Contractor producing mix.
2. Site of plant producing mix.
3. Type mix being verified.
4. Current JMF No. of mix being verified.
5. Date mix verification data submitted to QA Supervisor.
6. Date(s) of actual tests data/calibrations for mix verification.
7. Date of last production of this mix under QMS specification.
8. Check blank indicating that binder content test data is attached.
9. Check blank indicating that $P_{0.075}/P_{be}$ ratio has been computed and shown on QA/QC-1 Form.
10. Check blank indicating that blended aggregate gradation test data is attached.
(May be washed gradation on recovered aggregate from mix.)
11. Check blank indicating that complete Superpave Gyratory test data is attached.
12. Check blank indicating that %VTM, %VMA, and %VFA calculations are attached.
13. Check blank indicating that Rice test data is attached. (If any aggregate absorption is 1.5% or higher, a dry back must be performed with mix verification.)
14. Check blank indicating that %Gmm @ Nini is attached. The gyratory printouts for Ndes specimen must be attached to the QA/QC-1 form.
15. Check blank indicating that mix verification sample was split, bagged, and tagged for possible testing by QA. Sample shall be retained for 5 calendar days.
16. Check blank indicating that actual washed stockpile gradations of each material in the mix is current and on file at the QC Lab

(Continued)
INSTRUCTIONS
FOR
QC-11(SP)

17. Check blank indicating that RAP gradation and Binder Content test data is current and on file and meets Table 611-1 of Standard Specifications, if mix being verified is a recycled mix.
18. Check blank indicating that combined moisture content test data for aggregate is attached. (Drum Plant Only.)
19. Check blank indicating that evidence of actual cold feed calibration, at time of mix verification, is attached.
20. Check blank indicating that batch plant scales check/calibration (aggregate and asphalt) is current within required time frame and is on file.
21. Check blank indicating that drum plant AC meter check/calibration is current within required time frame and on file.
22. Check blank indicating anti-strip additive meter check/calibration is current within required time frame and on file. (Only applicable if plant has anti-strip metering system.)
23. Signature of QC Level II technician verifying that all mix verification tests, plant checks, and calibrations, have been performed and mix test results meet the applicable specification requirements.
24. HiCams Certification No. of QC Level II technician verifying and signing the checklist.
25. Signature of QA Supervisor. QA Supervisor must verify that Contractors' mix verification meets all specification requirements and approve those results, calibrations, etc. by signing here. The QA Supervisor will return a copy to QC for their records.

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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION QUALITY ASSURANCE ASPHALT MIX SUMMARY REPORT

TYPE MIX: [1] _____ JMF NO. [2] _____ DATE: [3] _____
 CONTRACTOR: [4] _____ QC SAMPLE NO. [5] _____ QC SAMPLE DATE: [6] _____
 PLANT LOCATION: [7] _____ PLANT CERT. NO. [8] _____ DIVISION: [9] _____

[10] GRADATION COMPARISON TEST RESULTS										[11] MIX PROPERTIES COMPARISON TEST RESULTS									
SIEVE	JMF TARGET	INITIAL TEST			WITH LIMITS OF PRECISION		CHECK TEST			WITH LIMITS OF PRECISION		INITIAL TEST			CHECK TEST		WITH LIMITS OF PRECISION		
		QA	B	C	YES	NO	QA	QC	QC	YES	NO	QA	QC	QC	QA	QC	YES	NO	
50.0mm	A							F	G										
37.5mm																			
25.0mm					D	E													
19.0mm																			
12.5mm																			
9.5mm																			
4.75mm																			
2.36mm																			
1.18mm																			
0.600mm																			
0.300mm																			
0.150mm																			
0.075mm																			

[12]

REMARKS:

*PRINT QA SUPERVISOR'S NAME w/HICAMS#: [13]

*QA SUPERVISOR'S SIGNATURE: [14]

* BY PROVIDING THIS DATA UNDER MY SIGNATURE AND/OR HICAMS CERTIFICATION NUMBER, I ATTEST TO THE ACCURACY AND VALIDITY OF THE DATA CONTAINED ON THIS FORM AND CERTIFY THAT NO DELIBERATE MISREPRESENTATION OF TEST RESULTS, IN ANY MANNER, HAS OCCURRED.

COPIES TO: CONTRACTOR

INSTRUCTIONS
FOR
QA-1 (SP)
ASPHALT QUALITY ASSURANCE SUMMARY REPORT

GENERAL NOTE: This form is to be completed by the Division QA Supervisor whenever plant mix quality assurance comparison test(s) are performed. A copy is to be forwarded to the Contractor each time assurance comparison test are performed. The original is to be maintained in the appropriate plant file at the Division QA Lab indefinitely unless permission is given otherwise.

1. Type mix produced
2. Appropriate Job Mix Formula number
3. Date QA sample tests performed
4. Name of Contractor producing mix
5. QC sample number
6. Date QC sample was taken
7. Site of plant producing mix
8. Current asphalt plant certification number
9. Division in which asphalt plant is located
10. Gradation data from QA/QC-1(SP) worksheet
 - A. JMF Target Values for gradation
 - B. Initial QA test result values
 - C. Initial QC test result values
 - D. Are QA/QC initial test result values within limits of precision as per Article 609-6 when results are compared
 - E. QA check test result values, if check test is performed
 - F. QC check test result values, if check test is performed
 - G. Are QA and QC check test result values within limits of precision as per Article 609-6
11. Mix properties comparison test results: Data from QA/QC-1SP worksheet
 - A. Mix property targets from JMF or MD, whichever is applicable
 - B. QA initial test result values
 - C. QC initial test result values
 - D. Are QA/QC test result values within limits of precision per Article 609-6
 - E. QA check test result values, if check test is performed
 - F. QC check test result values, if check test is performed
 - G. Are QA/QC test result values within limits of precision per Article 609-6
12. Any relative remarks pertaining to test data and/or comparisons on the form
13. Printed QA Supervisor's name and HiCAMS certification number
14. QA Supervisor's signature certifying that all data entered on this form is true and correct

**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
HOT MIX ASPHALT CERTIFICATION**

CONTRACTOR: _____ [1] _____ PERIOD: [2] _____ TO [3] _____
(BEGIN DATE) (END DATE)

PLANT LOCATION: _____ [4] _____ PLANT CERT. NO. _____ [5]

PLANT MIX PRODUCED IN ACCORDANCE WITH SPECIFICATIONS			
MIX TYPE	JMF NO.	TONNAGE	REMARKS
[6]	[7]	[8]	[9]
↓	↓	↓	↓
↓	↓	↓	↓
↓	↓	↓	↓
↓	↓	↓	↓
↓	↓	↓	↓
↓	↓	↓	↓
↓	↓	↓	↓

THIS IS TO CERTIFY THAT ALL HOT MIX ASPHALT TONNAGE LISTED ABOVE WAS PRODUCED IN ACCORDANCE WITH THE PROVISIONS OF THE NCDOT QUALITY MANAGEMENT SYSTEM FOR ASPHALT PAVEMENTS. ALL MIX PRODUCED, EXCEPT AS NOTED ON THE ATTACHED FORM QA-2A MAY BE ACCEPTED AS BEING WITHIN FULL COMPLIANCE OF THE SPECIFICATIONS FOR PLANT MIX TEST PROPERTIES. ACTUAL TONNAGE FOR PAYMENT PURPOSES WILL BE DETERMINED FROM THE CERTIFIED WEIGH TICKETS ISSUED FOR THE APPROPRIATE PROJECT /WORK ORDER, ETC.. DOCUMENTATION FOR ACCEPTANCE OF THESE QUANTITIES IS ON FILE AT THE DEPARTMENTS QA LAB AND THE CONTRACTOR'S QC LAB.

THIS CERTIFICATION DOES NOT INCLUDE EVALUATION FOR DENSITY COMPLIANCE WITH SPECIFICATIONS.

*PRINT QA SUPERVISOR'S NAME w/HICAMS#: _____ [10]

*QA SUPERVISOR'S SIGNATURE: _____ [11]
DIVISION QA SUPERVISOR

* BY PROVIDING THIS DATA UNDER MY SIGNATURE AND/OR HICAMS CERTIFICATION NUMBER, I ATTEST TO THE ACCURACY AND VALIDITY OF THE DATA CONTAINED ON THIS FORM AND CERTIFY THAT NO DELIBERATE MISREPRESENTATION OF TEST RESULTS, IN ANY MANNER, HAS OCCURRED.

NOTE: FORM TO BE COMPLETED AND DISTRIBUTED ON A QUARTERLY BASIS. (END OF MARCH, JUNE, SEPTEMBER, AND DECEMBER.)

FORM QA-2A ATTACHED YES NO

[12]

INSTRUCTIONS
FOR
QA-2
HOT MIX ASPHALT ACCEPTANCE CERTIFICATION

GENERAL NOTE: This certification form to be completed and distributed to the State Materials Engineer by the Division QA Supervisor on a quarterly basis (End of March, June, September, and December.) It will be completed for all time periods regardless of whether or not any mix is produced out of a specific plant. This form certifies that all hot mix asphalt tonnage produced for this time period is in accordance with the provisions of the NCDOT Quality Management System for Asphalt Pavements. Any mix produced not meeting these provisions will not be included on this form, but will be included on Form QA-2A. The project Resident Engineer or District Engineer is responsible for determining actual pay tonnage based on project weigh tickets. This form may be used for more than one type mix. This certification does not include evaluation for density or pavement smoothness compliance with the specifications.

1. Contractor producing mix.
2. Beginning date of certification, not to include any previous certification period. Beginning dates will be: January 1, April 1, July 1, and October 1.
3. Ending date of certification period. Ending dates will be March 31, June 30, September 30, and December 31.
4. Site at which plant is located.
5. Current plant certification number.
6. Type mix produced during certification period.
7. JMF number for appropriate type mix.
8. Total tonnage for certification period which fully complies with the specifications for all mix test properties.
9. Any appropriate remarks.
10. Printed name and HiCAMS certification number of QA Supervisor completing the form
11. Signature of QA Supervisor certifying that all data entered on this form is true and correct.
12. Mark appropriate block for attachment of Form QA-2A. The State Materials Engineer's copies of all appropriate QA-2A forms should be held until the quarterly completion of the QA-2 form. All applicable QA-2A forms will then be attached to the back of the QA-2 form.

**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
MIX DEFICIENCY PAY FACTOR / RETEST FORM**

PROJECT NO: [1]
 DATE PRODUCED: [3]
 CONTRACTOR: [5]
 TYPE MIX / JMF: [7]
 INDIVIDUAL TEST LIMIT: [9]
 JMF TARGET: [11]

CONTRACT NO: [2]
 PROJECT ENGINEER: [4]
 PLANT LOCATION: [6]
 MIX DEFICIENCY: [8]
 RETEST LIMIT: [10]
 TONNAGE: [12]

TEST RESULTS: QC = [13]
 QA = [15]

V test (if run) = [14]
 DR test (if run) = [16]

QC SAMPLE # [17]

- 1) Is QC or V result is outside Retest Limits compared to JMF?
- 2) If YES to #1, then complete RETEST section below.
- 3) Is QC result outside Individual Limits compared to JMF?
- 4) If YES to #3, calculate Pay Factor adjustment (%).
- 5) Is V result outside Individual Limit but within Retest Limits?
- 6) If YES to #5, then complete RETEST section below.

YES or NO [18]

YES or NO [19]

[20]

YES or NO [21]

RETEST section				Total Tonnage =	[22]			
SUBLOTS (tons)	#1 = _____	#2 = _____	#3 = _____	<input style="width: 100px;" type="text"/>				
Original sample taken from Sublot # _____	<table border="1" style="width: 100%; height: 80px;"> <tr> <td style="width: 33%;"></td> <td style="width: 33%;"></td> <td style="width: 33%;"></td> </tr> </table>						Show approximate location of retests on sublots	[23]
Retest Results	#1 = _____	#2 = _____	#3 = _____	Original sample: QC	[24]			
	#1 = _____	#2 = _____	#3 = _____	Sublot sample: S-#				
Recommended Action	#1 = _____	#2 = _____	#3 = _____	Verification sample: V-#	[25]			

PROJECT ENGINEER'S FINAL ACTION	
The _____ % pay factor specified above was applied on Estimate Number _____ Dated _____	[26]
Deficiency Location: _____	
NOTE: For any mix accepted under Article 105-3, provide penalty assessed and justification: _____	
Signature: _____	

Original To: Project Engineer

* Contractor must be notified in writing by Project Engineer of any adjustment / action within 30 calendar days of original QC test.

- cc: State Asphalt Design Engineer
 State Pavement Construction Engineer
 Division QA Supervisor
 Division Construction Engineer
 Area Roadway Construction Engineer

INSTRUCTIONS
FOR
QA-2A (Revised 01-02-2014)
MIX DEFICIENCY PAY FACTOR / RETEST FORM

GENERAL NOTE: This form shall be used for ALL mix deficiencies and retests (sublots). It is used in the determination of a pay factor for mix which does not meet Specification requirements. It shall be date and plant specific and used for only one mix deficiency, one project number, one type mix, and one JMF number. It will not be utilized for density deficiencies since the QA-2B form is used for determining density deficiency pay factors. This QA-2A form is initiated by the Division QA Supervisor. The Division QA Supervisor is responsible for determining the actual adjusted pay tonnage and the initially recommended pay factor. Once this is completed and as soon as possible after the mix deficiency occurs, he will inform the Project Engineer and the Area Roadway Construction Engineer (RCE) for concurrence on the Pay Factor. The Area RCE approves all pay factors in HiCAMS. For any major or unresolved issues, contact the State Pavement Construction Engineer for questions or final determination. The original form shall then be returned to the Project Engineer for application and certification of any pay factor applied. The Project Engineer or a representative shall be responsible for distribution of the completed form.

1. Project number for which the mix was produced.
2. Contract number for which mix was produced.
3. Date deficient mix was produced.
4. Project Engineer's printed name (normally either Resident Engineer or District Engineer).
5. Contractor that produced the mix.
6. Location of asphalt plant producing deficient mix.
7. Type mix in which deficiency occurred and JMF number: i.e.; RS9.5B / JMF# 11-0359-152.
8. Specific mix requirement not met (Gradation, AC Content, VTM, VMA, etc.), the amount results exceeded the requirement, and whether it applies to an individual test or the moving average.
9. Individual Test Limit
10. Retest Limit
11. JMF Target
12. Actual tonnage of deficient mix. This tonnage will be compiled by use of control charts, Form QC-1 and project weigh tickets.
13. Original QC test result
14. Verification test result (if run in that same lot)
15. QA split test result
16. Dispute Resolution (DR) sample test result
17. Original QC Sample Number
18. If the QC or V (if run) test results are outside the Retest Limits compared to JMF, then go to Retest section and fill out.
19. If the QC test results are outside the Individual Limits compared to JMF but inside the Retest limits, then that is in the penalty range and the Pay Factor adjustment shall be applied.
20. Calculate the pay factor adjustment. Reference Section 609 of the Standard Specifications. This shall be a percentage of the unit bid price and not a reduction percentage.
21. If the V test (if run) result is outside the Individual Limits but within the Retest Limits, then go to Retest section.
22. Determine SUBLOT tonnage breakdown and fill in the appropriate numbers. Total Tonnage should equal the amounts added from the breakdown and equal the tonnage in Item 12.
23. Fill out locations of tests in the appropriate place in boxes with Original sample (QC), Sublot samples (S-1, S-2 and S-3), and V sample (if taken) as V-1. Note that the location of the deficient mix sample shall be located on the roadway and random numbers not be used for that sublot.
24. Fill out Retest test results in appropriate sections underneath the SUBLOT boxes.
25. QA Supervisor shall make recommendations on the Recommended Action to be taken based on test results and confer with Project Engineer and Area RCE.
26. Fill out Final Action box with resolution of pay factor percentage or any asphalt removed and replaced in the remarks section. If applying Article 105-3 for mix acceptance, explain resolution and justification. Then, sign the form and distribute to all parties in the cc list.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DENSITY DEFICIENCY PAY FACTOR RECOMMENDATIONS /ACTIONS

PROJECT NO. _____ [1] CONTRACT NO: _____ [2]
 DATE PRODUCED: _____ [3] PROJECT ENGINEER: _____ [4]
 CONTRACTOR: _____ [5] PLANT LOCATION: _____ [6]
 TYPE MIX /JMF: _____ [7] LOT AVERAGE: _____ [8]

Project Engineer's Recommended Pay Factor	Tonnage	Automatic Adjustment (PF)	Not Reasonably Close Conformity Adjusted Pay	Unacceptable Removal/No Pay	Reasonably Acceptable Full Pay
	[9]	[10]	_____	_____	_____ →

SIGNATURE: _____ [11] DATE: _____ [12]
 COMMENTS: _____ [13]

Division Engineer's Recommended Pay Factor	Tonnage	Automatic Adjustment (PF)	Not Reasonably Close Conformity Adjusted Pay	Unacceptable Removal/No Pay	Reasonably Acceptable Full Pay
	[9]	[10]	_____	_____	_____ →

SIGNATURE: _____ [11] DATE: _____ [12]
 COMMENTS: _____ [13]

Construction Unit's (PCE) Final Pay Factor	Tonnage	Automatic Adjustment (PF)	Not Reasonably Close Conformity Adjusted Pay	Unacceptable Removal/No Pay	Reasonably Acceptable Full Pay
	[9]	[10]	_____	_____	_____ →

SIGNATURE: _____ [11] DATE: _____ [12]
 COMMENTS: _____ [13]

PROJECT ENGINEER'S FINAL ACTION	
The [14] % pay factor specified above was applied on Estimate Number [15] dated [16]	
Deficiency Location: _____ [17]	
Signature: _____ [18]	

ORIGINAL TO: PROJECT ENGINEER
 CC: STATE MATERIALS ENGINEER
 STATE PAVEMENT MANAGEMENT ENGINEER
 PAVEMENT CONSTRUCTION ENGINEER
 QA SUPERVISOR

★ Contractor must be notified in writing by
 Project Engineer of any adjustment /action.

INSTRUCTIONS
FOR
QA-2B
DENSITY DEFICIENCY PAY FACTOR RECOMMENDATIONS / ACTIONS

GENERAL NOTE: This form is used only when the pay quantities for a contract is not handled thru the Department's HiCams computer system. It is used in the determination of a pay factor for asphalt densities which do not meet Specification requirements. It shall be used for only one lot's density deficiency, one project number, one type mix, and one JMF number. It will not be utilized for plant mix deficiencies. The QA-2A form will be used for determining mix deficiency pay factors. This QA-2B form is initiated by the Project Engineer (normally either the Resident Engineer or District Engineer). Prior to the actual completion of the form, the Project Engineer shall consult with the Pavement Construction Engineer to determine if an adjustment is necessary. The Project Engineer is responsible for determining the actual adjusted pay tonnage and the initially recommended pay factor. Once this is completed and as soon as possible after the density deficiency occurs, he will forward this form to the Division Engineer. The Project Engineer shall also prepare a brief memo to the Division Engineer detailing the density deficiency and attach this form to it. The Division Engineer may elect to either complete his recommendation or assign that responsibility to someone else. Once that is complete, the form will be forwarded to the Pavement Construction Engineer who will consult with the State Construction Engineer prior to completing the final pay factor portion of the form. The final determination of acceptance, pay adjustments, and/or removal is the responsibility of the State Construction Engineer. The original form shall then be returned to the Project Engineer for application and certification of any pay factor applied. The Project Engineer shall be responsible for distribution of the completed form.

1. Project number on which mix was placed.
2. Contract number on which mix was placed.
3. Date density deficiency occurred.
4. Project Engineer's printed name (normally either Resident Engineer or District Engineer).
5. Contractor that placed deficient mix.
6. Location of asphalt plant producing mix.
7. Type mix in which deficiency occurred and JMF no.; i.e.; S12.5C JMF# 00-100-021.
8. Average density of failing lot; i.e. 91.2%. (See Section 10.3.3 of this manual for Lot determination)
9. Actual tonnage of mix with deficient density. This tonnage will be compiled by use of Roadway Technician's Daily Report, Form QC-5, and project weigh tickets.
10. Recommended pay factor as established by Section 609 of the Standard Specifications. This shall be a percentage of the unit bid price and not a reduction percentage. One pay factor percentage figure shall be entered in the appropriate space.
11. Signature of appropriate person making recommendation and / or establishing pay factor.
12. Date of signature.
13. Pertinent comments as deemed necessary by the recommending / establishing person.
14. Final pay factor applied by the Project Engineer.
15. Estimate number on which the specified pay factor was applied.
16. Date of estimate on which pay factor was applied.
17. Beginning and ending station numbers, lane designation, etc., where the deficient densities occurred. This information to be completed by the Project Engineer at time the adjustment is applied.
18. Signature of Project Engineer (normally Resident or District Engineer) verifying the information in blank numbers 14 -17 above is correct and that the adjustment has been applied.

INSTRUCTIONS
FOR
QA-3
QA SAMPLE LOG

GENERAL NOTE: This form is used to log in all QA samples taken. A separate form shall be maintained by the Division QA Lab for each type mix for each plant. Form should be maintained in QA files for a period of three (3) years after the last sample date entered on the form. A new form will be started at the beginning of each calendar year.

1. Type mix logged on this form.
2. Contractor producing this mix.
3. Site of plant producing mix.
4. QC sample number.
5. Date QA personnel obtain mix sample.
6. JMF number which represents this sample.
7. Printed name of QA Technician obtaining sample from QC Lab.

North Carolina Department of Transportation
Inspection of QC Plant and Laboratory Facilities

DATE: _____ TIME ARRIVED: _____ TIME LEFT: _____

CONTRACTOR: _____ PLANT LOCATION: _____ PLANT CERT. # _____

- 1. ARE CONTRACTOR'S CERTIFICATIONS AND PERMITS CURRENT?
REMARKS: _____
- 2. ARE PUBLIC WEIGHMASTER CERTIFICATES CURRENT?
REMARKS: _____
- 3. ARE SCALES CURRENTLY DOA CERTIFIED?
REMARKS: _____
- 4. ARE REQUIRED EQUIPMENT CHECKS BEING PERFORMED AND RECORDED ON PROPER FORMS?
REMARKS: _____
- 5. HAVE WEEKLY AGGREGATE, RAP AND RAS STOCKPILE GRADATIONS BEEN CHECKED?
REMARKS: _____
- 6. ARE AGGREGATE, RAP AND RAS STOCKPILES WITHIN TOLERANCE?
REMARKS: _____
- 7. ARE SCALES, WEIGHBRIDGES AND METER SYSTEMS IN CALIBRATION ?
REMARKS: _____
- 8. REVIEW QC RANDOM SAMPLING PROCESS (QC-9)
REMARKS: _____
- 9. OBSERVED QC SAMPLING MIX FROM TRUCK.
REMARKS: _____
- 10. OBSERVED QC PERSONNEL SPLITTING MIX SAMPLE ?
REMARKS: _____
- 11. OBSERVED QC PERSONNEL PERFORMING FIELD TEST ?
REMARKS: _____
- 12. DIRECTED QC PERSONNEL TO TAKE MIX SAMPLE/TSR SAMPLE .
REMARKS: _____
- 13. CHECKED FOR PROPER OPERATION OF TESTING EQUIPMENT.
REMARKS: _____
- 14. SAMPLED TRUCK FOR QA VERIFICATION /TSR SAMPLES.
REMARKS: _____
- 15. RETESTED QC GYROTORY SPECIMENS / ROADWAY CORES.
REMARKS: _____
- 16. CHECKED MIX TEMPERATURE IN TRUCKS?
REMARKS: _____
- 17. DIRECTED CONTRACTOR TO REWEIGH LOAD OF MIX ON AN INDEPENDENT SET OF SCALES.
REMARKS: _____
- 18. REVIEW QC FIELD RECORD BOOK FOR ENTRIES OF MIX CHANGES, ETC.
REMARKS: _____

COMMENTS: _____

QC LAB TECHNICIAN _____ QA TECHNICIAN: _____

HICAMS CERTIFICATION No. _____ HICAMS CERTIFICATION No. _____

NOTE: QA TECHNICIAN WILL REVIEW CHECKLIST WITH QC TECHNICIAN TO POINT OUT ANY DEFICIENCIES .
QA TECHNICIAN WILL GIVE ONE COPY TO THE QC TECHNICIAN TO KEEP ON FILE AT QC LAB AND
KEEP ONE COPY FOR QA FILES

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INSTRUCTIONS
FOR
QA-5
REPORT OF QUALITY ASSURANCE CORE SAMPLE DENSITY RESULTS

GENERAL NOTE : This form to be completed by QA technicians when performing retest of QC core samples, testing of quality assurance comparison core samples, and testing of verification core samples. Samples from more than one day's production may be reported on each form. This form shall be initiated by the Department's QA Roadway Technician by completing blanks numbered 1-12 and 16-17 at the roadway paving site. The QA core samples and Form QA-5 will either be taken to the appropriate QA Lab by DOT personnel or placed in a sealed container and delivered to the Contractor's QC Lab for pick up by QA personnel. When compaction results have been determined by the QA Lab, the QA plant technician will complete lines 13,14,15,18, and 19. Distribution will be as follows: QA lab will send the original to the Resident Engineer, fax a copy the Contractor's QC lab and the QC lab will forward a copy to the NCDOT roadway technician.

1. Prime project number from which core sample(s) were taken.
2. Project Engineer in charge of project.
3. Contractor that placed and compacted the mix.
4. Division in which the project is located.
5. Location of plant producing mix for the project
6. Numbering of samples will be as follows:
 - 1)- Retest of a QC core: no. will be the QC number followed by the suffix "R";
 - 2)- QA comparison cores: no. will be the QC sample number followed by suffix "QA"
 - 3)- Verification cores: no. will be the QC test section no. followed by the suffix "V"
 - 4)- Longitudinal joint cores: no. will be the QC test section no. followed by the suffix "J"
7. Actual date material was placed and compacted.
8. Type of mix core sample (s) represents; i.e. S9.5B, I19.0C, etc.
9. Job mix formula of type mix being tested.
10. Map or route number on which mix is being placed.
11. Actual station number from which core sample was taken.
12. Location of lane being paved. (Rt. EBL, Lt. SBL, Rt. -Y 4-, etc.)
13. Percent compaction of actual QA core sample to nearest 0.1%.
14. Percent compaction of actual QC core sample to nearest 0.1%.
15. Mark "Yes" if QA and QC results are within acceptable limits of precision or "No" if not.
16. Printed Name and HiCAMS certification number of the certified Roadway Technician completing form
17. Signature of certified Roadway Technician certifying that data entered on this form is true and correct.
18. Printed Name and HiCAMS certification number of the certified QA Lab Technician completing form
19. Signature of certified QA Lab Technician certifying that data entered on this form is true & correct.

INSTRUCTIONS FOR
M&T 514 QA/QC
CONTROL STRIP DENSITY

GENERAL NOTE: This form to be completed by both the QA and QC Nuclear Density Technicians when a control strip is tested to determine a correlated target density. (Refer to nuclear gauge operator's manual for control strip frequencies.) The Contractor's gauge operator will always correlate his/her gauge to the control strip core samples. The Department's gauge operator will correlate his/her gauge to the control strip samples at the same time as the Contractor's gauge operator, if possible. The Contractor should notify the Department's Roadway Technician far enough in advance of placing a control strip so the Department can provide a gauge operator at that time. Distribution of this form should be as follows: The QC Density Technician will maintain the gold copy. QC copy to be retained for a minimum 3 years after completion. The QC Technician will provide the other two (2) copies to the Department's Roadway Technician at the end of each days operation when a control strip is placed. These will be attached to the daily roadway report (M&T 605) and forwarded to the Resident Engineer. The pink copy will be forwarded to the M&T Unit to the Soils Engineer. The white copy will remain on file at the Resident Engineer's office. When this form is completed by the Department's QA gauge operator, he/she will keep the gold copy. The QA Technician will give two (2) copies to the NCDOT Roadway Technician and distribution will be the same as above for the QC copies.

1. Date mix was placed, compacted and tested
2. Master project no. on which mix is being placed (Not individual work order numbers within a contract)
3. County in which Contract is located
4. Sequential control strip number for each type mix being placed (Refer to Nuclear Gauge Operators Manual for procedures for numbering control strips)
5. Beginning reference station number of the control strip
6. Ending reference station number of the control strip, not to exceed 300' if from beginning of control strip
7. Lane on which control strip is placed (i.e. NBL - Lt. Ln., WBL - Rt. Ln.)
8. Layer of type mix being placed (i.e. B25.0C 1st layer, S9.5B 2nd layer, etc.)
9. Thickness of layer being placed (i.e. 1 1/4", 1", 3 1/2", etc.)
10. Width of layer being placed (i.e. 10', 12', 24', etc.)
11. Road number or Route number (i.e. US-1 North, SR-1559, I-40, etc.)
12. Appropriate Job Mix Number of mix type being placed
13. Nuclear Gauge Serial Number (usually etched into handle of Nuclear Gauge)
14. Type Material being tested (See JMF i.e. B25.0C, S9.5B, etc.)
15. Location of asphalt plant producing mix
16. Actual number from gauge when taking standard counts. The standard count must be taken at the project site on material being tested.
17. QC or QA Core sample number, station number, and % compaction of core samples in the control strip. This information is transferred from the QC-5 form
18. Actual station number control strip core samples were placed
19. Nuclear gauge readings in pounds per cubic foot. Two (2) gauge readings must be taken on each side of each core sample location in the control strip
20. Average pounds per cubic foot of the ten (10) gauge readings at core sample locations
21. Correlated target density to be entered in gauge for determining density of a sections (Avg. PCF divided by core sample average x 100)
22. QA or QC Technician's printed name and HiCAMS nuclear gauge operators certification number, depending on who completes form
23. QA or QC Technician's signature certifying that data entered on this form is true and correct

**North Carolina Department of Transportation
Division of Highways
Density Gauge Test Section**

M&T - 515 QA
Rev. 11/11

Contract/Project No. [1] Date [2] Division [3] Crew No. [4] Control Strip No. [5]
 Map/Route No. [6] Contractor [7] J.M.F. [8] Type Material [9]
 Layer [10] Gauge Serial No. [11] Standard Counts (nuclear gauge only) Sys1 [12] Sys2 [13]
 Core Sample Avg. [14] % Avg. of gauge readings [15] PCF Correlated Target Density [16] PCF
 Interim Density Calculated Target: 62.4 PCF x [17] = [18] Calculated Target PCF

Gmm

Test Sect. No. [19]		Begin Sta. [20]		End Sta. [21]		Length: [22]		/5 = [23]		Increments		
Random No.		Increments		Random (calc.)		Test Site Location			Density Readings			
Length	Width	Length	Width	Length	Width	Station	Offset	Lane	PCF	%		
A	B	C	D	A x C =	B x D =							
[24]	[25]	[26]	[27]	[28]	[29]	[30]	[31]	[32]	[33]	[34]		
Comments: [35]								Test Section Average (%)		[36]	Pass	Fail
								QC Test Average (%)		[37]	Within Limits of Precision	
											Yes	No

Test Sect. No.		Begin Sta.		End Sta.		Length:		/5 =		Increments		
Random No.		Increments		Random (calc.)		Test Site Location			Density Readings			
Length	Width	Length	Width	Length	Width	Station	Offset	Lane	PCF	%		
A	B	C	D	A x C =	B x D =							
Comments:								Test Section Average (%)			Pass	Fail
								QC Test Average (%)			Within Limits of Precision	
											Yes	No

*Print Name Legibly w/HiCAMs No. [38]

*QA Technician Signature: [39]

cc: Resident Engineer [White]
QA Technician [Gold]

*By providing this data under my signature and/or HiCAMs certification number, I attest to the accuracy and validity of the data contained on this form and certify that no deliberate misrepresentation of test results, in any manner, has occurred.

INSTRUCTIONS FOR FORM M & T 515QA

GENERAL NOTE: This form is to be completed by the Department's QA Nuclear Gauge Operator when performing re-test and verification tests of a QC technician's test section. Only the density results of one mix type, one project number, and one control strip is to be used on this form. Distribution will be as follows: QA Technician will maintain the gold copy and furnish the white copy to the NCDOT Roadway Technician to be attached to Form M & T 605 and forwarded to the Resident Engineer. The Resident Engineer will keep the white copy in the project file.

1. NCDOT contract number (list primary number if contract has multiple contract numbers)
2. Date asphalt layer is actually placed, compacted and tested
3. Division in which contact is located
4. Crew Number (once established remains the same for the entire project)
5. Sequential number of control strip per mix type
6. Work order map number within a contract
7. Name of Contractor placing and compacting the mix
8. Job Mix Formula of the material being tested
9. Type of mix being tested (i.e. RS-12.5 C or I-19.0 B, etc)
10. Layer of mix being placed (i.e. 1st layer S-9.5 B, 2nd layer S-9.5 B, etc)
11. Gauge serial number
12. Standard Count result of System 1 (must be within Allowable Range)
13. Standard Count result of System 2 (must be within Allowable Range)
14. Average percent compaction of control strip core samples from M&T 514 QA/QC form
15. Average of density readings (in p.c.f.) taken at each core site within the control strip
16. Correlated Target Density determined from the control strip (formula provided on form M&T 514 QA/QC)
17. Gmm (rice specific gravity) determined at mix verification or Gmm moving average if mix has been previously produced or a 17 day lapse in production of this mix has occurred
18. Calculated target density in p.c.f.
19. This number will be the same base number as the QC test section number but will have a suffix of either "QA" for re-test or "V" for verification tests. For example: if the Contractor's test section number is 24QC, a QA re-test would be numbered 24QA and/or a QA verification test would be 24V
20. Reference station number for beginning of each test section
21. Reference station number for ending of each test section
22. Length of test section
23. Increment length of each test site (i.e. 400' or 300' etc)
24. Random number from the random number table used to determine station of test site (if re-testing QC site record station (#30) and offset (#31) from QC Technician)
25. Random number from the random number table used to determine offset width location of test site (if re-testing QC site record station (#30) and offset (#31) from QC Technician)
26. Increment length of each test site (from #23)
27. Width of pavement layer being placed and compacted
28. Calculate length to test location within incremented section ($A \times C =$) (if re-testing QC site record station (#30) and offset (#31) from QC Technician)
29. Calculate offset width to test location within incremented section ($B \times D =$) (if re-testing QC site record station (#30) and offset (#31) from QC Technician)

30. Station of test site (measurement taken with gauge)
31. Offset width pulled from reference line to test site
32. Lane being tested (i.e. NBL Rt, WBL Lt, or SBL Lt, etc)
33. Density reading in pounds per cubic foot (p.c.f.)
34. Percent compaction of target density for test site
35. Record any pertinent information (i.e. re-rolled section at second reading)
36. Average percent compaction of test section
37. Record average percent compaction of QC test section results and determine if result are within Limits of Precision
38. QA Technician printed name and HiCAMs number
39. Signature of QA Technician certifying data listed on the form is true and correct.

**North Carolina Department of Transportation
Division of Highways
Density Gauge Test Section**

M&T - 516 QC
Rev. 11/11

Contract/Project No. [1] Date [2] Division [3] Crew No. [4] Control Strip No. [5]
 Map/Route No. [6] Contractor [7] J.M.F. [8] Type Material [9]
 Layer [10] Gauge Serial No. [11] Standard Counts (nuclear gauge only) Sys1 [12] Sys2 [13]
 Core Sample Avg. [14] % Avg. of gauge readings [15] PCF Correlated Target Density [16] PCF
 Interim Density Calculated Target: 62.4 PCF x [17] = [18] Calculated Target PCF
 Gmm

Test Sect. No. [19]		Begin Sta. [20]		End Sta. [21]		Length: [22] /5 = [23]			Increments	
Random No.		Increments		Random (calc.)		Test Site Location			Density Readings	
Length	Width	Length	Width	Length	Width	Station	Offset	Lane	PCF	%
A	B	C	D	A x C =	B x D =	-----	-----	-----	-----	-----
[24]	[25]	[26]	[27]	[28]	[29]	[30]	[31]	[32]	[33]	[34]
Comments: [35]									Test Section Average	[36]
										Pass Fail

Test Sect. No.		Begin Sta.		End Sta.		Length: /5 =			Increments	
Random No.		Increments		Random (calc.)		Test Site Location			Density Readings	
Length	Width	Length	Width	Length	Width	Station	Offset	Lane	PCF	%
A	B	C	D	A x C =	B x D =	-----	-----	-----	-----	-----
Comments:									Test Section Average	
										Pass Fail

Test Sect. No.		Begin Sta.		End Sta.		Length: /5 =			Increments	
Random No.		Increments		Random (calc.)		Test Site Location			Density Readings	
Length	Width	Length	Width	Length	Width	Station	Offset	Lane	PCF	%
A	B	C	D	A x C =	B x D =	-----	-----	-----	-----	-----
Comments:									Test Section Average	
										Pass Fail

At end of production for the day, calculate lot average by averaging test section results: Daily Lot Average [37] % Pass / Fail

*Print Name Legibly w/HiCAMs No. [38]

*QC Technician Signature: [39]

Note: (1) All failing lots must be documented by Resident Engineer on the QA-2B form.
Contractor must be notified by letter of any pay adjustment or pavement removal.

*By providing this data under my signature and/or HiCAMs certification number, I attest to the accuracy and validity of the data contained on this form and certify that no deliberate misrepresentation of test results, in any manner, has occurred.

cc: Resident Engineer [White]
QC Technician [Gold]

INSTRUCTIONS FOR M&T 516 QC

GENERAL NOTE: This form is to be completed daily by the Contractor's Density Control Technician when nuclear or non-nuclear density control is being utilized to perform quality control testing of the compaction process. This form is to be distributed as follows: The gold copy is maintained by the QC Density Technician. The white copy is given to the Department's Roadway Technician and attached to his/her daily roadway report (M&T 605) and forwarded to the Resident Engineer. The Resident Engineer will keep the white copy in the project files.

1. NCDOT contract number (list primary number if contract has multiple contract numbers)
2. Date asphalt layer is actually placed, compacted and tested
3. Division in which contact is located
4. Crew Number (once established remains the same for the entire project)
5. Sequential number of control strip per mix type
6. Work order map number within a contract
7. Name of Contractor placing and compacting the mix
8. Job Mix Formula of the material being tested
9. Type of mix being tested (i.e. RS-12.5 C or I-19.0 B, etc)
10. Layer of mix being placed (i.e. 1st layer S-9.5 B, 2nd layer S-9.5 B, etc)
11. Gauge serial number
12. Standard Count result of System 1 (must be within Allowable Range)
13. Standard Count result of System 2 (must be within Allowable Range)
14. Average percent compaction of control strip core samples from M&T 514 QA/QC form
15. Average of density readings (in p.c.f.) taken at each core site within the control strip
16. Correlated Target Density determined from the control strip (formula provided on form M&T 514 QA/QC)
17. Gmm (rice specific gravity) determined at mix verification or Gmm moving average if mix has been previously produced or a 17 day lapse in production of this mix has occurred
18. Calculated target density in p.c.f.
19. Consecutive number of test sections for each type mix per paving operation
20. Reference station number for beginning of each test section
21. Reference station number for ending of each test section
22. Length of test section
23. Increment length of each test site (i.e. 400' or 300' etc)
24. Random number from the random number table used to determine station of test site
25. Random number from the random number table used to determine offset width location of test site
26. Increment length of each test site (from #23)
27. Width of pavement layer being placed and compacted
28. Calculate length to test location within incremented section ($A \times C =$)
29. Calculate offset width to test location within incremented section ($B \times D =$)
30. Station of test site (measurement taken with gauge)
31. Offset width pulled from reference line to test site
32. Lane being tested (i.e. NBL Rt, WBL Lt, or SBL Lt, etc)
33. Density reading in pounds per cubic foot (p.c.f.)
34. Percent compaction of target density for test site
35. **Record any pertinent information (i.e. re-rolled section at second reading)**

36. Average percent compaction of test section
37. Average percent compaction of each lot tested (only one lot per M&T 516 QC form – see HMA/QMS manual for lot determination)
38. QC Technician printed name and HiCAMs number
39. Signature of QC Technician certifying data listed on the form is true and correct.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 ASPHALT ROADWAY INSPECTOR'S DAILY REPORT

5-1-07

Project No.: [1]		County: [2]		Div. [3]		Report No. [4]					
Date: [5]		Weather: [6]		Temp. High: [7]		Low: [8]					
Type of Construction: [9]				Route No. [10]		Miles: [11]					
Map Proj. No.: [12]		Map No.: [13]		Map Length: [14]							
Contractor (Prime): [15]		Paving Contractor: [16]									
Contractor Producing Asphalt Mix: [17]				Plant Site: [18]							
[19] SPREADING EQUIPMENT				[20] ROLLING EQUIPMENT							
No.	Make	Speed		No.	Type	Weight	Tire Pressure	Speed			
[A]	[B]	[C]		[A]	[B]	[C]	[D]	[E]			
↓	↓	↓		↓	↓	↓	↓	↓			
[21] TACK COAT				[22] ROADWAY OPERATIONS							
Source	Grade	Gals Used	Temp.	No. Loads Received: [A]		Total Hours: [B]					
[A]	[B]	[C]	[D]	Time First Rec'd	Time Last Rec'd	Delay Time	Hrs. Operation				
				[C]	[D]	[E]	[F]				
[23] MATERIAL PLACED TODAY											
Type Mix	Map No.	Mat Location	Base Type (ABC, New Mix, Exist. Pav't)	Beg. Station	End Station	L. F.	Width	Sq. Yards	Lbs. Per Sq. Yard	Tack Coat Rate	
[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	[J]	[K]	
↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	
[24] MATERIALS PLACED (TONS)											
Mix Type	[A]	→									
JMF No.	[B]	→									
Today's Tons	[C]	→									
[25] QA DENSITY INFORMATION											
Type Density Control: [A]				No. of Verification Tests Today: [C]							
No. of QC Tests Today: [B]				No. of Comparison Tests: [D]							
[26] ROADWAY SURFACE TEMPERATURE						[27] MIX TEMPERATURE					
Type Mix	Time	Temp.	Type Mix	Time	Temp.	Type Mix	Time	Mix Temp.	Type Mix	Time	Mix Temp.
[A]	[B]	[C]	[A]	[B]	[C]	[A]	[B]	[C]	[A]	[B]	[C]
↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
Official Inspection: [28]											
Remarks: [29]											
**Print Rdwy Tech.'s Name w/HICAMS#: [30]						RD1-			Res. Engr.		
**Rdwy Tech.'s Signature: [31]									[32]		

HAS OCCURRED

Pink - Materials & Tests Unit
 White - Resident
 Gold - Roadway Technician

12-76 BY PROVIDING THIS DATA UNDER MY SIGNATURE AND /OR HICAMS CERTIFICATION NUMBER, I ATTEST TO THE ACCURACY AND VALIDITY OF THE DATA CONTAINED ON THIS FORM AND CERTIFY THAT DELIBERATE MISREPRESENTATION OF THE TEST RESULTS, IN ANY MANNER, HAS OCCURRED.

INSTRUCTIONS
FOR
M&T 605 (SP)
ASPHALT ROADWAY INSPECTORS DAILY REPORT

GENERAL NOTE: This report is to be completed in entirety each day that any pavement is placed on a project. In the event that more than one paving crew is in operation on the project, a separate report is required for each operation. Documentation for supporting operations within a days' production should be attached to this report. For example: (1) Nuclear Density Testing; M&T 514 QA/QC, when appropriate, and M&T 516 QC daily. (2) Core Sample Testing; Forms QC-5 and/or QA-5 as appropriate. The M&T 605 Form and all required supporting forms will be stapled together in a single assembly for each day pavement is placed and forwarded to the appropriate parties within five (5) working days. The M&T 605 should always be stapled on top of each days assembly of reports. Distribution will be as follows: The DOT Roadway Technician shall keep the gold copy. The white and pink copies shall be attached to the M&T 605 Form and forwarded to the Resident Engineer. The Resident Engineer shall maintain the white copy in the project files and forward the pink copy to the M&T Unit. Retention of this report will be in accordance with the latest edition of the NCDOT Construction Manual.

For metric projects the most current metric version of M&T 605M shall be used.

1. Prime project number (usually first project number on the contract).
2. County in which work is being performed.
3. Division in which project is located.
4. Sequential report number 1, 2, 3, etc. Only one set of sequential report numbers for each contract per paving crew. If more than one paving crew places mix on the project, use suffixes of a,b,c, etc. to designate each paving crew. For example: Paving Crew 1 would have report nos. 1,2,3, etc. and Crew 2 would be 1a,2a,3a, etc. Individual work order numbers will not have separate report numbers.
5. Date work is performed.
6. Brief statement of weather conditions, i.e., partly cloudy or sunny, cool, windy, etc.
7. Day's high temperature. Does not have to be the official temperatures for that day.
8. Day's low temperature. Does not have to be the official temperatures for that day.
9. Brief statement of type of construction, i.e., resurfacing, widening, new construction.
10. Route number of road being paved, i.e., SR 1379, US 421, I-440.
11. Total length (in miles) of project.
12. Project number of map if different than prime project number.
13. Map number, if applicable.
14. Length of map being paved, if applicable.
15. Prime Contractor for total contract.
16. Contractor actually placing pavement on project.
17. Contractor actually producing asphalt mixture.
18. Site (location) of asphalt plant producing mix.

(Continued)
INSTRUCTIONS
FOR M&T 605 (SP)

19. Spreading Equipment Used:
 - A. Number of pavers
 - B. Make of pavers
 - C. Average speed of paver (fpm) during placing operations
20. Rolling Equipment Used:
 - A. Number of rollers
 - B. Type of rollers (i.e. vibratory, static steel wheel, rubber tire)
 - C. Weight of roller (in tons).
 - D. Average tire pressure of rubber tire rollers.
 - E. Average speed (mph) of each roller
21. Tack Coat Applied:
 - A. Source (Manufacturer) of tack
 - B. Grade of tack (i.e. CRS-1, HFMS-1, PG 64-22, etc.)
 - C. Total number of gallons of tack used
 - D. Temperature that tack was applied
22. Roadway Operations:
 - A. Number of truck loads of mix received and placed.
 - B. Total hours of paving operations (hours & mins.)
 - C. Time first load arrived on project.
 - D. Time last load arrived on project.
 - E. Any significant amount of time that placing pavement was delayed.
 - F. Total hours of actual placing and compacting pavement (total hours less any significant delays).
23. Materials Placed Today:
 - A. Type of mix placed (i.e. S4.75A, SF9.5A, I19.0B, B37.5C, etc.)
 - B. Map numbers on which mix was placed
 - C. Layer and lane on which mat is being placed (i.e., 1st layer Rt. Ln., 2nd layer, Lt. Ln.; widening; paved shoulder, etc.)
 - D. Base type on which mix is being placed (i.e., New Asphalt Layer, ABC, Existing Pavement, etc.)
 - E. Station paving began
 - F. Station paving ended
 - G. Linear feet of pavement that was placed
 - H. Width that pavement was placed
 - I. Number of square yards of pavement placed (Length x Width ÷ 9)
 - J. Rate of pavement placed in pounds per square yard (Tons x 2000 ÷ Sq.Yds.)
 - K. Rate of tack coat applied for each area tacked in a day's operation (No. Gals ÷ Sq.Yds.)

(Continued)
INSTRUCTIONS
FOR M&T 605 (SP)

24. Materials Placed (Tons): (Do not separate tonnage for different work orders within a contract.)
 - A. Type of mix placed (i.e. SF9.5A, S12.5C, I19.0B, B25.0B, etc)
 - B. Job Mix Formula number of mix placed
 - C. Number of tons of each JMF placed this date on this contract
25. QA/QC Density Information
 - A. Type of Density Control Used (Either Nuclear or Core). If nuclear control, record the day's standard counts number here as well.
 - B. The no. of Contractor's QC tests performed (Either nuclear or core).
 - C. The no. of QA Verification tests for that day's operation.
 - D. The no. of QA Comparison cores (adjacent to QC cores) for that day's operation.
26. Roadway Surface Temperature
 - A. Type of mix placed (i.e. SF9.5A, S12.5C, I19.0B, etc.)
 - B. Time that surface temperature was checked.
 - C. Existing surface temperature at the time it was checked.
27. Mix Temperature:
 - a. Type of mix being placed (i.e. SF9.5A, I19.0B, B37.5C, etc.).
 - b. Time temperature was checked.
 - c. Temperature of mix when checked.
28. Name and title of personnel visiting the project, other than normal project personnel.
29. Relative remarks such as possible reasons for failures, conversations about specific project related items, and other general comments that may be helpful in case of price adjustments or material rejections. When nuclear density control is being used, record the days standard counts number for the nuclear gauge. Technician should observe the standard count being taken.
30. Printed name and HiCAMS certification number(Will begin with the prefix RD1) of DOT Roadway Technician completing form
31. Signature of DOT Roadway Technician certifying that all data entered on this form is true and correct
32. Resident Engineer or authorized Assistant Resident Engineer's signature or initials verifying their review of report. (Should not be the Resident Engineer or Assistant Resident Engineer's name printed by the roadway technician.)

Name of Trainee: _____

Part II : Required Sampling and Testing: Section 7 of Current HMA/QMS Manual

Sample / Test	Min. No. Rep's Req'd	Certified QMS Plant Technician Initials and Dates for Each Repetition *												For Final Review Tech Use Only				
		1	2	3	4	5	6	7	8	9	10	11	12					
Sampling Mix	12	[2]																[15]
Sampling Aggregates	12	[3]																
Quartering Mix	12	[4]																
Quartering Aggregates	12	[5]																
Bag and Tag Samples	12	[6]																
Binder Content	12	[7]																
Washed Gradation	12	[8]																
Gyratory Test	12	[9]																
Maximum Spec. Grav.	12	[10]																
TSR Test	2	[11]																
Moisture Content	6	[12]																
Core Sample Density	12	[13]																
Cold Feed Calibration	6	[14]																

* Exception: Technicians with other approved certifications required to perform a minimum of 1 of each test before final review.

Certified QMS Technician must initial and date when each subject is reviewed.

Final Review will be performed after completion of Parts I, II, III, IV by a person from the Approved List of Final review Technicians.

No other Technicians are acceptable for the Final Review.

Name of Trainee: [1]

Part IV : Required Forms: Section 11 of the most current HMA/QMS Manual

Forms	Min. No. Reqs.		Certified QMS Plant Technician Initials and Dates for Each Repetition *												FINAL REVIEW TECHNICIAN ONLY		
	QA	QC	1	2	3	4	5	6	7	8	9	10	11	12			
QA-1	6	**	[2]														[24]
QA-2	2	**	[3]														
QA-3	2	**	[4]														
QA-5	12	**	[5]														
QC-1	**	6	[6]														
QC-2	2	2	[7]														
QC-3	**	6	[8]														
QC-4	2	12	[9]														
QC-5	**	12	[10]														
QC-6	2	12	[11]														
QC-7	**	12	[12]														
QC-8	12	12	[13]														
QC-9	12	12	[14]														
QC-11	**	2	[15]														
QA/QC-1	12	12	[16]														
QA/QC-1A	12	12	[17]														
QA/QC-2	12	12	[18]														
QA/QC-4	12	12	[19]														
QA/QC-5	12	12	[20]														
QA/QC-6	12	12	[21]														
M&T 612 (TSR)	2	2	[22]														
QMS 7	4	4	[23]														

* Exception: Technicians with other approved certifications required to complete a minimum of 1 of each form before final review.

**Technician does not have to complete this form but should review and be knowledgeable of the completed form.

***Either the 1 or 1A form should be completed the minimum no. of repetitions depending on test method used to determine Gmm.

Certified QMS Technician must initial and date when each subject is reviewed.

Final Review will be performed after completion of Parts I, II, III, IV by a person from the Approved List of Final review Technicians.

No other Technicians are acceptable for the Final Review.

**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
QMS LEVEL I PLANT TECHNICIAN
ON-THE-JOB (OJT) TRAINING**

PART V : FINAL REVIEW

Name of Trainee: _____ [1] _____ S.S.N. _____ [2] _____
 (First) (Middle Initial) (Last) (Last 4 Digits only)

ONLY to be Completed by Technicians from Approved List But NOT Same Person That Does OJT.

	Date Review Completed	Initials of Final Review Tech.	Certification No.
PART I	[3]	[4]	[5]
PART II	↓	↓	↓
PART III			
PART IV	↓	↓	↓

I certify that the above named person has satisfactorily completed all listed requirements on this checklist. This was done either under my direct supervision or under the supervision of another certified QMS Superpave Technician. I further certify that I have completed the Final Review and the above named person is knowledgeable of the HMA/QMS Specifications and the latest HMA/QMS Superpave Manual and can adequately perform these tests, calculations, and perform all Duties required of a Level I Plant Technician.

_____ [6] _____
 Printed Name of Approved Certified Technician

_____ [7] _____
 QMS Certification No.

_____ [8] _____
 Signature of Approved Certified Technician

_____ [9] _____
 Date

NOTE: This completed checklist is to be attached to the QMS class application form and mailed to : State Asphalt Design Engineer
 NCDOT - Materials and Tests Unit
 1801 Blue Ridge Road
 Raleigh, NC 27607

In order for the individual to be eligible to attend the QMS Plant Level I Technician Class and take the certification exam; the class application, OJT Checklist, other State certification (if required) and a check for \$100.00 dollars must be received at least 7 days in advance of the scheduled class date.

INSTRUCTIONS
FOR QMS-3

QMS LEVEL I PLANT TECHNICIAN OJT PROGRAM CHECKLIST

GENERAL NOTE: This checklist is to be completed by a certified Level I or II QMS technician when training new technicians under the Level I On-The-Job-Training (OJT) Program. A minimum of 20 working days is required to complete the OJT program. The certified QMS technician, or monitor, is generally required to be "with" the trainee at all times. All training must be conducted under his/her direct supervision. Two very important requirements which the monitor should keep in mind is that the trainee must later pass a "Final Review" conducted by a different approved certified final review technician and eventually pass the Level I technician certification exam before becoming certified; therefore, this training process should be conducted in a very thorough and professional manner. Once the checklist is completed in entirety (Parts I thru IV), the "final review" (Part V) must be performed by a technician from the Approved List of Final Review Technicians. The final review can not be performed by the same technician that did the original OJT training. The final review must be satisfactorily completed before the applicant is eligible to attend the Level I class and take the certification exam. After the final review is completed, the checklist and a \$100 fee must be attached to the class registration form and mailed to the **Asphalt Design Engineer** for enrollment into the Level I Certification class. If approved for enrollment, a confirmation of enrollment will be returned. The trainee should bring this confirmation with him/her to class.

Exception: **In lieu of the 20 day minimum training and the minimum requirements in Parts II, III and IV, a current asphalt plant mix testing certification from another State or other approved testing agency, such as NICET, may be substituted. In this case, a copy of the certification shall be attached to the back of this sheet.**
In addition, the OJT technician must perform all required repetitions in Part I and one repetition of all requirements in Parts II, III, and IV in the presence of a certified plant technician prior to the checkoff by a final review technician

All other requirements of this OJT checklist shall be completed as specified

SUMMARY SHEET (Minimum of 20 calendar days of training required)

1. Name of trainee.
2. Last four digits of Trainee's Social Security number.
3. Classification/position of trainee.
4. Division number, Only if DOT employee.
5. Company name Only if non-DOT employee.
6. Dates on which OJT training occurred
7. QMS Lab Certification number in which training was conducted
8. Printed name of certified technician monitoring the training
9. Certification number of technician monitoring the training
10. Signature of certified technician monitoring the training

PART I

The initial review of the following topics is to familiarize the trainee with the Specifications and HMA\QMS Manual and their contents. The final review with the trainee should insure a thorough knowledge of all subjects previously reviewed. The initial review should be prior to completion of Parts II, III, & IV. The final review should be after completion of Parts II, III, and IV. The "final review" (Part V) must be performed by a technician from the Approved List of Final Review Technicians. The final review can not be performed by the same technician that did the original OJT training.

1. Name of OJT Trainee
2. Review of entire QMS 609 specification and any current special provision.
3. Review of entire QMS 610 specification and any current special provision.
4. Review Current HMA\QMS Manual contents.
5. Review QMS Personnel requirements (**Section 1 of HMA/QMS Manual**)
6. Review mix design procedure (**section 4 of HMA/QMS Manual**)
7. Review job mix formula requirements. (**section 4 of HMA/QMS Manual**)
8. Review QMS Plant requirements (**sections 5& 6 of HMA/QMS Manual**)
9. Review mix verification procedures and requirements. (**section 7 of HMA/QMS Manual**)
10. Review required sampling frequency. (**section 7 of HMA/QMS Manual**)
11. Review sample numbers and how they are determined.
12. Review sample location determinations. (**section 7 of HMA/QMS Manual**)
13. Review getting a representative sample of asphalt mix. (**section 7 of HMA/QMS Manual**)
14. Review getting a representative sample of aggregate. (**section 7 of HMA/QMS Manual**)
15. Review quartering samples. (**section 7 of HMA/QMS Manual**)
16. Review both QC & QA Testing procedures. (**section 7 of HMA/QMS Manual**)
17. Review Significant Decimals and procedures. (**section 7 of HMA/QMS Manual**)
18. Review both QC & QA Lab requirements. (**section 7 of HMA/QMS Manual**)
19. Review corrective action requirements. (**section 7 of HMA/QMS Manual & Article 609-5(C)(5)**)
20. Review density specifications for understanding of procedures. (**section 10 of HMA/QMS Manual**)
21. This column to be used during Final Review Only.

PART II

These tests and procedures must be witnessed, initialed, and dated by a Certified QMS Superpave Technician. The final check-off must be by a Superpave QMS Technician from the Approved List of Final Review Technicians. This check-off should be coordinated with the appropriate party.

1. Name of OJT Trainee
2. Trainee must take a minimum of 12 asphalt mix samples.
3. Trainee must take a minimum of 12 stockpile samples.
4. Trainee must quarter asphalt mix a minimum of 12 times.
5. Trainee must quarter belt-cut or stockpile sample a minimum of 12 times.
6. Trainee must bag samples and fill out QC-7 form a minimum of 12 times.
7. Trainee must determine binder content by approved method a minimum of 12 times.
8. Trainee must perform a minimum of 12 washed gradations.
9. Trainee must make a minimum of 12 sets of Gyrotory specimens.
10. Trainee must perform a minimum of 12 Rice specific gravity tests.
11. Trainee must prepare and test a minimum of 2 sets of TSR specimens.
12. Trainee must determine moisture content of combined aggregate a minimum of 6 times.
13. Trainee must determine roadway core density for a minimum of 12 roadway cores.
14. Trainee must calibrate cold feeds a minimum of 6 times.
15. Identify method of testing from #7 (binder content).
16. This column to be used during Final Review Only.

PART III

All calculations must be performed in the presence of a QMS Certified Superpave Technician. The QMS Technician must initial and date all required repetitions. Calculations from actual test procedures are preferable.

1. Name of OJT Trainee
2. Trainee must generate random number and sample tonnage a minimum of 12 times in accordance with method ASTM D 3665. **(this is the only allowable method)**
3. Trainee must calculate voids in total mix a minimum of 12 times.
4. Trainee must calculate voids in mineral aggregate a minimum of 12 times.
5. Trainee must calculate effective stone gravity (**G_{se}**) using the actual test results from G_{mb}, G_{mm} and P_b a minimum of 12 times
6. Trainee must calculate voids filled with asphalt a minimum of 12 times.
7. Trainee must calculate P_{0.075}/P_b Eff. A minimum of 12 times.
8. Trainee must calculate %G_{mm} @ N_{ini} a minimum of 12 times.
9. Trainee must calculate the Ignition Furnace Calibration Factor a minimum of 2 times.
10. Trainee must calculate a minimum of 2 sets of TSR specimens.
11. This column to be used during Final Review Only.

PART IV

QA and QC Trainee's are required to complete all applicable QA, QC and QA/QC forms. A Certified QMS Technician, as applicable, will check calculations and date and initial if calculations are correct.

1. Name of OJT Trainee
2. QA-1 Form to be filled out a minimum of 6 times.
3. QA-2 Form to be filled out a minimum of 2 times (may be an example completion).
4. QA-3 Form to be filled out a minimum of 2 times (may be an example completion).
5. QA-5 Form to be filled out a minimum of 12 times.
6. QC-1 Form to be filled out a minimum of 6 times.
7. QC-2 Form to be filled out a minimum of 2 time (must be completed during a scales check/calibration).
8. QC-3 Form to be filled out a minimum of 6 times.
9. QC-4 Form to be filled out, frequency as required on QMS-3 Form (entries and calculations).
10. QC-5 Form to be filled out a minimum of 12 times (12 entries and calculations).
11. QC-6 Form to be filled out, frequency as required on QMS-3 Form (entries and calculations).
12. QC-7 Form to be filled out a minimum of 12 times.
13. QC-8 Form to be filled out a minimum of 12 times (12 entries and calculations).
14. QC-9 Form to be filled out a minimum of 12 times (12 entries and calculations).
15. QC-11 Form to be filled out a minimum of 2 time (with appropriate attachments).
16. QA/QC-1 Rev. Form to be filled out a minimum of 12 times. **(If Vacuum Pump is Used)**
17. QA/QC-1A Rev. Form to be filled out a minimum of 12 times. **(If Corelock is Used)**
18. QA/QC-2 Form to be filled out a minimum of 12 times.
19. QA/QC-4 Form to be filled out a minimum of 12 times (12 entries and calculations).
20. QA/QC-5 Form to be filled out a minimum of 12 times (12 entries and calculations).
21. QA/QC-6 Form to be filled out a minimum of 12 times (12 complete plots of individual and moving average values for actual test results).
22. M&T 612 Form to be filled out a minimum of 2 time (2 entry and calculations).
23. QMS-7 Form to be filled out a minimum of 4 times
24. This column to be used during Final Review Only.

PART V
OJT COMPLETION

1. Trainee's name
2. Trainee's social security number (**last four digits only**)
2. Date final review of each part was completed in it's entirety
4. Initials of approved certified technician performing final review
5. Certification number of approved technician performing final review
6. Printed name of Approved Final Review Technician
7. Certification number of approved Final Review Technician
8. Signature of Approved Final Review Technician
9. Date Approved Final Review Technician verifies OJT completion

Name of Trainee: _____

PART I: REVIEW OF SPECIFICATIONS and Project Special Provisions

Specification Section	Date of PSP Covered	Specification Review (Initial and Date Each Section Reviewed)					
		SPEC.	Review #1	Review #2	Review #3	Review #4	FRT USE ONLY
Section 600 Prime Coat [1]	[2]	[3]	[4]	[4]	[4]	[4]	[5]
Section 605 Tack Coat		STD. SPEC.					
Section 609-5(D) QC Density		STD. SPEC.					
Section 609-6 QA Density		STD. SPEC.					
Section 609-7 and 610-13 Density Acceptance		STD. SPEC.					
Section 610-4 Weather Limitations		STD. SPEC.					
Section 610-7 Hauling Asphalt Mixture		STD. SPEC.					
Section 610-8 Spreading and finishing		STD. SPEC.					
Section 610-9 Compaction		STD. SPEC.					
Section 610-10 Density Requirements		STD. SPEC.					
Section 610-11 Pavement Joints		STD. SPEC.					
Section 610-12 Surface Requirements		STD. SPEC.					
Section 607 Milling Pavements		STD. SPEC.					
Section 650 652 654 660 661 663 Construction Requirements Methods and Rates		STD. SPEC.					
Final Surface Testing Specification		7/18/2006 PSP					

Certified QMS Roadway Technician must initial and date when each subject is reviewed.

Final Review will be performed after completion of Parts I, II, III, IV, by a person from the Approved List of Final Review Technicians. No other Technicians are acceptable for the Final Review.

Name: _____

PART II-A: REVIEW OF THE MOST CURRENT EDITION OF HMA/QMS MANUAL
Section 3 & 4

SUBJECT	Pavement Design and Layer Depth Review (Initial & Date Each Subject Reviewed)				FINAL REVIEW TECH.'S USE ONLY
	Review #1	Review #2	Review #3	Review #4	
Section 3					
[1]	[2]	[2]	[2]	[2]	[3]
Superpave Mix Types Table 3-1	→	→	→	→	
Pavement Layer Depths (Single Lifts)					
Maximum Layer Depths					
Rates of Spread per Inch of Depth					
Single Layer Depths					
Rates					
Review of Typical Section	→	→	→	→	
Section 4					
Section 4					
JMF Numbering System	→				Final Review Tech. only
Mix Types Virgin / Recycled					
Review of JMF	→	→	→	→	

Certified QMS Roadway Technician must initial and date when each subject is reviewed.

Final Review will be performed after completion of Parts I, II, III, IV, by a person from the Approved List of Final Review Technician. No other Technicians are acceptable for the Final Review.

Name of Trainee: _____

PART II-B : REVIEW OF THE MOST CURRENT EDITION OF THE HMA/QMS MANUAL
Section 9

SUBJECT	Asphalt Paving Equipment (Initial & Date Each Subject Reviewed)				
	Review #1	Review #2	Review #3	Review #4	Final Review Tech. Only
[1]	[2]	[2]	[2]	[2]	[3]
Distributor	→	→	→	→	→
Planning Paving Operations					
Incidental Tools					
Haul Trucks					
Pavers - Tractor Unit					
Pavers - Screed Unit					
Materials Transfer Vehicles					
Rollers - Steel Wheel					
Rollers - Pneumatic Tire					
Rollers - Vibratory					
Equipment Inspection					

Certified QMS Roadway Technician must initial and date when each subject is reviewed.

*Final Review will be performed after completion of Parts I, II, III, IV by a person from the Approved list of Final Review Technicians
 No other Technicians are acceptable for the Final Review.*

Name: _____

PART III: ROADWAY CALCULATIONS
Section 10

Subject	Roadway Calculations (Initial & Date Each Calculation)						FINAL REVIEW TECH USE ONLY
	Calculation #1	Calculation #2	Calculation #3	Calculation #4	Calculation #5	Calculation #6	
[1]	[2]	[2]	[2]	[2]	[2]	[2]	[3]
Determining Length From Station Numbers	↓	↓	↓	↓	↓	↓	↓
Calc. Square Yards							
Calc. Prime Coat Rate							
Calc. Tack Coat Rate							
Calc. Rate of Spread							
Calc. Tons Required							
Determining No. of Density Test Sections							
Computing Random Density Locations							
Determining CSI Index and Pay Factors (Final Surface Testing)							
Significant Decimals							

Certified QMS Roadway Technician must initial and date when each calculation is completed.

Final Review will be performed after completion of Parts I, II, III, IV, by a person from the Approved List of Final Review Technicians.
No other Technicians are acceptable for the Final Review.

Name of Trainee: _____

PART IV : ROADWAY RECORDS & REPORTS
SECTION II

Report No.	Minimum Number of Repetitions		Roadway Records & Reports					Final Review Tech Use Only
	QA	QC	Initial & Date Each Review					
			Repetition #1	Repetition #2	Repetition #3	Repetition #4	Repetition #5	
[1]		[2]	[3]	[3]	[3]	[3]	[3]	[4]
M&T 605	5	*						
M&T 514 QA/QC	5	5						
M&T 515 QA	5	*						
M&T 516 QC	*	5						
M&T 517 QA/QC	*	5						
QC-5	*	5						
QA-5	5	*						
QA/QC-7	5	*						

**Technician does not have to complete this form. Needs to review and be knowledgeable of the completed form Forms to be completed under actual field conditions and under the direct supervision of a Certified Technician

Final review will be performed after completion of Parts I, II, III, and IV by a person from the Approved List of Final Review Technicians
No other Technicians are acceptable for the Final Review.

**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
QMS ROADWAY TECHNICIAN
ON-THE-JOB (OJT) TRAINING**

PART V: FINAL REVIEW

Name of Trainee: _____ [1] _____ SSN: _____ [2]
 (First) (M.I.) (Last) (Last 4 Digits Only)

Only to be Completed by Technicians from Approved List but not same person that does OJT.

[3]	[4]	[5]	[6]
	Date Review Completed	Initials of FRT.	Certification No.
PART I	↓	↓	↓
PART II-A	↓	↓	↓
PART II-B	↓	↓	↓
PART II-C	↓	↓	↓
PART III	↓	↓	↓
PART IV	↓	↓	↓

I certify that the above named person has satisfactorily completed all listed requirements on this checklist. This was done either under my direct supervision or under the supervision of another certified QMS Roadway Technician. I further certify that I have completed the final review and the above named person is knowledgeable of the QMS Specifications and HMA/QMS Superpave Manual and can adequately perform calculations and duties of a Roadway Technician

_____ [7]
 Printed Name of Approved Final Review Technician

_____ [8]
 QMS Certification No.

_____ [9]
 Signature of Approved Final Review Technician

_____ [10]
 Date

NOTE: This completed checklist is to be attached to the QMS class application form and mailed to : **State Asphalt Design Engineer
 NCDOT - Materials and Tests Unit
 1801 Blue Ridge Road
 Raleigh, NC 27607**

In order for the individual to be eligible to attend the QMS Roadway Technician Class and take the certification exam, the class application, OJT Checklist, other State certification, or certificate verifying minimum 1 years experience (If required) and a check for \$100.00 dollars must be received at least 7 days in advance of scheduled class date.

**INSTRUCTIONS
FOR
QMS-5 FORM
QMS ROADWAY TECHNICIAN OJT PROGRAM CHECKLIST**

GENERAL NOTE:

This checklist is to be completed by a certified roadway technician when training new technicians under the Roadway On-The-Job-Training (OJT) Program. A minimum of 20 working days is required to complete the OJT program. The certified roadway technician, or monitor, is not required to be "with" the roadway trainee at all times, but must conduct the training under his/her direct supervision. It is suggested that monitors stay with the trainee full time for at least the first several days of this process and then possibly establish a procedure whereby the trainee would be checked daily to verify accuracy and completeness of work and to answer questions. Two very important requirements which the monitor should keep in mind is that the trainee must later pass a "Final Review" conducted by an approved certified technician and eventually pass the roadway technician certification exam before becoming certified; therefore, this training process should be conducted in a very thorough and professional manner. Once the checklist is completed in entirety (Parts I thru IV), the "final review" (Part V) must be performed by a technician from the Approved List of Final Review Technicians. The final review can not be performed by the same technician that did the original OJT training. The final review must be satisfactorily completed before the applicant is eligible to attend the roadway class and take the certification exam. After the final review is completed, the checklist and a \$100 fee must be attached to the class registration form and mailed to the **Asphalt Design Engineer** for enrollment into the Roadway Certification class. If approved for enrollment, a confirmation of enrollment will be returned. The trainee should bring this confirmation with him/her to class.

Exception: In lieu of the 20 days minimum training, either of the following may be substituted:

- 1) a current roadway paving certification from another state or other approved testing agency, or**
- 2) Certification verifying a minimum of 1 year asphalt roadway paving experience from a supervisor who has direct knowledge of the applicant's roadway paving experience.**

In either case, the appropriate certification shall be attached to the back of the OJT checklist and included with the class application package. All other requirements of the OJT checklist shall be completed in full as specified, including the Final Review Checkoff by an Approved Final Review Technician

The Approved List of Final Review Technicians will be established and maintained by the State Pavement Construction Engineer and his staff. The Pavement Construction Section may be contacted for a current copy of the list or the list may be accessed on their web site at:

www.doh.dot.state.nc.us/operations/dp_chief_eng/constructionunit/paveconst/

SUMMARY SHEET (Minimum of 20 calendar days of training required)

1. Name of applicant being trained
2. Social Security number of applicant
3. Applicant's classification if DOT or Position Title if NON-DOT
4. DOT Only -- Division in which the applicant works
5. NON-DOT Only -- Company with which the applicant works
6. Date on which OJT training occurred
7. DOT project number on which training was conducted
8. Name of certified technician monitoring the training
9. Certification number of technician monitoring the training
10. Signature of certified technician monitoring the training

PART I **REVIEW OF SPECIFICATIONS and Project Special Provisions**

1. Specification Section to be studied and reviewed by trainee
2. Trainer must list dates of PSP's covered with OJT Student
3. **STD. SPEC.** indicates that the most current Standard Specification Book is where trainee will find subject matter that is to be studied and reviewed.
4. Initials and dates of certified technician for each review of each section (minimum of 4)
5. * This column is for date and initials of the Final Review Technician **only** when a trainee has had the final review of that subject. *Can not be certified technician that monitored initial training.*

PART II-A: **REVIEW OF MOST CURRENT EDITION OF THE HMA/QMS MANUAL
(SECTIONS 3 and 4)**

1. Subject to be reviewed by trainee
2. Initials and dates of certified technician for each review of each subject (minimum of 4)
3. * This column is for date and initials of the Final Review Technician **only** when a trainee has had the final review of that subject. *Can not be certified technician that monitored initial training.*

PART II-B: **REVIEW OF MOST CURRENT EDITION OF THE HMA/QMS MANUAL
(SECTION 9)**

1. Subject to be reviewed by trainee
2. Initials and dates of certified technician for each review of each subject (minimum of 4)
3. * This column is for date and initials of the Final Review Technician **only** when a trainee has had the final review of that subject. *Can not be certified technician that monitored initial training.*

PART II C: **REVIEW OF MOST CURRENT EDITION HMA/QMS MANUAL
(SECTION 10)**

1. Subject to be reviewed by trainee
2. Initials and dates of certified technician for each review of each subject (minimum of 4)
3. * This column is for date and initials of the Final Review Technician **only** when a trainee has had the final review of that subject. *Can not be certified technician that monitored initial training.*

PART III: REVIEW ROADWAY CALCULATIONS

1. Calculations to be performed by trainee
2. Initials and dates of certified technician for each calculation performed (minimum of 6)
3. * This column is for date and initials of the Final Review Technician **only** when a trainee has had the final review of that subject. *Can not be certified technician that monitored initial training.*

PART IV: REVIEW OF ROADWAY RECORDS AND REPORTS
(SECTION 11 --- *all forms and instructions are in Section 11*
of most current edition of the HMA/QMS Manual)

1. The form number to be completed and/or reviewed by trainee
2. Minimum number of repetitions that each form is to be completed and/or reviewed by QA and QC technician trainees
3. Initials and dates of certified technician that completed or reviewed the form
4. * This column is for date and initials of the Final Review Technician **only** when a trainee has had the final review of that subject. *Can not be certified technician that monitored initial training.*

PART V: OJT TRAINING FINAL REVIEW

****ONLY TO BE COMPLETED BY A TECHNICIAN ON THE APPROVED LIST OF FINAL REVIEW TECHNICIANS. CONSULT THE NCDOT PAVEMENT CONSTRUCTION SECTION OR ACCESS THEIR INTERNET WEB PAGE FOR THE MOST CURRENT LIST.**

1. Part Number of OJT checklist being reviewed
2. Date final review was completed in it's entirety
3. Initials of approved certified technician performing final review
4. Certification number of approved technician performing final review
5. Printed full name of OJT trainee
6. Social Security number of trainee
7. Printed name of approved final review technician
8. Certification number of approved final review technician
9. Signature of approved certified technician verifying OJT completion
10. Date approved technician verifies OJT completion

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Request For JMF Change

Contractor: 1
 Plant Location: 3
 Plant #: 5

Mix Type: 2
 Existing JMF#: 4
 Division: 6

Anti Strip Additive

Current Brand / Grade	New Brand / Grade	TSR Results	Old %	New %
7	8	9	10	11

Aggregate Sources and Blend Percentages

Supplier	Material	Source	Old Blend %	New Blend %
12	13	14	15	16
↓	↓	↓	↓	↓
↓	↓	↓	↓	↓
↓	↓	↓	↓	↓
TOTAL				

Gradation

Sieve Size	JMF Value	Change To
50.0mm	17	18
37.5mm		
25.0mm		
19.0mm		
12.5mm		
9.50mm		
4.75mm		
2.36mm		
1.180mm		
0.600mm		
0.300mm		
0.150mm		
0.075mm	↓	↓

Volumetric Properties

Property	JMF Value	Change to
Gsb (Bulk Dry S.G.)	19	20
Gse (Effective S.G.)		
Gsa (Apparent S.G.)		
% Pba (Absorption)		
% RAP / Virgin		
Gmm (Rice S.G.)		
Gmb (Lab S.G.)		
VTM%		
VMA%		
VFA%		
Virgin Binder %		
Binder From RAP %		
Other % Binder		
Total % Binder		
Binder Grade		
Mix Temp	↓	↓

QC Comments: 21

QA Comments: 22

Change Requested By: 23
QC Level II Technician

Change Date: 24
Date

I have checked that these changes meet the allowable adjustments outlined in section 7 of the HMA QMS Manual

Change Approved By: 25
QA Supervisor

Verbal Approval: 26
Date

*****Asphalt Laboratory Approval*****

Approved By: 27

Effective Date: 28

Date Approved: 29

New JMF No.: 30

INSTRUCTIONS
FOR
FORM QMS-6
REQUEST FOR JOB MIX FORMULA CHANGE

GENERAL NOTE: This form shall be used by QC personnel when requesting a change to an existing job mix formula. This form is to be initiated by the QC Level II technician and then forwarded to the appropriate Division QA Supervisor. If a JMF gradation change is requested due to an aggregate blend change, a 0.45 Power Chart with both the old and proposed gradation plotted on same chart must be submitted with the change request form. If the blend change is greater than 10% from the JMF blend, documentation of the new aggregate blend consensus properties (FORM M&T 620-SP) must also be attached. The QA Supervisor will review the requested change(s) and required documentation to ensure that the change(s) is in accordance with "The Allowable Mix Adjustments" in Section 7 of the HMA/QMS manual. The QA Supervisor will then forward this request to the appropriate Pavement Construction Specialist, who will either approve or disapprove it. If approved, he/she will make the requested changes, issue a revised JMF and void the old JMF, as appropriate. If disapproved, the QMS-6 form will be returned to the Contractor through the appropriate QA Supervisor.

1. Name of Contractor producing this mix
2. Type mix produced
3. Actual site location of plant (shown on JMF)
4. Existing job mix formula number
5. Current asphalt plant HiCams certification number; i.e., AS XXX
6. Highway Division in which plant is located
7. Current brand and grade of anti-strip additive used in this JMF
8. New brand and grade of anti-strip additive
9. TSR test results (required if change in anti-strip source or dosage is requested)
10. Existing percentage of anti-strip additive in the job mix formula
11. New percentage of anti-strip additive requested
12. Aggregate supplier; i.e., Vulcan, Martin-Marietta, etc.
13. Type of material; i.e., 78M, #67, Screenings, etc.
14. Source where material originates; i.e., Crabtree Quarry, Belgrade Quarry, etc.
15. Existing blend of materials on this job mix formula
16. Proposed new blend of materials on this job mix formula
NOTE: Blend change(s) greater than 10% from original JMF must have aggregate consensus properties rechecked with documentation attached to the QMS-6
17. Current percent passing each sieve on JMF (show all sieves)
18. Proposed percent passing each sieve for new JMF (show changes only)
19. Current volumetric property values from existing JMF (show all values)
20. Proposed volumetric property values for new JMF (show changes only)
21. Include any pertinent comments by QC Level II Technician
22. Include any pertinent comments by QA Supervisor
23. Signature of QC Level II Technician
24. Date change is requested to be effective
25. Signature if QA Supervisor giving verbal approval (Must advise PC Specialist to revise JMF)
26. Date Verbal approval is given by the QA Supervisor
27. Signature of Pavement Construction Section's approving person (See Section 7 of MANUAL)
28. Effective date of the new job mix formula
29. Actual date the change was made
30. New job mix formula number

North Carolina Department of Transportation Asphalt Plant Scale Verification

Contractor: _____ [1]	Division: _____ [2]
Plant Location: _____ [3]	Type of Check: (Check Blank)
Project Number: _____ [4]	QC Check : _____ [5]
	Directed QA Check : _____

Plant Scales Used for Pay Purposes		
Type Scales :	[6]	
Location :	[7]	
Date of Check: [8]		→
	Initial	Recheck
A) Gross Weight	[9]	→
B) Tare Weight	[10]	→
C) Material Weight	[11]	→

Other Approved Scales		
Type Scales :	[6]	
Location :	[7]	
Date of Check: [8]		→
	Initial	Recheck
A) Gross Weight	[12]	→
B) Tare Weight	[13]	→
F) Material Weight	[14]	→

NOTE : If certified weighing devices other than platform scales are used, gross and tare weights are not required.

	Wt @Plant Scale	Wt. @ Other Scale	Difference	% Difference	Within +/- 0.4% Tolerance
	C	F	G = C - F	(G / C) x 100	Yes / No
Initial Check	[15]	[16]	[17]	[18]	[19]
Recheck	▼	▼	▼	▼	▼

COMMENTS : _____ [20]

_____ [21]

QC Supervisor / Technician -- Cert. No.

(Printed Name)

_____ [23]

Approved By: QA Supervisor -- Cert. No.

(Printed Name)

_____ [22]

QC Supervisor / Technician

(Signature)

_____ [24]

Approved By: QA Supervisor

(Signature)

cc: Resident Engineer (Project Files)
QA Supervisor
Contractor

INSTRUCTIONS
FOR
QMS-7
ASPHALT PLANT SCALE VERIFICATION

GENERAL NOTE: This form shall be used by both QC and QA personnel when reweighing loads of asphalt mix to verify pay weights. QC may check plant weigh scales at their discretion or are required to do so when directed by QA personnel or the Project Engineer. QC shall furnish the appropriate QA Supervisor two copies of the completed form. QA shall retain one copy and furnish one copy to the appropriate Project Engineer.

1. Name of Contractor producing this mix.
2. NCDOT Division in which plant is located.
3. Actual location of plant site.
4. Project number for which mix is being produced.
5. Check (✓) appropriate blank, whether at QC's discretion or directed by QA.
6. Type scales will normally be either platform scales or load cells.
7. Location of scales be utilized. This may be a plant site, quarry site, grain company, etc.
8. Date scales check performed, either initial or recheck date.
9. Total weight of haul truck and asphalt mix from scales at plant site (if platform scales).
10. Weight of haul truck without asphalt mix from scales at plant site (if platform scales).
Note: If certified weighing devices other than platform scales are used, gross & tare wts. not required.
11. Net weight of asphalt mix (10 - 11 if platform scales or net weight if other certified weighing device).
12. Total weight of haul truck and asphalt mix from scales at "Other Appoved Scales" (if platform scales).
13. Weight of haul truck without asphalt mix from scales at "Other Appoved Scales" (if platform scales).
Note: If certified weighing devices other than platform scales are used, gross & tare wts. not required.
14. Net weight of asphalt mix (12 - 13 if platform scales or net weight if other certified weighing device).
15. Net weight of mix from no. 11, dependent on whether initial or recheck.
16. Net weight of mix from no. 14, dependent on whether initial or recheck.
17. Difference in weights (15 - 16).
18. Percent difference (17 divided by 15 times 100).
19. Mark appropriate blank as to whether or not check meets the 0.4% requirement.
20. Include any pertinent comments by either QC personnel or QA Supervisor.
21. Printed name and certification no. of QC technician performing scales check.
22. Signature of above QC technician.
23. Printed name and certification no. of QA Supervisor monitoring / approving scales check.
24. Signature of above QA Supervisor. This signature verifies QA's approval of the scales check.