

QMS 2010 Update

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Major Changes to 2010 QMS Program

- New Minimum Acceptance Density Requirement
- Nuclear Density Sample entry in HiCAMS (December 18, 2009)
- Review of QA Sampling Frequencies
- Implementation of QAP (December 18, 2009)
- Warm Mix Provision (May 19, 2009 Letting)
- Shingles in HMA
- Higher RAP% (May 19, 2009 Letting)

Article 610-13 - Density Acceptance

Effective with 10-20-09 Project Letting

$$PF = 100 - 10(D)^{1.465}$$

PF = Pay Factor Computed to 0.1%

D = the deficiency of the lot density,
not to exceed **2.0%**

Nuclear Density Reporting

- Capture individual nuclear gauge readings rather than test section average.
- Statistical analysis of results



Review Density Asphalt Nuclear QC (C202403)

Contract: C202403 **Contractor:** BARNHILL CONTRACTING COMPANY **WBS:** 6CR.10781.35 **Status:** Active
Test Date: 01/01/2010 **JMF:** 10-269-151 **Material:** Asphalt Concrete Surface Course, Type RS 9.5B - Tons **Retrieve**

Lot Results History

Include In Avg	Test Sect	Test Type	Station	Station Fraction	Location	% Comp Shot 1	% Comp Shot 2	% Comp Shot 3	% Comp Shot 4	% Comp Shot 5	Avg % Comp
<input checked="" type="checkbox"/>	1	QC	101	+	00 Left Lane - 8' from lt edge	92.3	91.9	93.2	93.1	92.5	92.6
<input type="checkbox"/>	2	QC		+		.0	.0	.0	.0	.0	.0
<input type="checkbox"/>	3	QC		+		.0	.0	.0	.0	.0	.0

JMF Min % Comp: 92.00 **Lot Construction:** Other New **Lot Average:** 92.6
Lot: **Lot Completed:** Open Complete **Lot Status:** Meets Specs

Comment:

Asphalt Adjustments

May 19, 2009 Letting

- PSP for Asphalt Pavements – Superpave revised the asphalt adjustment clause
 - Only pay an adjustment on the additional (virgin) binder content
 - Reclaimed asphalt paid at contract unit price
 - Virgin asphalt paid at adjusted unit price depending on the average terminal price for PG 64-22
- Identical from the 1995 Specification Book

Check your Contract!

- HiCAMS
 - Functions
 - Contract Maintenance
 - Review Contract Details
 - » Click on Financials Tab
 - » Adjust Total AC should be Unchecked
- If there is problem, Call Marie Novello
(919) 733-2210

Review Contract Details (C202294)

Contract: C202294



Contractor: REA CONTRACTING LLC

Status: Executed

Description (nickname): MILLING, RESURFACING, CURB & GUTTER, AND SHLDR RECONST.

- General
- Routes/Counties
- Staff
- Goals
- Dates
- Financials**
- Status
- Completion
- CCU Log
- M&T Status
- History

Bonding Company: Fidelity & Deposit Company of Maryland

Bond Number:

Fuel Base Price: \$0.00

Current Retainage: 0.00%

AC Base Price: \$0.00

Escrow Agent:

AC Adjustment:

Adjust Total AC %: 

AC Threshold %: 0.00

Defaulted Date: 00/00/0000

Fuel Threshold %: 0.00

MPP Invoice %: 95.00

Company To Assume Contract

- Bonding Company
- Contractor
- Other

QA Sampling Frequencies

- Changes in 2005 QMS Manual
 - Verification sampling at 10% of required QC
 - Taken at locations independent of QC sample
 - Must meet Acceptance Specification limits
 - Comparison sampling at 5% of required QC
 - Taken 8" away from the QC sample
 - Compared to limits of precision of QC Sample
 - Retest QC sample locations at 5% frequency

(QAP) Quality Assurance Program

- Web based application
- Central database for QC and QA laboratory test results
- Users input results – calculations performed by system for consistency
- Tracks Tonnage Reports
- Performs Statistical Analysis

Access to QAP

NCDOT Materials & Tests Unit: Asphalt Laboratory - Windows Internet Explorer provided by NC Dept. of Transportation

http://www.ncdot.org/doh/operations/materials/asphalt/

NCDOT Materials & Tests Unit: Asphalt Laboratory

North Carolina Department of Transportation
Materials and Tests Unit

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ASSESSMENT PROGRAM | SUPERPAVE INFORMATION | SUPERPAVE MIX DESIGN CERTIFICATION CLASS | LINKS

ONLINE NAVIGATION

- HOME » ASPHALT LABORATORY
- Asphalt Laboratory
- Asphalt Design Engineer - Todd W. Whittington, P.E.
- Asst. Asphalt Design Engineer - James Budday
- The Asphalt Laboratory of the Materials and Tests Unit has the responsibility of the design and approval of asphalt mixes for contract projects and maintenance; testing and approval of the materials used in asphalt mixes; testing and approval of mineral fillers, asphalt truck release agents and various asphalt additives; aiding in the development of specifications, test procedure manuals and training programs; participating in research as needed by the North Carolina Department of Transportation; running support tests for field projects; and performing Independent Assurance tests on all federally funded paving projects.

The North Carolina Department of Transportation

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Aggregate QA Program

QC Testing

View Reports

Asphalt QA Program

QC Testing

QA Testing

View Reports

Contact DOT

Materials and Tests Unit

Pavement Construction Section

NCDOT » HICAMS » QA Program

Asphalt QC Testing

[Enter Test Results](#)

Manually enter the data

[Correct Test Results](#)

Make a correction to the data

[Enter Tonnage Data](#)

Manually enter the data

[Correct Tonnage Data](#)

Make a correction to the data

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- Aggregate QA Program
 - QC Testing
 - View Reports
- Asphalt QA Program
 - QC Testing
 - QA Testing
 - View Reports
- Contact DOT
 - Materials and Tests Unit
 - Pavement Construction Section

NCDOT » HICAMS » QA Program » Asphalt QA Testing

Enter Asphalt QC Test Results

Plant: AS205 - Everywhere, NC

Producer:

JMF: 03-786-152 - Asphalt Concrete Surface Course, Type RS 9.5B

Sample Type: QAQC-1 (Rice) QAQC-1A (CoreLok)

Sample No: QC-10-1 Partial? Sample Date: 1/1/2010

Test Date: 1/1/2010

Comments:

Next >> Cancel

Aggregate QA Program

QC Testing

View Reports

Asphalt QA Program

QC Testing

QA Testing

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NCDOT » HiCAMS » QA Program » Asphalt QA Testing

Enter Asphalt QC Test Results

Sample No: QC-10-1

Sample Date: 1/1/2010

Dry & Pan Weights

Agg Weight after Ignition:

Dry Weight after Wash:

Furnace Weights

Basket + Mix:

Basket Weight:

Furnace Readout:

% Binder (Pb)

%Binder From Burn:

Furnace Cal. Factor:

Moisture Content

Mix Sample Weight:

Mix Dry Weight:

Tech Certification Number:

Gradation Data

(all weights are after burn weights)

SIEVE	Accumulated Weight
37.5 mm	<input type="text"/>
25.0 mm	<input type="text"/>
19.0 mm	<input type="text"/>
12.5 mm	<input type="text"/>
9.5 mm	<input type="text"/>
4.75 mm	<input type="text"/>
2.36 mm	<input type="text"/>
1.18 mm	<input type="text"/>
.600 mm	<input type="text"/>
.300 mm	<input type="text"/>
.150 mm	<input type="text"/>
.075 mm	<input type="text"/>
PAN	<input type="text"/>

<< Previous Next >> Cancel

NCDOT » HiCAMS » QA Program » Asphalt QA Testing

Enter Asphalt QC Test Results

Sample No: QC-10-1

Sample Date: 1/1/2010

	#1	#2	#3	#4	#5
Hot Bin Weights (Batch Plant):	<input type="text"/>				
Cold Feed (materials):	<input type="text"/> *				
Percentages:	<input type="text"/> *				

Gyratory Compacted Specimen Test Data

Specimen No.	A) Height @ Nini	B) Height @ Ndes	C) Dry Wt. in Air	D) SSD Wt. in Air	E) Weight in Water
	Measured	Measured	Measured	Measured	Measured
1	<input type="text"/> *				
2	<input type="text"/> *				
3	<input type="text"/> *				

Tech Certification Number: *

<< Previous Next >> Cancel

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

Plant No: AS205
Plant Loc: Everywhere, NC
JMF No.: 01-567-151

Sample Date: 1/1/2010
Test Date: 1/1/2010
Sample No.: QA-10-1

Referee Sample:
Verification Sample:
Mix Type: Asphalt Concrete Surface Course, Type RS 9.5A

Sample Replaced by Referee: _____
Associated QC Sample: _____

JMF Pba: 0.14 MD Gb: 1.03
JMF Gse: 2.694 Calculated Gse: 2.664
JMF Gsb: 2.684 Corrected Gsb: 2.654

Dry & Pan Weights		Pan Wt. <0.2% of Dry Wt After Sieving? True
Agg Wt after Ignition	1919.8	
Dry Wt after Wash	1853.1	
Pan Weight	1851.9	
% Loss from Sieving	0.06	

Furnace Weights		Furnace Scale Within 6.0 grams? True
Basket + Mix	5292.5	
Basket Wt.	3267.7	
Total Mix Wt.	2024.8	
Furnace Readout	5295.5	

% Binder (Pb)	
JMF %Binder	5.6
% Binder from Burn	5.1
Furnace Calibration Factor	0.10

Moisture Content	
Mix Sample Weight	
Mix Dry Weight	
Mix % Moisture	

Hot Bin Weights (Batch Plant)	#1	#2	#3	#4	#5
Cold Feed (materials)	Sand	Screenings	78	67	RAP
Percentages	5	31	26	23	15

Gradation Data (all weights are after burn weights)				
SIEVE	Accumulated Weight	Percent Retained	% Pass	JMF
37.5 mm				
25.0 mm				
19.0 mm	114.800	6.0	94.000	100.000
12.5 mm	396.900	21.0	79.000	99.000
9.5 mm	579.500	30.0	70.000	96.000
4.75 mm	918.500	48.0	52.000	73.000
2.36 mm	1167.500	61.0	39.000	55.000
1.18 mm	1326.000	69.0	31.000	46.000
.800 mm	1438.400	75.0	25.000	34.000
.300 mm	1559.700	81.0	19.000	20.000
.150 mm	1687.500	88.0	12.000	11.000
.075 mm	1797.400	93.7	6.300	6.100
PAN	1851.9		Constant =	0.05212133

VMA	13.6
VFA	86
%Gmm@Nini	92.008
P0.075 / Pbe Ratio	1.3

Gmm (Rice) Test Data	
A. Weight of Container	2253.0
B. Weight of Container + Mix	4307.1
C. Weight of Container + Mix In Water	2658.4
D. Weight of Container (hanging in water)	1455.5
E. Uncorrected Maximum Specific Gravity $(B - A) - (C - D)$	2.465
Weighing Intervals	
0 Min	
16 Min	
30 Min	
45 Min	
60 Min	
75 Min	
F. Weight of Pan + Final Weight	
G. Weight of Pan	
H. Max Specific Grav $(F - G) - (C - D)$	
I. Dry Back Correction Factor	
J. $(E) - (I)$ = Corrected Value	
K. Reheat Correction Factor	
L. $(H) \times (K)$ Corrected Max Specific Gravity	

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	SAMPLE VOLUME		J). Correction Factor	K). Gmb @ Nini Estimated	L). Gmb @ Nini Corrected	M). Gmm Rice Grav	N). VTM @' Ndes
	Measured	Measured	Measured	Measured	Measured	C / (D-E)	C / I	H). '@ Nini	I). '@ Ndes	F / G	C / H	J x K	Measured	(M) / (N) x 100
1	119.7	113.2	4769.3	4773.3	2796.2	2.412	2.384	2115.3	2000.4	1.012	2.255	2.282	2.465	2.15
2	121.3	113.6	4765.8	4771.8	2807.9	2.427	2.374	2143.6	2007.5	1.022	2.223	2.272	2.465	1.54
3	124.0	115.5	4760.8	4781.7	2809.0	2.413	2.332	2191.3	2041.1	1.035	2.173	2.249	2.465	2.11
AVERAGES						2.417						2.268		1.9

Comments: Test to see if QA Sample can be entered along with a Verification

By providing this data under my HICAMS Technician ID and Name, 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

Tech 1 ID: 1705

Tech 2 ID: 1705

Tech 3 ID: 1705

Tech 1 Name: Dale Buchanan

Tech 2 Name: Dale Buchanan

Tech 3 Name: Dale Buchanan



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Asphalt Reports

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[QA/QC Test Summary Reports](#)

[QC Moving Averages Reports](#)

[Daily Tonnages Report](#)

[Paired - t Test Report](#)

[F & t Test Report](#)

[Mix Test Report](#)

[Asphalt Tonnage Summary](#)

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Asphalt Paired – t Test Report

Producer: Barnhill Contracting, Inc. - Rocky Mount, North Carolina Plant: A5209

Material: Asphalt Concrete Surface Course, Type RS 3.5B Property: pb

QA Mean	QA Standard Deviation	QC Mean	QC Standard Deviation	Number of Paired Tests	Standard Deviation of QA/QC Difference	t Test Result	T(crit)**	Are Means The Same?	Alpha**
6.0277778	0.29212926	6.29444444	0.29902104	18	0.16329932	6.73	1.74	Fall	0.05

QA Sample No	QA Sample Date	QC Sample No	QC Sample Date	QA Test Result	QC Test Result	QA/QC Difference
QA-09-1	08/24/2009	QC-09-1	08/24/2009	5.900	6.100	0.199999999999999
QA-09-101	12/07/2009	QC-09-101	12/07/2009	6.600	6.900	0.300000000000001
QA-09-14	08/27/2009	QC-09-14	08/27/2009	5.800	6.300	0.5
QA-09-18	08/28/2009	QC-09-18	08/28/2009	5.700	5.900	0.2
QA-09-22	08/28/2009	QC-09-22	08/28/2009	5.700	5.800	0.0999999999999996
QA-09-33	09/03/2009	QC-09-33	09/03/2009	6.000	6.000	0
QA-09-37	09/03/2009	QC-09-37	09/03/2009	5.700	6.200	0.5
QA-09-44	09/10/2009	QC-09-44	09/10/2009	6.100	6.500	0.4
QA-09-59	10/02/2009	QC-09-59	10/02/2009	5.800	6.200	0.4
QA-09-61	10/02/2009	QC-09-61	10/02/2009	6.400	6.500	0.0999999999999996
QA-09-62	10/07/2009	QC-09-62	10/07/2009	6.000	6.100	0.0999999999999996
QA-09-71	10/12/2009	QC-09-71	10/12/2009	6.100	6.400	0.300000000000001
QA-09-72	10/12/2009	QC-09-72	10/12/2009	6.300	6.700	0.4
QA-09-77	10/20/2009	QC-09-77	10/20/2009	6.400	6.400	0
QA-09-8	08/26/2009	QC-09-8	08/26/2009	5.600	6.100	0.5
QA-09-83	10/21/2009	QC-09-83	10/21/2009	6.200	6.400	0.2
QA-09-91	11/03/2009	QC-09-91	11/03/2009	6.400	6.800	0.399999999999999
QA-09-38	09/04/2009	QC-09-38	09/04/2009	5.800	6.000	0.2

** T(crit) – the critical value at which the differences in the means of the two data sets (QA and QC) becomes statistically significant. A t-Test result at or above this level shows two data sets with differences in their means greater than is likely to occur from chance. If the t Test result exceeds this value, there is significant statistical probability that the QA and QC samples were handled and/or tested differently (e.g., differences in sample / testing procedures, differences in instrument calibrations, etc).

Warm Mix Asphalt Provision

May 19, 2009 Letting

- Notify Resident Engineer 2 weeks before production to schedule a Pre-Pave Meeting
- Attendees
 - Paving Superintendent
 - QC Manager
 - WMA Manufacture Representative
 - RE and ARE
 - Project Inspectors
 - QA Supervisor
 - Roadway Construction Engineer
 - Pavement Construction Engineer

Warm Mix Provision Requirements

- Pre-pave Meeting Discussion Topics
 - Approved Method of Warm Mix Technology
 - JMF Approval
 - Discuss Testing Requirements
 - Where will it be placed?
 - Regional and Sub-regional routes only

SP6R02 – WMA

- Based on Existing Job Mix Formula (JMF)
 - JMF should be: xx-xxx-8xx
- Tensile Strength Ratio (TSR) Testing
 - At mix verification prior to production
 - Monthly thereafter

Warm Mix Provision Requirements

Manufacturers Representative at plant and roadway during initial production

- Ensure mix is produced correctly
- Placed in the field correctly

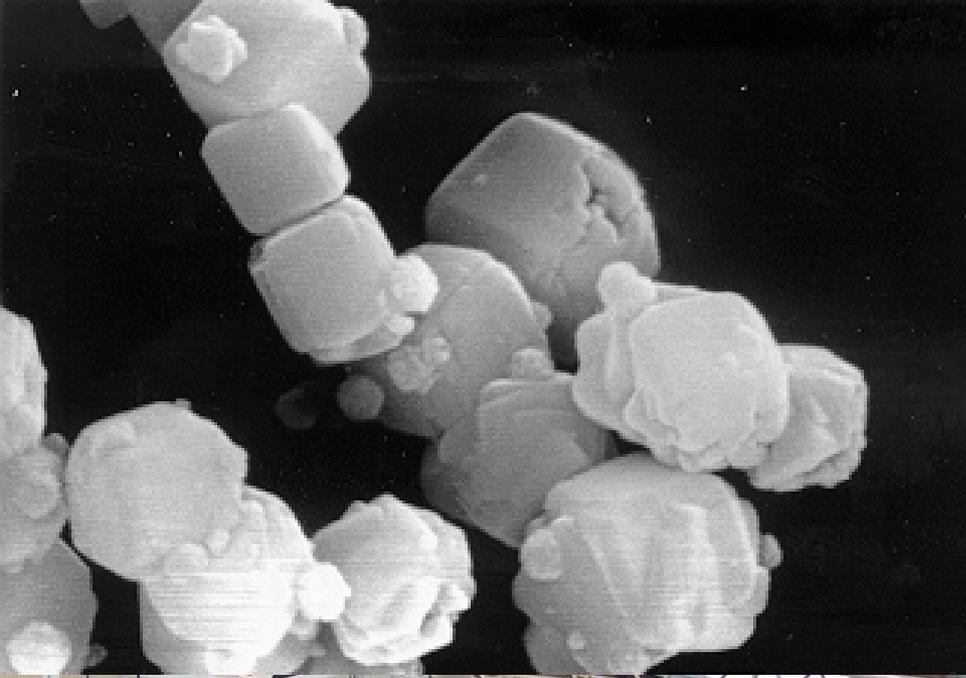
Tracking of Warm Mix Sections

Database to Track Performance

- Project Description
- Route Locations
- Construction Season
- Type of Mix Used
- Tonnage Placed
- JMF Information
 - Plant
 - Mixing Temperature
 - RAP %
- Paving Contractor
- Density Information

Warm Mix Asphalt (WMA)

- Improved Workability
- More Compaction Per Roller Pass
 - Fewer Roller Passes Needed
 - Better Compaction for High RAP Mixes
- Better Compaction at Lower Temperatures
 - Cold Weather Paving
 - Increased Haul Distances
 - Extended Paving Season???







HMA

WMA

Shingles in HMA

- Have Used “Post-Manufacturer” Shingles for Years
 - Plant Rejects and Tabs
 - 6% Maximum
- Looking at Provision for “Post-Consumer” Shingles Use
 - Asbestos
 - Deleterious Materials
 - Stiffer Residual Binder

Higher RAP in Hot-Mix Asphalt

- For years have used ~15%
 - Some Contractors used >15% with softer asphalt binder (PG58-28)
- 2007: moved limit of low range up to 20%
 - Still had to use softer binder >20%
- 2009: reset limit of high range to 30%
 - Allows Contractors to use more RAP without additional Binder tanks
 - Introduces Fractionation

New Table 610-2A

	Percentage of RAP in Mix		
	Category 1	Category 2	Category 3
Mix Type	% RAP \leq 20%	20.1% \leq %RAP \leq 30.0%	%RAP $>$ 30.0%
All A and B Level Mixes, I19.0C, B25.0C	PG 64 -22	PG 64 -22	TBD
S9.5C, S12.5C, I19.0D	PG 70 -22	PG 64-22	TBD
S 9.5D and S12.5D	PG 76-22	N/A	N/A

Category 1 = RAP maximum size of 2 inches

Category 2 = RAP maximum size of 1 inch – by Crushing or Screening

Category 3 = RAP maximum size of 1 inch – by Fractionating

Approved Stockpile RAP

- Fractionated RAP is Isolated and Tested
 - Special Testing – Engineer Determines Virgin Binder Grade
 - Approved Stockpiles
 - Engineer May Reject Any Stockpiles That Are Not Kept Clean and Separated
- Higher Equipment and Land Costs
- But, Gives Contractors a Product that **THEY CONTROL**

Fractionated RAP



Introduction to Asphalt Pavements ONLINE Course

- Still a Required Prerequisite for All Other QMS Certifications
- PDF-based, with Topic-Specific Modules
 - Student can go at own pace
 - Modules have study questions for review
- Finish with an Online Exam

“Online Intro. Class”

NCDOT Materials & Tests Unit: Asphalt Laboratory

North Carolina Department of Transportation
Materials and Tests Unit

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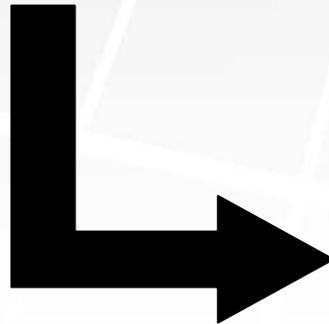
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Asphalt Laboratory

Asphalt Design Engineer - Todd W. Whittington, P.E.
Asst. Asphalt Design Engineer - James Budday

The Asphalt Laboratory of the Materials and Tests Unit has the responsibility of the design and approval of asphalt mixes for contract projects and maintenance; testing and approval of the materials used in asphalt mixes; testing and approval of mineral fillers, asphalt truck release agents and various asphalt additives; aiding in the development of specifications, test procedure manuals and training programs; participating in research as needed by the North Carolina Department of Transportation; running support tests for field projects; and performing independent assurance tests on all federally funded paving projects.

- ONLINE NAVIGATION
 - Quality Assurance
 - Solia Laboratory
 - Structural Members
 - 2010 Training Schedule
 - Meeting Minutes
 - NCDOT/PCI Minutes
 - NGD/IFC/JI Minutes
 - Approved Lists
 - EFirms, User Manuals and Presentations
 - Minimum Sampling Guide
 - Approved Procedures
 - Quality Assurance Program (QAP)
 - Online Standards
 - AASHTO Documents
 - ASTM Documents
- LINKS
 - AASHTO-SOM
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 - TOCC



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

SUPERPAVE

Hot Mix Asphalt
Quality Management System

ROADTEC RP195

HMA/QMS 2010

North Carolina Department of Transportation

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