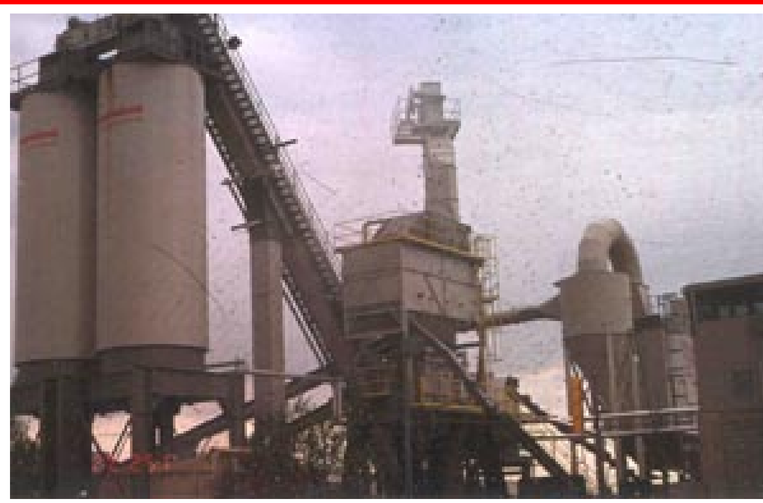
MONITOR ADMINISTRATION

2013



TECHNICAL TRAINING & CERTIFICATION PROGRAM

Iowa Department of Transportation

HIGHWAY DIVISION

☆ **SPECIFICATIONS**

☆ **SUPPLEMENTAL SPECIFICATIONS**

☆ **CONSTRUCTION MANUAL**

☆ **INSTRUCTIONAL MEMORANDUMS**

All of the above materials can be found on the following website:

http://www.iowadot.gov/erl/index.html

Be sure to have the necessary materials with you when monitoring a project. Rather than hauling all the Instructional Memorandums (IM's) with you, it may be easier to sort out only the ones applicable for the project you're monitoring. This would be the materials in effect when the project was let.

GLOSSARY

CPI – Certified Plant Inspector

MON – Plant Monitor

RCE – Resident Construction Engineer/Project Engineer

DME – District Materials Engineer

QMA – Quality Management Asphalt

QMC – Quality Management Concrete

Agency Personnel – Anyone employed by the DOT, county, city, or a consultant representing those agencies.

Acceptance – All factors that compromise the State Transportation Department's determination of the quality of the product as specified in the contract requirements. These factors include verification sampling, testing, and inspection and may include results of quality control sampling. Acceptance tests are, therefore, all test results used to determine payment to the contractor for the product provided.

Validation – The comparison of test results, similar to correlation, but is not limited to split sample one to one test result analysis, but can be used for sets of data that contain either equal or unequal number of results. It is a more general term and there are many methods that may be used to conduct validation.

Correlation – Correlation of test results as used by the Iowa DOT means obtaining test results on split samples and determining if the difference between the results falls within a normal range of variation established by analysis of past tests. Correlation in this sense can only be done on a one to one basis. Correlation of test results is used in the dispute resolution process.

Independent Assurance – Activities that are an unbiased and independent evaluation of all the sampling and testing procedures used in the acceptance program.

Independent Samples – Those obtained without respect to each other.

Monitor –Agency personnel that ensure the CPI is performing all duties required. This can be accomplished by visual inspection, correlation, and/or sampling and testing.

Quality Control – All contractor/vendor techniques and activities that are performed to fulfill the contract requirements.

Quality control sampling and testing results may be used as part of the acceptance decision provided that:

(A) The sampling and testing has been performed by qualified laboratories and qualified sampling and testing personnel.
(B) The quality of the material has been validated by verification testing and sampling. The verification shall be performed on samples that are taken independently of the quality control samples.

Verification – Sampling and testing performed to validate the quality of the product.

What does this mean in relation to the Quality Control/Quality Assurance and Acceptance Program used by the Iowa DOT?

Verification

When the contractors' QC test results are NOT used for acceptance then the verification samples are the acceptance samples. That is, they must "validate the quality of the product" and payment is based on those test results only.

However, when the contractors' QC test results are used to accept and pay for the product then the verification samples and tests by the DOT perform two functions. In this case, not only must the tests validate the quality, but they must also validate the contractors' test results. This is a common situation in the Iowa DOT. Currently samples obtained and split by the contractor then tested by the DOT for correlation are used to validate the contractors' test results. This does not comply with 23 CFR 637 which states, "The verification shall be performed on samples that are taken independently of the quality control samples." Because of this, changes to the Iowa DOT acceptance program are currently being implemented that will require that independent samples be obtained or witnessed by DOT personnel for verification.

Independent Assurance

The correlation of split samples is actually a part of the independent assurance program. Technician certification and recertification, regular inspection of qualified labs, round robin testing, and observing the tests being performed are also all activities intended to "evaluate the sampling and testing procedures" and are, therefore, independent assurance activities. The situation is complicated by the fact that the same personnel and test equipment cannot be used to perform both verification/acceptance and independent assurance. Independent assurance, therefore, is not a material acceptance function.

MONITOR ADMINISTRATION

Monitor Administration

- Welcome
- Instructors
  - Tammy Jeanes - PCC
  - Julia Snyder - HMA
- Function Code 187

MONITORING GENERAL

GLOSSARY

SAMPLING FREQUENCIES – I.M. 204

COMPARISON TESTING – I.M. 216

CERTIFIED LAB – I.M. 208

PLANT INSPECTION DUTIES – I.M. 209, I.M. 213

SPECIFICATIONS, SUPPLEMENTAL SPECIFICATIONS, CONSTRUCTION MANUAL, INSTRUCTIONAL MEMORANDUMS

SAMPLE IDENTIFICATION

MONITORING –GENERAL

- Who
- What
- Where

Monitoring General

Who:

- A monitor is some one who works for or is hired by the Contracting Authority Agency.
- A monitor answers or reports to the Project Engineer assigned to that project.

Monitoring General

What:

- The monitor assures for the Contracting Authority that the contractor's personnel are performing Quality Control in the plant, and that samples and tests are done at the frequencies the DOT has set up. This can be accomplished by visual inspection, correlation and/or sampling and testing.

Monitoring General

Where:

- Contractor's PCC paving plant
- Ready Mix plant
- HMA Plant

Monitoring General

- CPI – Certified Plant Inspector
- MON – Plant Monitor
- RCE – Resident Construction Engineer
- DME – District Materials Engineer

Monitoring General

- QMA – Quality Management Asphalt
- QMC – Quality Management Concrete
- QMA & QMC Technicians

Monitoring General

- **Verification** – Sampling and testing performed to validate the quality of the product.
- **Independent Assurance** – An unbiased and independent evaluation of all the sampling and testing procedures used in the acceptance program.

GLOSSARY

- **Quality Control** – All contractor/vendor techniques and activities that are performed to fulfill the contract requirements.
- **Ind. Assr. & Verification (Acceptance**)– All factors that comprise the DOT's determination of the quality of the product. Acceptance tests are, therefore, all test results used to determine payment to the contractor for the product provided.

Monitoring General

- Correlation – Correlation of test results as used by the Iowa DOT means obtaining test results on split samples and determining if the difference between the results falls within a normal range of variation established by analysis of past tests. Correlation, in this sense, can only be done on a one to one basis. Correlation of test results is used in the dispute resolution process.

Monitoring General

- Comparison – Comparison of test results, while similar to correlation, is not limited to split sample one to one test result analysis, but can be used for sets of data that contain either equal or unequal number of results. It is a more general term and there are many methods that may be used to conduct a comparison.

Monitoring General

- Validation – The comparison of test results, similar to correlation, but is not limited to split sample one to one test result analysis, but can be used for sets of data that contain either equal or unequal number of results. It is a more general term and there are many methods that may be used to conduct validation.

Monitoring General

- Dispute Resolution – Whenever the agency validates the contractor's QC tests for acceptance, there must be a dispute resolution process in place to address those situations where the agency's and the contractor's test results do not agree.

Monitoring General

- The Monitor may run validation testing with the contractor's CPI.
- Monitor Inspection is the basis the Contracting Agency uses in accepting the Contractor's plant inspection work.

Monitoring General

- Your job is very important! You are the eyes and ears for the project engineer.
- You are the first line of defense in the plants, for the Engineer. Everything should be filtered thru you. If the CPI has any questions they need to call you, then you will advise who, what or how.

Monitoring General – 1st step

- Contract and Proposal – Project #
- Plans
- Mix Designs- All Asphalt Projects & QMC
- Specifications (IM's & Const. Manual) monitor duty lists in each section
- Monitor Forms- to document your checks

Monitoring General

- How would you know what samples to test and how often, as a Monitor?
- IM 204 (Frequency IM) App. E

Monitoring General

- IM 216
- Guidelines for Verifying Certified Testing
- Monitors need to compare CPI's gradation with theirs (QMA and QMC).
- Forms – are found in this IM.
- Computerized forms on Materials Web page

IM 208 Lab Qualification

- Only applies to Primary or State projects and any Federal Aid local projects
- Materials Office will qualify labs
- Lab inspections good for two years
- Paper work on file
- Monitor's Lab also needs to be qualified

FORM 193

- Form 193 is the most improperly filled out form for the Materials Office. Be sure all blanks are filled in and the form is completed properly. The instructions for filling out the form are located on the back of the form.

Iowa Department of Transportation
Highway Division, Office of Materials, Ames, Iowa
IDENTIFICATION OF SAMPLE TEST

Central Lab No. ____

Security ID No. ____

Material ____ Sender's Sample No. ____
Intended Use ____ Accounting ID Number ____
County ____ Group No. ____ Design No. ____
Project ____ Contract I.D. Number ____
Contractor ____ (Name) ____ (Address)
Supplier ____ Source ____
Producer ____ Brand ____
Lot No./Heat No. ____
Location of Producing Plant ____
Quantity Represented ____
Sample by ____ (Name) ____ (Address)
Date Sampled ____ Date Received ____
Report to District Materials (Check appropriate box(es)) Dist 1 ☐ Dist 2 ☐ Dist 3 ☐ Dist 4 ☐ Dist 5 ☐ Dist 6 ☐
Report to Residency (Write appropriate residency number) (Last two digits of Cost Center)
Report to Counties (Write appropriate county number)
Report to Other ____
Report to Other ____
Report to Other ____
Results need by: Date ____

Additional Detailed Information:

Circle Sample Type	
V	Verification
PN	Project Information
MD	Mix Design
DI	Dept. Information
WH	Warehouse Stock
IA	Independent Assurance

(NOTE: A representative of the Department of Transportation shall select the sample.)

Distribution: White copy - Central Materials; Yellow copy - File

MONITORING
PCC

Monitoring

Portland Cement Concrete

Portland Cement Concrete

- Instruction Memorandums (IM's)
  - IM 527
  - IM 528
  - IM 535 (NEW)
- Construction Manual
  - Appendices:
    - 3-2.1 - 3-2.4 Paving
    - Monitor Duties
    - 3-3.1 - 3-3.4 Structures Monitor Duties

MONITOR DUTIES

- The actual Monitor's duties are listed on the following slides. Although these are the specified duties, there are many duties and issues a Monitor will need to watch for and help with. These could vary from project to project and contractor to contractor.

Make sure the CPI has no other duties besides plant inspection. The CPI can't be assuming the role of

Simultaneously trying to batch concrete, run the end loader, manage the plant and do plant inspection is NOT possible.

If you have a new CPI, meet with them to talk about what is required of them. Make sure their forms are the most current ones from the IDOT website.

Have they ever completed gradations on their own before? You may want to take the time to observe them. This goes for the computer work also.

Flowable mortar – make sure you have a current mix design from the Material's Office

- The Monitor needs to be sure the CPI has:
  - Current I.M.'s, Specifications, etc.
  - Proper Forms
  - Computer Programs
  - Other Supplies
  - www.dot.state.ia.us/materials/index.htm
  - The monitor should stress to the CPI the importance of a thorough DIARY so all activities are documented.

Daily Diary Date: 10/26/12
Project No.: NHSN-000-S(584)--2R-00
Contract ID: 00-000S-584 Date: 10/23/12
High: 77 Low: 61 Weather: Mostly Sunny
Started batching at 10:33 for Ten Point Construction, the mix used was M-4, for patches. Stopped batching at 10:52, for a total of 10.00yds3.
Location: Hwy 14, south end of Knoxville.
AIR = 6.5% SLUMP = 2.0
WENT WELL
STEVE STANLEY, SE369
WASTE = 1.00yds3

Lord have mercy. Today was a weird day for this job, to say the least. I ran my moistures this A.M. and we batched the concrete out at the same w/c ratio that we have for all the other pours. I wrote the ticket and sent it along with tour driver. Contractor requested a 4" slump. I should have gone out and took a visual of the concrete before it left but I didn't. It was only 12 yds. and I got lazy. Our driver said that he left with a 5" slump but thought nothing of it because he had a 30 minute trip ahead of him and he thought it would surely tighten up an inch. When he got to the job, DOT inspector took a slump and got a 9" on his cone. We asked the next truck who was already loaded what slump he left with and he said 4". When he got to the job, inspector took a slump and got a 7". Both trucks were rejected due to slump. So, we re-batched the 12 yards and I went out and took a slump and an air. I got 2.5" slump and a 5.5" on the air. I let the truck go to the job and he said they added 5 gal. and got a 3" with a 5.5% air. The second (or 4th) truck was batched with 4 gal. less per yard just like the 3rd and he had about a 3" when he left.

PLANT CALIBRATION

All plants must be certified to produce materials for a state project.

Calibration must be done each time a plant is moved, for portable plants, or annually for stationary plants. Calibrating the plant is done by the contractor and CPI. The Material's Office must be notified of calibrations so they may witness the calibration. The calibration sheet must be visible at all plants.

The monitor is no longer required to be at plant calibrations. The construction monitor should be familiar with the plant set-up and should check stockpiles, look over scales, check mix time, etc., when they visit a plant.

BOOKS

Certified Plant Inspectors should keep up their books or computer program daily so that the Monitor is able to check the CPI's records any day of the week. The CPI should keep a good daily dairy, since the Monitor is usually at the plant only once a week. This makes it easy for the Monitor to know what has taken place during that week. As a Monitor, you will have a minimum of one entry per week.

The Monitor needs to keep up their records as well.

It's too easy to get behind when a CPI is working on a project that is producing daily. It is just as easy for a monitor to get behind when they are monitoring several projects at the same time.

MATERIAL SOURCES

Ask where the materials for the project are coming from

- Any material hauled to the plant MUST have proper documentation
- Look at the tickets – ALL the correct information must be on the tickets
- Remind the CPI to keep a copy of all tickets at the plant
- Record material deliveries in the plant book
- Always have the IM T-203 available, along with the sources of approved cement, fly ash and admixtures.

Material Sampling

Safety First!

•Make sure that everything is safe where samples are taken

•* Check to make sure there is a safety switch on aggregate

Admixtures

•The Materials Dept. should take samples of cement, fly ash and admixtures

•The monitor needs to check the lot numbers of the admixture. The following admixtures are included:

- •Air Entrainment
- •Water Reducers
- •Retarders

•Check admixture tanks, circulation pumps, hoses

•Make sure plant circulates admixtures before pour

•Retarder and water reducer needs to be introduced into the mixer after all other ingredients

Material Testing

•Materials need to be tested according to the instructional Memorandums. The testing IM's are located in Volume II.

•Aggregate

- •IM 302 – Sieve Analysis
- •IM 306 – Material Finer than No. 200
- •IM 336 – Reducing Samples
- •IM 307 – Specific Gravity
- •IM 308 – Moisture

•The IM's also cover temperature, air, slump, beams, cylinders and maturity.

IM 527

Paving Plant Inspection

What exactly is a "lot"? (part 1)

For continuous construction operations, a verification lot is defined as a week of paving. Lots less than three days of paving will be grouped with the previous or subsequent lot. A verification lot may include a minimum of three days up to 8 days. Quality control sampling and testing shall be performed daily. Verification sampling and testing will be performed the first day of paving. Thereafter, verification sampling will be performed daily and tested once per lot. If production on a given day is less than 500 c.y., verification sampling may be grouped with the previous or subsequent full day.

(IM 527, Sampling & Testing, 1b)

What exactly is a "lot"? (part 2)

Intermittent construction operations involving small quantities, less than 500 cy per day, shall be grouped to establish a lot not to exceed one week. A minimum of one quality control sample shall be obtained and tested during the week. A minimum of one verification sample will be obtained and tested during the week. When intermittent production is longer than one week, sample once per week and test 20% of samples obtained.

(IM 527, Sampling & Testing, 1b, pg. 12-13)

What are my lots?

CONTINUOUS CONSTRUCTION OPERATIONS

1	2 150	3 450	4 780	5 1600	6 2000	7 850
8	9 2500	10 3500	11	12	13	14
15	16	17	18 940	19 1700	20	21
22	23 1000	24 850	25	26	27 1300	28
29	30	31 675	1 425	2 860	3	4

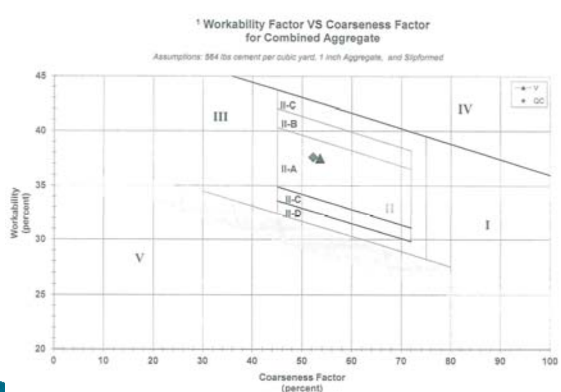
IM 204 Appendix E - QMC Paving

- **Air Content**
  - Quality Control - Sample/Test - 1/350 c.y. (paving plant)
    1/100 c.y. (ready mix)
  - Ind. Assur. & Ver. -Sample/Test – 1/700 c.y.(paving plant)
    1/350 c.y. (ready mix)

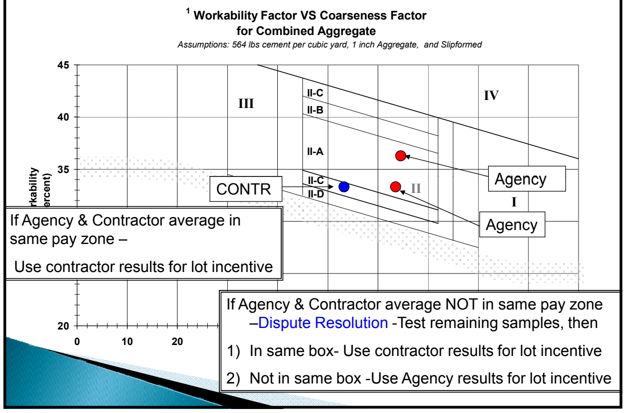
(no changes)

IM 204 Appendix E - QMC Paving

- **Gradation**
  - Quality Control - Sample/Test – 1st day, then 1/1,500 c.y.
    If <500 c.y./day, 1/week
  - Ind. Assur. & Ver. - Sample/Test – 1st day
    Sample – 1/day >500 c.y., test 2/week
    If <500 c.y./day, S/T 1 week



Determining QMC Incentive



INTERMITTENT CONSTRUCTION OPERATIONS

1	2 150	3 200	4	5 75	6 130	7
8	9 250	10 200	11	12	13	14
15	16	17	18 75	19 90	20	21
22	23 80	24 250	25	26	27 125	28
29	30	31 90	1 110	2 25	3	4

IM 204 Appendix E - NON QMC Paving

- **Air Content**
  - Quality Control - Sample/Test - n/a
  - Ind. Assur. & Ver. - Sample/Test – 1/700 c.y. (paving plant)
    1/100 c.y. (ready mix)
- **Gradation**
  - Quality Control - Sample/Test – 1/day
  - Ind. Assur. & Ver. - Sample – 1st day
    Test - 1st day plus 1/week

Things to think about (paving plant)--

- Is there a copy of the current QMC or other mix being used in the batch trailer?
- Is the mixing time correct?
- Are the drivers cleaning out their truck boxes on a regular basis?
- Are the proper forms being kept up daily as required on the computer?
- Concrete yield check?
- Are YOU keeping up with your samples and gradations and reporting as required?

- Are you checking to see if they are putting their maturity information in from the grade?
- Are they keeping up their air charts from the grade?
- Are they keeping their gradations up for the coarseness/workability charts?

IM 528

Ready Mix Concrete Plant Inspection

Batching

A PCC Level II certified technician may also act as a batch person for the following items only:

•Non-structural and miscellaneous items less than 50 c.y. per week

•Night work patching

•Two truckloads of structural concrete or less produced per day

A PCC Level Ii certified technician shall perform required plant inspection duties prior to start up and a minimum of once a lot. A PCC Level II certified technician responsible for quality control shall be available by cell phone.

What is a monitor actually looking for at the plant site?

a) Do they have a laptop or desktop computer for their use?
b) Do they have either internet access to the latest IM's, or an updated paper copy?
c) Is the plant book available for you to look at in the plant? Is it up to date?
d) Do they have a copy of the contract for the project?
e) Do they have the latest air & slump target charts posted?
f) Are material tickets readily available for your review?
g) Are their stockpiles being well taken care of?
h) Is their lab inspection up to date? Are they performing the required tests?
i) Does the plant have a phone, or some availability to reach the plant or batch person?
j) Do they have any questions about when to secure samples and run them?
k) Do they know who to call if they run into any problems and you are not there?
l) Do you have a good working relationship with the CPI?
m) Can you depend on them to call you if they think you do not know about an upcoming pour?

n) Does the CPI understand when electronic plant reports are due in your office? Does he/she abide by the rules?
o) What are they providing for batch tickets? Handwritten or computerized?
p) Are they capable of providing computerized batch tickets?
q) What is on the tickets? Batch weights? Tolerances? Added water?
r) Are the truck inspection cards up to date?
s) Is the clock on their computers printing the correct time?
t) Are you maintaining a good relationship with your person on the grade so that airs and slumps are relayed back to the plant for potential changes to be made during a pour?
u) Does your grade person know how much water can be added to each load? Is it printed on the tickets in some fashion?
v) Is your grade person relaying the 'water added' back to the plant every day in a timely fashion to be put on the plant reports?
w) Does your grade person know how much time they have to get a load unloaded?
x) Do you know whose responsibility it is to reject loads that have run out of time or are out of specification?
y) Are their plant reports filled out completely and submitted timely?
z) Do they have a current maturity curve for this plant? If so, are they keeping their maturity curve validated?

Gradation - One sample for each aggregate per lot.

For structural concrete, a quality control lot shall consist of one week. If 50 c.y. or less are produced in one calendar week, testing may be grouped with previous or subsequent lot, or 1 per two weeks. A bridge deck is considered a lot.

Gradation - One sample for each aggregate per lot.

For non-structural concrete items as described below, a quality control lot shall be one per month. Testing and sampling for non-structural concrete is based on that being the only concrete being produced. If structural or paving concrete is being produced, no additional gradation sampling and testing is required for non-structural concrete produced from the same plant, since the sampling and testing frequency for structural and paving concrete is greater. If multiple projects are being supplied by the plant, one representative sample for the lot covers quality control sampling and testing for all of the projects.

Gradation - One sample for each aggregate per lot.

Miscellaneous concrete and structural or non-structural concrete bid items supplied at 10 c.y. or less for a project will be accepted without gradation testing. A gradation test for flowable mortar, revetment grout, or fabric formed revetment grout is required for the mix design only. The PCC Level II technician shall provide, for these bid items, materials certifications, batch tickets and plant reports.

Quality Control Sampling, Testing and Reporting

PRODUCTION Project Basis	Specific Gravity	Moisture	Gradation	Report
Structural	1/week first 2 weeks, 1/two weeks thereafter	2/week or 1/deck	1/deck, or 1/week If <50 yd3 produced in week, 1/two weeks	1/lot or 1/deck
Non-structural	1/two weeks	1/two weeks	1/month	1/month
Miscellaneous	N/A	N/A	N/A	1 project

IM 528, Sampling & Testing, Quality Control, #1, pg. 5

Verification Sampling, Testing and Reporting

Production Project Basis	Gradation Sampling	Gradation Testing
Structural	1/deck, or 1/week If <50 yd3 produced in a week, 1/two weeks	First week, then 20% of samples obtained or 1/deck
Non-structural	1/project	1/project
Miscellaneous	N/A	N/A

IM 528, Sampling & Testing, Verification, pg. 6

Structural concrete

Article	Work Type
2403	Structural Concrete
2405	Foundations
2406	Concrete Structures
2412	Bridge Decks
2413	Deck Surfacing, Repair, Overlay
2414	Railings
2415	Box, Arch Circular Culverts
2416	Rigid Pipe Culverts
2423	Support Structures
2424	Shotcrete
2433	Drilled Shaft
2503	Storm Sewers
2503	Intakes, Utility Access
2501	Pile encasement
2505	Guardrail anchorage
2513	Concrete barrier
2516	Walls and Steps

Non-structural concrete

Article	Work Type
2201	PCC Base
2212	Base Repair
2213	Base Widening
2405	Seal course
2415	Curtain wall
2511	Sidewalks
2511	Trails
2512	Curb & gutter
2515	Driveways
2517	Railroad Approach Sections
2529	Patching (Full Depth), Rumble Strips
2530	Patching (Partial Depth)

Miscellaneous concrete

Article	Work Type
2304	Detour Pavement
2416	Pipe collars
2503	Catch basins, abandonment, collars
2506	Flowable mortar
2507	Revetment grout or fabric-formed revetment grout
2519	Fence construction
2524	Type A & B signs
2554	Thrust blocks

QUESTION ????

You have 3 or 4 different projects all running out of the same ready mix during the same week. How many aggregate samples do you have to have for that week to cover all of these different projects?

ANSWER:

One for fine aggregate, and one for coarse aggregate.

You can use the same gradations for all of the projects during the same week, EXCEPT for a bridge deck pour. Those gradations must be separate and stand alone.

PCC Gradation Test Report – Verification

- Can you put more than one gradation for a project on this report?
- If you change rock gradation numbers, from a "3" to a "2", do you need to have a different report?

QUESTION:

Are you able to write a non-compliance for work that does not comply?

Iowa Department of Transportation
NONCOMPLIANCE NOTICE

Contractor ________________ Project No. ________________
County ________ Contract ID No. ________ Date ________ Time ________
To: ________________

You are hereby notified that the following observation and/or test noted ________________

and is a violation of Article ________________
The test data value is ________________

and the specification limits are ________________

Additional tests may be performed.

The violation identified in this notice shall be ceased and/or corrected. This may require a modification of current practices or removal and replacement of materials, including labor, at no cost to the Contracting Authority.

You are to determine corrective action necessary.

You are to determine if you wish to discontinue operations until the violation is corrected or additional tests confirm or refute this failing test.

Remarks: ________________

Correction: ________________

Signed: ________________

Scenario –

- Full-depth patching out of a ready mix – poured Friday and Saturday.
- Plant monitor witnesses and picks up samples on Friday.
- Ready mix runs samples on Friday, knows they are out of spec. No one notifies plant monitor or contractor.
- Monday – ready mix continues to run mix, still no notification to plant monitor or contractor. Also, plant report is not sent in.
- Tuesday – ready mix continues to run mix, still no notification to plant monitor or contractor, and still no plant report.
- Wednesday – plant monitor runs samples from Friday; they are out of spec. Still no plant report. Plant monitor calls CPI, who informs that he knew the ready mix sample was out of spec. on Friday, and pulled new samples on Monday, ran them and they were all right. When asked where the plant report is, plant monitor is told that they have just been "too busy" to get it done. Late in the day, plant monitor finally gets plant report.

- Thursday – rain, plant not running.
- Friday – plant running. Plant monitor goes to secure a witnessed sample to rerun gradation verification.
- This sample turns out to be in gradation.

SO, what are the violations at hand that can be written up?

1. Ready mix gradation out of spec, and no notification to plant monitor.

2. Plant monitor gradation out of spec., deducts according to Construction Manual.

3. Late plant report

How are we going to write this up?

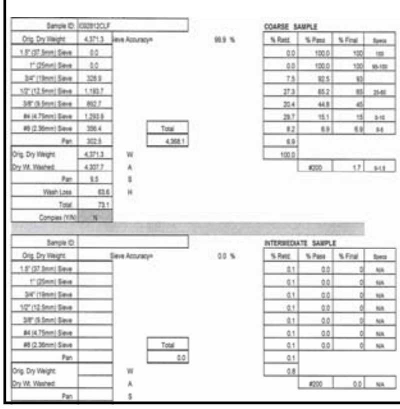
1. Gradation out of spec, and no notification to plant monitor.

IM 528 – Non Complying Gradation

When a quality control gradation test does not comply with the gradation requirements of Article 4109, the certified plant inspector shall contact the Engineer. After corrections have been made, the Engineer will obtain and test another verification sample.

When a verification gradation test does not comply with the gradation requirements of Article 4109, the Engineer will contact the contractor, producer and the District Materials Engineer. The DME may investigate sampling and testing procedures, stockpiling, source material, etc. After corrections have been made, the Engineer will obtain and test another verification sample.

2. Gradation out of spec., deducts according to Construction Manual, Appx. 2-34(A).



Sample ID	[illegible]
Orig. Dry Weight	4,371.3
1.5" (37.5mm) Sieve	0.0
1" (25mm) Sieve	0.0
3/4" (19mm) Sieve	328.9
1/2" (12.5mm) Sieve	1,193.7
3/8" (9.5mm) Sieve	892.7
#4 (4.75mm) Sieve	1,293.8
#8 (2.36mm) Sieve	356.4
Pan	302.5
Total	4,368.1
Sieve Accuracy=	99.9 %

WASH

Orig. Dry Weight	4,371.3
Dry Wt. Washed	4,307.7
Pan	9.5
Wash Loss	63.6
Total	73.1
Complies (Y/N)	N

COARSE SAMPLE

% Retd.	% Pass	% Final	Specs
0.0	100.0	100	100
0.0	100.0	100	95-100
7.5	92.5	93	
27.3	65.2	65	25-60
20.4	44.8	45	
29.7	15.1	15	0-10
8.2	6.9	6.9	0-5
6.9			
100.0			
	#200	1.7	[illegible]

Sample ID	
Orig. Dry Weight	
1.5" (37.5mm) Sieve	
1" (25mm) Sieve	
3/4" (19mm) Sieve	
1/2" (12.5mm) Sieve	
3/8" (9.5mm) Sieve	
#4 (4.75mm) Sieve	
#8 (2.36mm) Sieve	
Pan	
Total	0.0
Sieve Accuracy=	0.0 %
Orig. Dry Weight	
Dry Wt. Washed	
Pan	

INTERMEDIATE SAMPLE

% Retd.	% Pass	% Final	Specs
0.1	0.0	0	N/A
0.1	0.0	0	N/A
0.1	0.0	0	N/A
0.1	0.0	0	N/A
0.1	0.0	0	N/A
0.1	0.0	0	N/A
0.1	0.0	0	N/A
0.1			
0.8			
	#200	0.0	N/A

Ready mix gradation

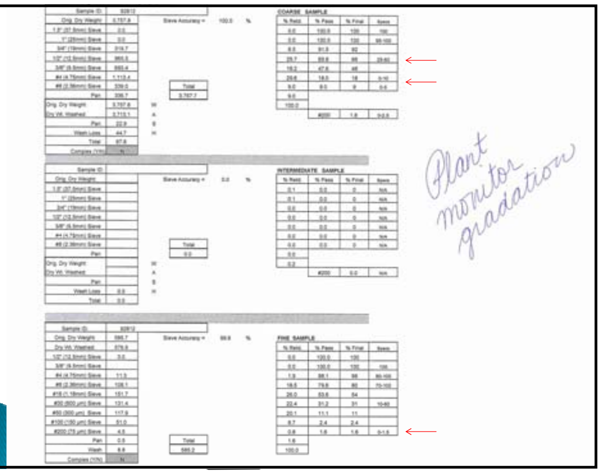


TABLE A

Price Adjustment for Aggregate Gradation Test Deviation

Specified Sieve Size	Deviation in Percent Passing	PCC % Contract Unit Price Adjustment
19 mm, 26.5 mm, 37.5 mm (3/4", 1", 1½")	0.1 – 5.0	1
	5.1 +	2
4.75 mm, 9.5 mm, 13.2 mm (#4, 3/8", ½")	0.1 – 4.0	1
	4.1 – 7.0	2
	7.1 +	3
2.36 mm thru 150 µm (#8 thru #100)	0.1 – 3.0	1
	3.1 – 5.0	2
	5.1 – 7.0	3
	7.1 +	4
75 µm (#200)	0.1 – 0.5	1
	0.6 – 1.0	2
	1.1 – 2.0	3
	2.1 – 4.0	4

PCC

For Structural Concrete, when a lot verification sample is non-complying, the limits of the non-complying material will be determined by testing previous and subsequent lot verification samples. The quantity of material identified as being non-complying will be price adjusted per column PCC in Table A.

For non-QM-C Paving and the #200 sieve for QM-C paving, when the lot verification sample is non-complying, the limits of the non-complying material will be identified by testing previous and subsequent samples within the lot. The quantity of material identified as being non-complying will be price adjusted per column PCC in Table A.

Application of Price Adjustment

1. All percent passing (and average percent passing) values are to be calculated to two

3. Late plant report

IM 528 – Reports and Reporting

… A separate, consecutively numbered, report is to be made for each project as required in the Quality Control Sampling, Testing and Reporting table. A copy of the completed PCC Plant Page shall be faxed or delivered to the DME within four hours on the next working day after the end of the lot. …

Monitor's

PCC Paving Book

Categories –

- Contract
- Plant information
  - Daily monitor checks
  - Weekly monitor checks
  - Plant site inspection checklist
- Air/Slump/Sp. G/Moisture
- Batch weights
- Mix adjustments

- Maturity curve/verifications
- Cement Yield
- Gradations
- Plant reports
  - QMC paving
  - Hand pours
- Diary

Monitor's

PCC Ready Mix Book

Categories –

- Contract
- Plant information
  - Weekly monitor checks
  - Plant site inspection checklist
- Air/Slump/Sp. G/Moisture
- Batch weights
- Maturity curve/verifications
- Gradations
- Plant reports
- Diary

PCC Plant Report

What are you looking for on a plant report?

- Date(s) poured
- Location "from" and "to" (for paving history)
- Is header completely filled out?
- Do they have the correct mix?
- Do they have the correct SpG's/moistures?
- Do they have grade water on the report?
- Did they use hot water or ice?
- Is there a gradation within spec on the report, and is it for the appropriate time period?

- Does the 'batched' totals add up to the 'actual' totals?
- Are the 'totals to date' correct?
- Are the sources boxes completely filled out?
- Did they put in any remarks?
- Is the CPI and monitor blocks correctly filled out?
- Do you know who actually filled in the report?
- Did they put any entries in their diary for the days they poured?
- Is the report getting to you timely?
- Are they emailing the report or faxing it?

Ready mix tickets – what is/should be on them?

- Correct date
- Correct time
- Is the ticket a load ticket, or a batch ticket, or a handwritten ticket?
- Is the ticket showing the correct batch weights?
- Is the ticket showing the tolerances?
- Does ticket reflect how much water can be added at the grade?

The importance of calendars and miscellaneous records to make your job easier …

JAN	2013	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	?	?
	FEB	2013			1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28		

Maturity curve records

Maturity curves	Original curve date	TTF recorded	Verification date	Verification date
Ideal – Chariton	5/18/2009	938	6/18/2009	7/21/2009
Ideal – Knoxville	10/16/2007	1176		
Norwalk Ready Mix	07/06/2009	1097		
American – Winterset	04/12/2010	1201		

Why is this important?

New IM 535

Review

IM 535

PCC Plant Monitor

New I.M.

Updating IM's

- When you are updating your IM's, what do you keep and what do you throw away?

- What projects are you currently working on? When were they let?

Question ??

- You have a maturity curve established. There has been a change in either the material source, proportions or mixing equipment. Do you need to develop a new curve???
- Not necessarily. IM 383 states: Development of a new maturity curve due to material source or portion changes in a concrete mix may be waived by use of the validation procedure. (under 'Factors Requiring a New Curve')

Questions ?????

PCC Level II Update

2012-2013

LEVEL II PCC
UPDATE

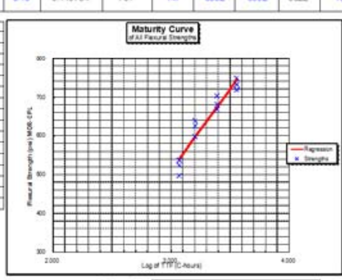
- IM 316
  - October 2009 – Using one fractured face, take measurement at each edge and at the center of the cross section for the width and depth. Average three reading.

- Level I Changes – IM 383
- April 2009
  - Average of first set of 3 beams >425 psi curve invalid
  - Test first set Class C or QMC – 12 – 16 hours
- October 2010
  - A curve validation is required once every 30 calendar days during normal plant production. If the plant has not supplied concrete to the project for a period of greater than 30 days, the curve must be validated prior to continued use.

BEAM #	LOAD AT BREAK (lbs)	TABLE VALUE (lbs)	BREAK LOCATION (in)	WIDTH (in)	DEPTH (in)	FLEXURAL COEFFICIENT	FLEXURAL STRENGTH CPL (psi)	AGE AT BREAK hrs	TTF CH 1	TTF CH 2	AVERAGE TTF	BEAM TEMP (AVG)
	Enter	Enter	Enter	Enter	Enter			Enter	Enter	Enter		Enter
1	4200	4200	0.25	6.00	6.00	0.125000	525	39	1200	1150	1175	13
2	4300	4300	CL	6.00	6.00	0.125000	538	39	1200	1150	1175	13
3	4150	4150	0.5	6.00	6.13	0.119754	497	39	1200	1150	1175	13
4	5000	5000	0.5	6.00	6.00	0.125000	625	63	1617	1581	1599	15
5	4990	4990	0.5	6.00	6.13	0.119754	598	63	1617	1581	1599	15
6	5000	5000	1.5	5.87	6.00	0.127768	639	63	1617	1581	1599	15
7	5500	5500	0.75	5.87	6.00	0.127768	703	94.25	2487	2428	2458	10
8	5350	5350	0.5	6.00	6.00	0.125000	669	94.25	2487	2458	2473	10
9	5450	5450	0.75	6.00	6.00	0.125000	681	94.25	2487	2458	2473	10
10	6000	6000	0.5	6.00	6.13	0.119754	719	147	3652	3592	3622	15
11	5990	5990	0.5	6.00	6.00	0.125000	749	147	3652	3592	3622	15
12	6100	6100	CL	6.00	6.13	0.119754	731	147	3652	3592	3622	15

MIX INFORMATION	Enter
AIR:	7.5
SLUMP:	3.5
w/c:	0.424
MIX:	C4CWR20
FLY ASH SOURCE:	FA004C
GGBFS SOURCE:	
CEMENT SOURCE:	PC0502
COARSE AGGREGATE SOURCE:	A85006
INTERM. AGGREGATE SOURCE:	
FINE AGGREGATE SOURCE:	A77530
WATER REDUCER BRAND:	322N
Add. Rate:	4ozs./Cwt
AIR ADMIXTURE BRAND:	Micro Air
Add. Rate:	1ozs./Cwt
METHOD OF DEVELOPMENT:	Maturity Meter
Desired Flexural Strength (MOR-CPL):	500 psi

REQUIRED TTF: 941



Certified Contractor Representative -

Comments:

Specification Changes
PCC Pavement 2301

- April 2009
  - Target air content shall be **8%**, with a tolerance of **plus or minus 2%**, just prior to consolidation
  - The target air content may be adjusted by the Engineer based on random tests
    - Used to consider need for a target chance
    - Will not be used in the acceptance decision

PCC Pavement 2301

- October 2011
- DELETED the following statement
  - Substitution of Type I/II cement with both GGBFS and fly ash will be permitted in ready mix concrete mixtures only
  - STILL APPLIES – Substitution of both slag and fly ash allowed in central batch plant and ready mix.

Specification Change
Bridge Decks 2412

- When retarder is required, must be on IM 403 Appendix B with working time limits
- April 2013
  - When a mid range WR is used, slump may be increased target to 1 to 4 inch, max. 5 inch

Specifications Changes Bridge Deck Overlay 2413

- October 2010 – HPC-0
- Mid range WR required
  - Retarder may be needed in conjunction with mid range WR
- Slump 1 – 4 inch, max 5 inch
- Fly ash substitution of 20%

Specification Changes Barrier Rail 2513

- October 2011
- Use a well graded combination of aggregates complying with Materials IM 532 in Zone II-A or II-B.

IM 401 / Article 4101

- April 2012
- Type IL cement
  - Typically 10% limestone addition
  - Similar properties Type I/II

IM 403

- April 2011
- A combination of a water-reducing admixture and a retarding admixture may be used to air in air entrainment and slump retention

IM 527

- October 2009
- Intermittent construction less than 500 yd3 per day grouped as a week
- October 2012
- When intermittent production is longer than one week, sample once per week and text 20% of samples obtained

IM 528 Non-structural & Miscellaneous Items

Non Structural Items

Article	Work Type
2201	PCC Base
2212	Base Repair
2213	Base Widening
2405	Seal course
2415	Curtain wall
2511	Sidewalks
2511	Trails
2512	Curb & Gutter
2515	Driveways
2517	Railroad Approach Sections
2529	Patching (Full Depth), Rumble Strips
2530	Patching (Partial Depth)

Miscellaneous Concrete Items

Article	Work Type
2304	Detour Pavement
2416	Pipe collars
2503	Catch basins, abandonment, collars
2506	Flowable Mortar
2507	Revetment Grout or Fabric Formed Revetment Grout
2519	Fence construction
2524	Type A and B signs
2554	Thrust Blocks

IM 528 – Quality Control

PRODUCTION ~~Project Basis~~	Specific Gravity	Moisture	Gradation	Report
Structural	1/week first two weeks, monthly thereafter or 1/ two weeks thereafter for DWU sources	2/week or 1/deck	1/deck, or 1/week If <50 yd^3 produced in week 1/two weeks	1/lot or 1/deck
Non-Structural	1/~~Two weeks~~ month	1/two weeks	1/month	1/month
Miscellaneous	N/A	N/A	N/A	1/project

IM 528 – Quality Control

October 2012 / April 2013

- A PCC Level II certified technician may also act as a batch person for the following items only:

  Non structural and miscellaneous items less than 50 yd^3 (40 m^3) per week
  Night work patching
  Two truckloads of concrete produced per day.

- A PCC Level II certified technician shall perform required plant inspection duties prior to start up and a minimum of once per lot. A PCC Level II certified technician responsible for quality control shall be available by cell phone.

IM 528 – Verification

October 2012

PRODUCTION Project Basis	Gradation Sampling	Gradation Testing
Structural Concrete	1/deck, or 1/week If <50 yd^3 produced in a week 1/two weeks	First week, then 20% of samples obtained or 1/deck
Non-Structural	1/project	1/project
Miscellaneous	N/A	N/A

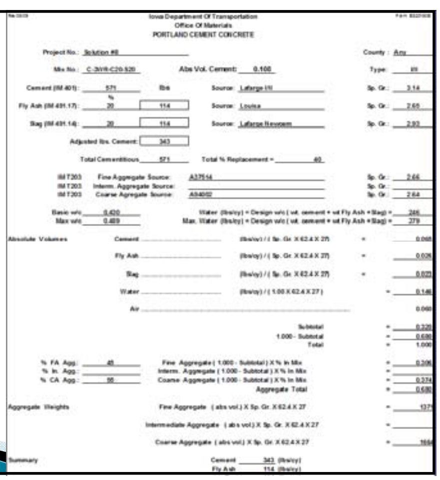
IM 529

- New mixes
  - HPC-O
  - M-5
  - M-V47B

Ternary Batch Weights (2009)

- C-3WR-C20-S30 (example)
  - 20% fly ash substitution
  - 30% GGBFS substitution
  - 571 lbs. per CY x .20 = 114 lbs. fly ash
  - 571 lbs. per CY x .30 = 171 lbs. GGBFS
  - 571 – 114 – 171 = 286 lbs. cement
  - ((114 + 171)/571) X 100 = 50% replacement

Form 820150



Iowa Department Of Transportation
Office Of Materials
PORTLAND CEMENT CONCRETE

Project No.: Solution #8 County: Any
Mix No.: C-3WR-C20-S20 Abs Vol. Cement: 0.108 Type: I/II
Cement (IM 401): 571 lbs Source: Lafarge I/II Sp. Gr.: 3.14
Fly Ash (IM 491.17): % 20 114 Source: Louisa Sp. Gr.: 2.65
Slag (IM 491.14): 20 114 Source: Lafarge Newcem Sp. Gr.: 2.93
Adjusted lbs. Cement: 343
Total Cementitious 571 Total % Replacement = 40
IM T203 Fine Aggregate Source: A37514 Sp. Gr.: 2.66
IM T203 Interm. Aggregate Source: Sp. Gr.:
IM T203 Coarse Agregate Source: A94002 Sp. Gr.: 2.64
Basic w/c 0.420 Water (lbs/cy) = Design w/c (wt. cement + wt Fly Ash + Slag) = 246
Max w/c 0.489 Max. Water (lbs/cy) = Design w/c (wt. cement + wt Fly Ash + Slag) = 279

Absolute Volumes
Cement (lbs/cy) / (Sp. Gr. X 62.4 X 27) = 0.065
Fly Ash (lbs/cy) / (Sp. Gr. X 62.4 X 27) = 0.026
Slag (lbs/cy) / (Sp. Gr. X 62.4 X 27) = 0.023
Water (lbs/cy) / (1.00 X 62.4 X 27) = 0.146
Air 0.060
Subtotal = 0.320
1.000 - Subtotal = 0.680
Total = 1.000

% FA Agg.: 45 Fine Aggregate (1.000 - Subtotal) X % In Mix = 0.306
% In. Agg.: Interm. Aggregate (1.000 - Subtotal) X % In Mix =
% CA Agg.: 55 Coarse Aggregate (1.000 - Subtotal) X % In Mix = 0.374
Aggregate Total = 0.680

Aggregate Weights
Fine Aggregate (abs vol.) X Sp. Gr. X 62.4 X 27 = 1371
Intermediate Aggregate (abs vol.) X Sp. Gr. X 62.4 X 27 =
Coarse Aggregate (abs vol.) X Sp. Gr. X 62.4 X 27 = 1664

Summary
Cement 343 (lbs/cy)
Fly Ash 114 (lbs/cy)

Administration

- IM 213
- Code 1020 & Unsatisfactory Notice
- Engineers must test to be certified
- Reciprocity with other States
- Reference books must be updated
- Registration Book
  - www.iowa.gov/dot/materials/training.htm

End of PCC Level II update

(silent cheer from the crowd)

Questions ?????

Other Required PCC Paving Acceptance Process Responsibilities

Duty	Task	Performed By/ Required Cert.	Minimum Frequency
1. Inspect stockpiles	•Observe stockpiling procedures. •Check for segregation. •Check for contamination. •Check for degradation. •Check for proper storage and handling of aggregates per Article 2301.13 and Materials IM 527.	Construction AGG II	Observe during startup and **during visits**
2. Concrete Grade Yield	•Compare quantity required to quantity batched and placed.	Construction PCC II	Weekly
3. Flexural Strength (beams) Curing and Testing	•Cast and cure per Materials IM 328. •Test per Materials IM 316.	Construction PCC I	Observe each occurrence
4. Maturity Curve Development and Validation	•Observe maturity curve development per Materials IM 383. •Observe casting and curing of beams. •Observe testing of beams. •Observe maturity meter readings at time of beam breaks. •Review Maturity - Strength Development MOR - CPL form. •Review Maturity - Field Data form. •Review Validation of Maturity Curve form.	Construction/PCC I District Materials Engr. Construction/PCC I District Materials Engr.	**When available** Review each curve for each mix. Review each form. Review each validation.
5. Field Maturity Testing	•Observe placement of maturity probes per Materials IM 383. •Observe contractor maturity meter readings	Construction PCC I	If using thermal meter, observe a temperature reading after first day and weekly thereafter
6. Test Equipment	•Inspect test equipment **to ensure in good working order and lab has been qualified.**	Construction PCC I & AGG II	**During startup and ~~W~~when problems arise**
7. Audit Checks and Test results in Plant Book	•Check for proper completion of Daily Plant Checklist and Plant Site Inspection List. •Observe beam break results (when used for pavement opening strength). •Observe record of test results for moistures and specific gravities.	Construction PCC II	Weekly

Other Required PCC Paving Acceptance Process Responsibilities

Duty	Task	Performed By/ Required Cert.	Minimum Frequency
8. Material certifications	Check certifications for: •Cement •Fly Ash •GGBFS (Slag) •Aggregates •Admixtures	Construction PCC II	**During visits**
9. Observe aggregate moisture and specific gravitity testing	•Observe CPI perform test in accordance with Materials IM 307 and IM 308.	Construction PCC II	**Central Batch -** Once during first week of production **Ready Mix - 1/project (structural or paving)**
10. Plant proportion control	•Observe delivery tolerance. •Observe scale sensitivity. •Observe admixture dispenser operation. •Check for proper batch proportions on computer generated or hand written batch tickets	Construction PCC II	**Central Batch -** Once during first week of production
11. Observe mix times and number of revolutions	•Per Article 2001.21.	Construction PCC II	**Central Batch - During visits**
12. Audit Daily Diary	•Review for proper recording of events.	Construction PCC II	**During visits**
13. Plant Reports	•Check for proper project and mix identification. •Check for dates and report number. •Review batch weights and aggregate gradations. •Check materials brands and sources. •Check for correct concrete and cement totals (daily, weekly, and to date). •Check for appropriate Plant Inspector signature or initials. •Sign report after review. •Check for hard copy or electronic backup of files	Construction PCC II	Daily/**Weekly**
14. Inspect Transit Mixers	•Inspect for buildup in drum per Article 2001.21 B. •Inspect for fin wear or broken fins per Article 2001.21 B. •Check for current truck certification per Article 2001.21 B.	Construction PCC II	1/Month
15. Monitor agitors & dump trucks for properly cleaned dump box	**•Check for properly cleaned dump box**	Construction PCC I	Daily
16. Inspect plant facility	•Observe plant calibration to assure compliance with Materials IM 527. •Check lab qualifications. •Inspect test equipment.	District Materials PCC II	Central Batch - **Startup** Ready Mix - Yearly

Other Required PCC Structures Acceptance Process Responsibilities

Duty	Task	Performed By/ Required Cert.	Miniumum Frequency
1. Inspect stockpiles	•Observe stockpiling procedures. •Check for segregation. •Check for contamination. •Check for degradation. •Check for proper storage and handling of aggregates per Article 2301.13 and Materials IM 527.	Construction AGG II	Observe during startup and **during visits**
2. Concrete Grade Yield	•Compare quantity required to quantity batched and placed.	Construction PCC II	N/A
3. Flexural Strength (beams) Curing and Testing	•Cast and cure per Materials IM 328. •Test per Materials IM 316.	Construction PCC I	Perform test each occurrence
4. Maturity Curve Development and Validation	•Observe maturity curve development per Materials IM 383. •Observe casting and curing of beams. •Observe testing of beams. •Observe maturity meter readings at time of beam breaks. •Review Maturity - Strength Development MOR - CPL form. •Review Maturity - Field Data form. •Review Validation of Maturity Curve form.	Construction/PCC I District Materials Engr. Construction/PCC I District Materials Engr.	**When available** Review each curve for each mix. Review each form. Review each validation.
5. Field Maturity Testing	•Observe placement of maturity probes per Materials IM 383. •Observe contractor maturity meter readings	Construction PCC I	Observe readings from continuous monitoring device once per project.
6. Test Equipment	•Inspect test equipment **to ensure in good working order and lab has been qualified.**	Construction PCC I & AGG II	**During startup and ~~W~~when problems arise**
7. Audit Checks and Test results in Plant Book	•Check for proper completion of Daily Plant Checklist and Plant Site Inspection List. •Observe record of test results for moistures and specific gravities.	Construction PCC II	Weekly
8. Material certifications	Check certifications for: •Cement •Fly Ash •GGBFS (Slag) •Aggregates •Admixtures	Construction PCC II	**During visits**

Other Required PCC Structures Acceptance Process Responsibilities

Duty	Task	Performed By/ Required Cert.	Miniumum Frequency
9. Observe aggregate moisture and specific gravitity testing	•Observe CPI perform test in accordance with Materials IM 307 and IM 308.	Construction PCC II	**1/project**
10. Plant proportion control	•Observe delivery tolerance. •Observe scale sensitivity. •Observe admixture dispenser operation. •Check for proper batch proportions on computer generated or hand written batch tickets	Construction PCC II	Once during first week of production
11. Observe mix times and number of revolutions	•Per Article 2001.21.	Construction PCC II	Once per pour
12. Audit Daily Diary	•Review for proper recording of events.	Construction PCC II	**During visits**
13. Plant Reports	•Check for proper project and mix identification. •Check for dates and report number. •Review batch weights and aggregate gradations. •Check materials brands and sources. •Check for correct concrete and cement totals (daily, weekly, and to date). •Check for appropriate Plant Inspector signature or initials. •Sign report after review. •Check for hard copy or electronic backup of files	Construction PCC II	Weekly
14. Inspect Transit Mixers	•Inspect for buildup in drum per Article 2001.21 B. •Inspect for fin wear or broken fins per Article 2001.21 B. •Check for current truck certification per Article 2001.21 B.	Construction PCC II	1/Month
15. Inspect plant facility	•Observe plant calibration to assure compliance with Materials IM 527. •Check lab qualifications. •Inspect test equipment.	District Materials PCC II	Central Batch/ Mobile Mixer - Beginning of project Ready Mix - Yearly

PCC Paving Independent Assurance Responsibilities

			Minimum Frequency	
Duty	Task	Performed By/ Required Cert	Central Batch	Ready Mix
1. Sample and test aggregate gradations (Fine and Coarse)	•Sample and test per Materials IM 204. •Check tolerance per IM 216.	District Materials AGG II	*1/100,000 square yards (1/100,000 square meters)	*1/100,000 square yards (1/100,000 square meters)
2. Entrained Air, Plastic	•Sample and test per Materials IM 204. •Check tolerance per IM 216.	District Materials PCC I	*1/100,000 square yards (1/100,000 square meters)	*1/100,000 square yards (1/100,000 square meters)
3. Test thickness cores	•Sample and test per Materials IM 204. •Check tolerance per IM 216.	District Materials PCC I	10% of project cores	10% of project cores
4. Calibrate smoothness testing equipment	•Per Materials IM 341.	Office of Materials	Yearly	Yearly

* Systems Approach Applicable

PCC Structures Independent Assurance Responsibilities

Duty	Task	Performed By/ Required Cert	Minimum Frequency: Ready Mix	Minimum Frequency: Mobile Mixer/Central Batch
1. Sample and test aggregate gradations (Fine, Coarse, and Intermediate)	•Sample and test per Materials IM 204. •Check tolerance per IM 216.	District Materials AGG II	*1/1000 cubic yards (1/750 cubic meters)	Mobile Mixer N/A *Central Batch 1/1000 cubic yards (1/750 cubic meters)
2. Entrained Air, Plastic	•Sample and test per Materials IM 204. •Check tolerance per IM 216.	District Materials PCC I	*1/1000 cubic yards (1/750 cubic meters)	*1/1000 cubic yards (1/750 cubic meters)
3. Slump	•Sample and test per Materials IM 204. •Check tolerance per IM 216.	District Materials PCC I	*1/1000 cubic yards (1/750 cubic meters)	*1/1000 cubic yards (1/750 cubic meters)
4. Calibrate smoothness testing equipment	•Per Materials IM 341.	Office of Materials	Yearly	Yearly

* Systems Approach Applicable

PCC Paving Verification Responsibilities

Duty	Task	Performed By/ Required Cert	Minimum Frequency
1. Sample and test aggregate gradations (Fine, Coarse, and Intermediate)	•Obtain independent sample per Materials IM 301. •Test per Materials IM 302 and 306.	Construction Sampling AGG I Testing - AGG II	Sample 1/day Test 1st day and 1/week (QM-C Test 1st day and 2/week)
2. Verify aggregate quality.	•Obtain independent sample and submit to Central Materials (Coarse and Intermediate).	Sampling - District Materials AGG II Testing - Office of Materials	1/100,000 square yards (1/100,000 square meters)
3. Verify cementitious.	•Obtain independent sample and submit to Central Materials (Portland Cement, Fly Ash, and Ground Granulated Blast Furnace Slag).	Sampling - District Materials PCC II Testing - Office of Materials	1/100,000 square yards (1/100,000 square meters)
4. Verify admixtures.	•Obtain independent samples and submit to Central Materials.	Sampling - District Materials PCC II Testing - Office of Materials	1/producers lot
5. Verify air, Plastic	•Sample per Materials IM 327. •Test per Materials IM 318.	Construction PCC I	1/700 cubic yards (1/500 cubic meters) - Central Batch 1/100 cubic yards (1/75 cubic meters) - Ready Mix
6. Slump, Hand Finish or Std. Fixed Form Only	•Sample per Materials IM 327. •Test per Materials IM 317.	Construction PCC I	1/700 cubic yards (1/500 cubic meters) - Min. 1/pour

PCC Paving Verification Responsibilities

Duty	Task	Performed By/ Required Cert	Minimum Frequency
7. Verify reinforcement.	•Obtain independent samples and submit to Central Materials.	Sampling - District Materials PCC II Testing - Central Materials	Varies - Check IM 204
8. Verify thickness	•Obtain core locations from District Materials •Witness core drilling •Secure and measure cores per Article 2301.34 and Materials IM 347	Construction PCC I	1/2000 square yards (1/2000 square meters)
9. Verify smoothness.	•Randomly select segments and measure smoothness per Materials IM 341. •Report results and compare to contractor's results. •Check tolerance per IM 216.	District Materials PROF	10% of project

PCC Structures Verification Responsibilities

Duty	Task	Performed By/ Required Cert.	Minimum Frequency
1. Sample and test aggregate gradations (Fine, Coarse, and Intermediate)	•Obtain independent sample per Materials IM 301. •Test per Materials IM 302 and 306.	Construction Sampling AGG I Testing - AGG II	Sample 1st day & 1/week Test 1st day & 20% of samples S & T 1/deck pour
2. Verify aggregate quality.	•Obtain independent sample and submit to Central Materials (Coarse and Intermediate).	Sampling - District Materials AGG II	Ready Mix/Central Batch 1/1000 cubic yards (1/750 cubic meters)
		Testing - Office of Materials	Mobile Mixer - 1/project
3. Verify cementitious.	•Obtain independent sample and submit to Central Materials (Portland Cement and Ground Granulated Blast Furnace Slag).	Sampling - District Materials PCC II	1/1000 cubic yards (1/750 cubic meters)
		Testing - Office of Materials	
4. Verify admixtures.	•Obtain independent samples and submit to Central Materials.	Sampling - District Materials PCC II	1/producers lot
		Testing - Office of Materials	
5. Verify air, Plastic	•Sample per Materials IM 327. •Test per Materials IM 318.	Construction PCC I	Ready Mix/Central Batch 1/30 cubic yards (1/25 cubic meters)
			Mobile Mixer - 1/100 square yards
6. Verify slump	•Sample per Materials IM 327. •Test per Materials IM 317.	Construction PCC I	Ready Mix/Central Batch 1/30 cubic yards (1/25 cubic meters)
			Mobile Mixer - 1/project

PCC Structures Verification Responsibilities

Duty	Task	Performed By/ Required Cert.	Minimum Frequency
7. Verify reinforcement.	•Obtain independent samples and submit to Central Materials.	Sampling - District Materials PCC II	Varies - Check IM 204
		Testing - Central Materials	
8. Verify smoothness.	•Randomly select segments and measure smoothness per Materials IM 341. •Report results and compare to contractor's results. •Check tolerance per IM 216.	District Materials PROF	10% of project

English Paving PCC Plant Monitor Book Index

Item Description	Form #
Plant Information Sheet	Plantinf
Project Information	Proj Info
Weekly Monitor Checks	E214
Daily Monitor Checks	E215
Plant Site Inspection List	E210
QMC Mix Information	QMC Mix
Gradation Sieve Analysis (5)	Grad 1- Grad 5
Gradation Report - Verification	821283C
CPI Gradations	CPI Grad
QMC 216	QMC 216
Beams Made & Tested	E114 or M114
Daily Diary	Daily 3 or 4

Plant Information Sheet

Project No.:	0		
	0	**Contract ID.:**	0
	0		

Prime Contractor:	0
Plant Type:	
Plant Location:	0
Pollution Control:	
Storm Water Permit No.:	
Date Calibrated:	
By:	

Material Sources

0	**0**	**0**
0	**0**	**0**
0	**0**	**0**
0		**0**
0		

		Phone No.	**Fax No.**
Plant Superintendent:			
Certified Plant Inspector:	**0**		
Certification No.:	**0**		
Certified Plant Inspector:			
Certification No.:			
Certified Plant Monitor:	**0**		
Certification No.:	**0**		
Certified Plant Monitor:			
Certification No.:			
Project Engineer:			
Project Manager:			
Project Inspector:			
Materials Inspector:			
Materials Inspector:			

Resident Auditor:		**TC Auditor:**	

Report No.:		7/19/10 tdh
Date This Report:		
Date Last Report:		
Project No.:		
Project No.:		
Project No.:		
Project No.:		
Mix ID:		
Plant Name and Location:		
Contractor:		
Contract ID:		
County:		
Structures Design Number :		
Central Plant (X):		
Ready Mix (X):		
Paving (X):		
Structural (X):		
Incidental (X):		
Patching (X):		
Specification:		
Report Weekly (X):		
Cement Source:		
Fly Ash Source:		
GGBFS Source:		
Air Entraining Brand / Source:		
Water Reducer Brand / Source:		
Retarder Brand / Source:		
Coarse Aggregate Source:		
Coarse Aggregate T-203 A #:		
Coarse Aggregate Gradation No. :		3, 4, 5, 6, or Blank
Intermediate Aggregate Source:		
Intermediate Aggregate T-203 A #:		
Fine Aggregate Source:		
Fine Aggregate T-203 A #:		
Fine Aggregate Gradation No. :		1, 7, or Blank
Plant Monitor's Name:		
Plant Monitor's Certification No.:		
C.A. Specification Limits 1 1/2" Sieve:		
C.A. Specification Limits 1" Sieve:		
C.A. Specification Limits 3/4" Sieve:		
C.A. Specification Limits 1/2" Sieve:		
C.A. Specification Limits 3/8" Sieve:		
C.A. Specification Limits #4 Sieve:		
C.A. Specification Limits #8 Sieve:		
C.A. Specification Limits #200 Sieve:		<=Enter 2.5, if increase in 200 allowed by DME
F.A. Specification Limits 3/8" Sieve:		
F.A. Specification Limits #4 Sieve:		
F.A. Specification Limits #8 Sieve:		
F.A. Specification Limits #30 Sieve:		
F.A. Specification Limits #200 Sieve:		
Contractor CF (QMC):		
Contractor WF (QMC):		
Contractor Lot Pay Zone:		
CPI Name:		
CPI Cert No.:		

Rev 01/98

Form E214

Weekly Monitor Checks (PCC Paving)

Page No.: ____________

Project No.: 0

Contract ID.: 0

	Stockpiles				Cement & Fly Ash Aggr. & Admixtures				Sampling & Testing			Concrete Test			Proportion Control						Test Equipment				Documentation					
Date	Procedure	Intermingling	Contamination	Segregation	Sources	Certifications	Condition	Documentation	Gradations	Moistures	Specific Grav.	Curing	Molds	Flexural Test	Scale Weights	Scale Operation	Admixture Disp.	Mixing Time	Mixing Revol.	Cement Yields	Scales	Sieves	Pycnometers	Splitters	Form 800240m	Plant Checks	Test Equipment	Quantities	Daily Diary	By:

Complies = Y
Discrepancy = D
Not Applicable = NA

Refer To Daily Diary For Discrepancies.

Rev 01/98 Form E215

Daily Monitor Checks (PCC Paving)

Page No.: ________________

Project No.: 0 **Contract ID.:** 0

	Plant Report				
Date	Batch Weights	% Fly Ash	Water / Cement	Gradations	By:

	Plant Report				
Date	Batch Weights	% Fly Ash	Water / Cement	Gradations	By:

Complies = **Y**
Discrepancy = **D**
Not Applicable = **NA**

Plant Site Inspection List (PCC)

Page No.: ______

Project No.: 0 **Contract ID.:** 0

Date Checked	Item	Complies Yes	Complies No	Remarks
	Bins			
	Bin Dividers			
	Bin Supports			
	Screens			
	Guards			
	Ladders			
	Railings			
	Belt Lockouts			
	Sampling Location			
	Aggregate Scales			
	Cement Scales			
	Fly Ash Scales			
	Admixture Dispensers			
	Water Meter			
	Cement Storage			
	Fly Ash Storage			
	Mixing Equipment			
	Lab Location			
	Lab Condition			
	Lab Equipment			
	Air Condition			
	Heating			
	Telephone			
	Water			
	Exhaust Fan			
	Restroom			
	Fax Machine			
	Computer			

If an item does not apply to the project, write (not applicable) in the remarks column.

Mix INFO for QMC/BR ONLY *Enter Aggregate Percentages from Plant Report at Ti*

	Gradation 1		
	Source	**A Number**	**Agg %**
Coarse			42.0
Intermediate			16.5
Fine			41.5
			100.0

Enter Required Fields for QMC, BR, HPC-D Mixes When (ENTER) displays

Target Gradation

1 1/2"	100
1"	
3/4"	
1/2"	
3/8"	
#4	
#8	
#16	
#30	
#50	
#100	
#200	1.5

Enter aggregate source & A number below, if different than Gradatior

	Gradation 2		
	Source	**A Number**	**Agg %**
Coarse			42.0
Intermediate			16.0
Fine			42.0
			100.0

	Gradation 3		
	Source	**A Number**	**Agg %**
Coarse			42.0
Intermediate			16.0
Fine			42.0
			100.0

	Gradation 4		
	Source	**A Number**	**Agg %**
Coarse			42.0
Intermediate			16.0
Fine			42.0
			100.0

	Gradation 5		
	Source	**A Number**	**Agg %**
Coarse			42.0
Intermediate			16.0
Fine			42.0
			100.0

Date:	
Proj. No.:	
Sample ID:	

Sieve Accuracy = 0.0 %

Orig. Dry Weight:		
1.5" (37.5mm) Sieve		
1" (25mm) Sieve		
3/4" (19mm) Sieve		
1/2" (12.5mm) Sieve		
3/8" (9.5mm) Sieve		
#4 (4.75mm) Sieve		
#8 (2.36mm) Sieve		Total
Pan		0.0
Orig. Dry Weight:		W
Dry Wt. Washed:		A
Pan		S
Wash Loss	0.0	H
Total	0.0	
Compies (Y/N)		

COARSE SAMPLE

% Retd.	% Pass	% Final	Specs
0.1	0.0	0	
0.1	0.0	0	
0.1	0.0	0	
0.1	0.0	0	
0.1	0.0	0	
0.1	0.0	0	
0.1	0.0	0	
0.1			
0.8			
	#200	0.0	

Sample ID:	

Sieve Accuracy = 0.0 %

Orig. Dry Weight:		
1.5" (37.5mm) Sieve		
1" (25mm) Sieve		
3/4" (19mm) Sieve		
1/2" (12.5mm) Sieve		
3/8" (9.5mm) Sieve		
#4 (4.75mm) Sieve		
#8 (2.36mm) Sieve		Total
Pan		0.0
Orig. Dry Weight:		W
Dry Wt. Washed:		A
Pan		S
Wash Loss	0.0	H
Total	0.0	

INTERMEDIATE SAMPLE

% Retd.	% Pass	% Final	Specs
0.1	0.0	0	N/A
0.1	0.0	0	N/A
0.1	0.0	0	N/A
0.1	0.0	0	N/A
0.1	0.0	0	N/A
0.1	0.0	0	N/A
0.1	0.0	0	N/A
0.1			
0.8			
	#200	0.0	N/A

Sample ID:		
Orig. Dry Weight:		
Dry Wt. Washed:		
1/2" (12.5mm) Sieve		
3/8" (9.5mm) Sieve		
#4 (4.75mm) Sieve		
#8 (2.36mm) Sieve		
#16 (1.18mm) Sieve		
#30 (600 μm) Sieve		
#50 (300 μm) Sieve		
#100 (150 μm) Sieve		
#200 (75 μm) Sieve		
Pan		Total
Wash	0.0	0.0
Compies (Y/N)		

Sieve Accuracy = 0.0 %

FINE SAMPLE

% Retd.	% Pass	% Final	Specs
0.1	0.0	0	
0.1	0.0	0	
0.1	0.0	0	
0.1	0.0	0	
0.1	0.0	0	
0.1	0.0	0	
0.1	0.0	0	
0.1	0.0	0	
0.1	0.0	0	
0.1			
1.0			

821283 COMPUTER

VER 9-09

Iowa Department of Transportation
Office of Materials

PCC GRADATION TEST REPORT - VERIFICATION

Check Mix(x)		Check One(x)	
Central		Paving	
Ready		Structure	
		Incidental	
		Patching	

Project No.: ______________________

Contract ID: ____________

County: ____________

Mix ID: ____________

Report No.: ________

Date This Report: ________

Date Of Last Report: ________

Structures Des. No: ____________

Contractor: ______________________

Plant Name: ____________________

COARSE AGGREGATE

GRAD NO.:

SOURCE:	T-203 A#	AGG %	Date Sampled	Sample ID	1 1/2" 37.5 mm	1" 25 mm	3/4" 19 mm	1/2" 12.5 mm	3/8" 9.5 mm	#4 4.75 mm	#8 2.36 mm	#200 75 um	Comply Y/N

INTERMEDIATE AGGREGATE

SOURCE:	T-203 A#	AGG %	Date Sampled	Sample ID	1 1/2" 37.5 mm	1" 25 mm	3/4" 19 mm	1/2" 12.5 mm	3/8" 9.5 mm	#4 4.75 mm	#8 2.36 mm	#200 75 um	Comply Y/N
													NA
													NA
													NA
													NA
													NA

FINE AGGREGATE

GRAD NO.:

SOURCE:	T-203 A#	AGG %	Date Sampled	Sample ID	1/2" 12.5 mm	3/8" 9.5 mm	#4 4.75 mm	#8 2.36 mm	#16 1.18 mm	#30 600 um	#50 300 um	#100 150 um	#200 75 um	Comply Y/N

COMBINED AGGREGATE GRADATION

1.5" (37.5)	1" (25)	3/4" (19)	1/2" (12.5)	3/8" (9.5)	#4 (4.75)	#8 (2.36)	#16 (1.18)	#30 (600)	#50 (300)	#100 (150)	#200 (75)	Within Target	Coarseness Factor	Workability Factor	QMC PAY ZONE

	Coarseness Factor	Workability Factor	QMC PAY ZONE
Lot Average - VERIFICATION			O
Lot Average - CONTRACTOR			

Enter CF & WF from other report if > 5 verification tests.

Coarseness Factor (CF)				
Workability Factor (WF)				

Remarks

Distribution: _____ DME _____ Proj. Eng. _____ Contractor

Monitor: ______________________ Cert No. ________

Enter CPI QMC or QC gradations for comparison

	D.O.T.			ENTER Prod. / C.P.I.		
Sieve Size	Coarse Aggregate Percent Passing	Intermediate Aggregate Percent Passing	Fine Aggregate Percent Passing	Coarse Aggregate Percent Passing	Intermediate Aggregate Percent Passing	Fine Aggregate Percent Passing
1.5" / 37.5mm	0.0	0.0				
1" / 25.0mm	0.0	0.0				
3/4" / 19.0mm	0.0	0.0				
1/2" / 12.5mm	0.0	0.0				
3/8" / 9.5mm	0.0	0.0	0.0			
#4 / 4.75mm	0.0	0.0	0.0			
#8 / 2.36mm	0.0	0.0	0.0			
#16 / 1.18mm			0.0			
#30 / 600um			0.0			
#50 / 300um			0.0			
#100 / 150um			0.0			
#200 / 75um	0.0	0.0	0.0			

Retained Total	0.0	0.0	0.0	0.0	0.0	0.0

Comments: ______________________________

cc: DME, RCE

QMC Gradation Correlation I.M. 216

Project No.: 0
0
0
0

Contract ID: 0

Date Sampled:

Plant Name: 0

County: 0

Gradation Date:

Contractor: 0

Mix Design Number: 0

Design No.: 0

Coarse Agg. Source: 0

Intermediate Agg. Source: 0

Fine Agg. Source: 0

Monitor: 0

Cert. No.: 0

Proper Equipment:

C.P.I.: 0

Cert. No.: 0

Specification: 0

Sieve Size	D.O.T. Coarse Aggregate Percent Retained	Prod. / C. P. I. Coarse Aggregate Percent Retained	Fraction Difference	Applicable Tolerance	Complies
1.5" / 37.5mm	100.0	100.0	0.0	0	Yes
1" / 25.0mm	0.0	0.0	0.0	2	Yes
3/4" / 19.0mm	0.0	0.0	0.0	2	Yes
1/2" / 12.5mm	0.0	0.0	0.0	2	Yes
3/8" / 9.5mm	0.0	0.0	0.0	2	Yes
#4 / 4.75mm	0.0	0.0	0.0	2	Yes
#8 / 2.36mm	0.0	0.0	0.0	1	Yes
#16 / 1.18mm					
#30 / 600um					
#50 / 300um					
#100 / 150um					
Minus #200	0.0	0.0	0.0	1	Yes

Sieve Size	D.O.T. Intermediate Aggregate Percent Retained	Prod. / C. P. I. Intermediate Aggregate Percent Retained	Fraction Difference	Applicable Tolerance	Complies
1.5" / 37.5mm	100.0	100.0	0.0	0	Yes
1" / 25.0mm	0.0	0.0	0.0	2	Yes
3/4" / 19.0mm	0.0	0.0	0.0	2	Yes
1/2" / 12.5mm	0.0	0.0	0.0	2	Yes
3/8" / 9.5mm	0.0	0.0	0.0	2	Yes
#4 / 4.75mm	0.0	0.0	0.0	2	Yes
#8 / 2.36mm	0.0	0.0	0.0	1	Yes
#16 / 1.18mm					
#30 / 600um					
#50 / 300um					
#100 / 150um					
Minus #200	0.0	0.0	0.0	1	Yes

Sieve Size	D.O.T. Fine Aggregate Percent Retained	Prod. / C. P. I. Fine Aggregate Percent Retained	Fraction Difference	Applicable Tolerance	Complies
3/8" / 9.5mm	100.0	100.0	0.0	0	Yes
#4 / 4.75mm	0.0	0.0	0.0	2	Yes
#8 / 2.36mm	0.0	0.0	0.0	1	Yes
#16 / 1.18mm	0.0	0.0	0.0	1	Yes
#30 / 600um	0.0	0.0	0.0	1	Yes
#50 / 300um	0.0	0.0	0.0	1	Yes
#100 / 150um	0.0	0.0	0.0	1	Yes
Minus #200	0.0	0.0	0.0	1	Yes

	Good	Fair	Poor
Care of Equipment			
Sampling Procedure			
Splitting Procedure			
Sieving to Completion			
Computations			
Reporting			

Comments:

DME, RCE

Rev 01/98

PC Concrete Beam Record

Form E114

Item Code: ______________ **Page No.:** ______________

Description: ______________ **Category No.:** ______________

Project No.: 0 **Contract ID:** 0

Beams Made Information							Beam Break Information									
Date Made	Mix Number	Beam No.	Time	Air %	Slump (in)	W/C Ratio	Age (Days)	Loc. (in)	Depth (in)	Width (in)	Indicated Load (lbs)	Actual Load (lbs)	Comp. Factor	Mod. Of Rupture (psi)	Spec. psi	By
													0.000000	0		
													0.000000	0		
													0.000000	0		
													0.000000	0		
													0.000000	0		
													0.000000	0		
													0.000000	0		
													0.000000	0		
													0.000000	0		
													0.000000	0		
													0.000000	0		
													0.000000	0		
													0.000000	0		
													0.000000	0		
													0.000000	0		
													0.000000	0		
													0.000000	0		
													0.000000	0		

Checked By: ______________

Page No.: ____________

Project No.: ________________________ **Contract ID:** ____________

Date: ____________ **Sunrise:** ____________ **High:** ____________

Day: ____________ **Sunset:** ____________ **Low:** ____________

Weather: ________________________________

By: ________________________

Rev 05/09 | **Iowa Department Of Transportation** | Form E820150E

Office Of Materials

PORTLAND CEMENT CONCRETE

Project No.: ____________________ **County :** ________

Mix No.: ____________ **Abs Vol. Cement:** ________ **Type:** ________

Cement (IM 401): ____________ **lbs** **Source:** ______________ **Sp. Gr.:** ________

%

Fly Ash (IM 491.17): ____________ [ ] **Source:** ______________ **Sp. Gr.:** ________

Slag (IM 491.14): ____________ [ ] **Source:** ______________ **Sp. Gr.:** ________

Adjusted lbs. Cement: [ ]

Total Cementitious ________ **Total % Replacement =** ________

IM T203	**Fine Aggregate Source:**	______________	**Sp. Gr.:** ________
IM T203	**Interm. Aggregate Source:**	______________	**Sp. Gr.:** ________
IM T203	**Coarse Agregate Source:**	______________	**Sp. Gr.:** ________

Basic w/c ________ **Water (lbs/cy) = Design w/c (wt. cement + wt Fly Ash +Slag) =** ________

Max w/c ________ **Max. Water (lbs/cy) = Design w/c (wt. cement + wt Fly Ash +Slag) =** ________

Absolute Volumes

Cement	**(lbs/cy) / (Sp. Gr. X 62.4 X 27)**	**=**	________
Fly Ash	**(lbs/cy) / (Sp. Gr. X 62.4 X 27)**	**=**	________
Slag	**(lbs/cy) / (Sp. Gr. X 62.4 X 27)**	**=**	________
Water	**(lbs/cy) / (1.00 X 62.4 X 27)**	**=**	________
Air			**0.060**
	Subtotal	**=**	________
	1.000 - Subtotal	**=**	________
	Total	**=**	**1.000**

% FA Agg.: ________	**Fine Aggregate (1.000 - Subtotal) X % In Mix**	**=**	________
% In. Agg.: ________	**Interm. Aggregate (1.000 - Subtotal) X % In Mix**	**=**	________
% CA Agg.: ________	**Coarse Aggregate (1.000 - Subtotal) X % In Mix**	**=**	________
	Aggregate Total	**=**	________

Aggregate Weights

Fine Aggregate (abs vol.) X Sp. Gr. X 62.4 X 27	**=**	________
Intermediate Aggregate (abs vol.) X Sp. Gr. X 62.4 X 27	**=**	________
Coarse Aggregate (abs vol.) X Sp. Gr. X 62.4 X 27	**=**	________

Summary

Cement	________	**(lbs/cy)**
Fly Ash	________	**(lbs/cy)**
Slag	________	**(lbs/cy)**
Water	________	**(lbs/cy)**
Fine Agg.	________	**(lbs/cy)**
Interm. Agg.	________	**(lbs/cy)**
Coarse Agg.	________	**(lbs/cy)**

Distribution: ___ **Materials,** ___ **DME,** ___ **Proj. Engr.,** ___ **Contractor**

12/95 Form E820912

Page: ___________

Report No.: ___________

Portland Cement Shipment Yield Report

Date Submitted: ___________

Contract ID: ____________________

Source: ____________________

Project No.: ____________________

Contractor: ____________________

County: ____________________

Plant Location: ____________________

Date	Invoice Number	Billed Tons	Type	Date	Invoice Number	Billed Tons	Type	Date	Invoice Number	Billed Tons	Type

Mix No.	Cement Per CY (lbs)	Batched (CY)		Cement Batched (Tons)
			....	0.00
			....	0.00
			....	0.00
			....	0.00
			....	0.00
Left In	This Check (+)			
Scale (Tons)	Previous Yield Check (-)			
	Total Weighed (Batch Scale)			0.00

Total Billed Weight (Tons)	0.00

Yield = 0.00 %

C.P.I.: ____________________

PCC
REPORTING

Many of the following forms can be located at: http://www.iowadot.gov/materials/pcc.htm

Paving and Structural Report
- Daily or Weekly
- Form 800240E

Portland Cement Shipment Yield
- Every 10,000 cubic yards
- Form 820912

Ready Mix Tickets
- Form 830212

Calibration Reports
- Form 820917

Transit Mixer Condition
- Form 820907

<u>PCC PAVING PLANT BOOK</u>

Plant Information Sheet

Portland Cement Concrete Form
- Batch Weights
- Form 820150E

PCC Plant Report
- Form 800240E

Portland Cement Shipment Yield Report
- Form 820912 E

Fly ash Shipments
- Form E203

Aggregate Certifications (Coarse and Fine)
- Form E204

Specific Gravities
- Form E205

Moistures (Pycnometer)
- Form E206

Daily Plant Checklist
- Form E212

Plant Site Inspection List
- Form E210

Random Gradations
- Form E211

Beams Made and Tested
- Form E114

PLANT REPORT

The same report #800240 is used for paving and structural reporting. This report is computer generated or is also available in hard copy.

The reports are available in Excel.

The CPI fills out these forms but they need to obtain some information from the grade inspector before completing. The information from the grade inspector would include the percent used and the water added on the grade.

This report is required daily for paving and weekly for structures.

The monitor needs to make sure the CPI has the most current copy of this report on disk or in hard copy.

800240 computer VER 1-06

PCC Plant Report

E - Units

Date of Placement		Location From	To
Mix 1	11/17/10		
Mix 2	11/18/10		
Mix 3			
Mix 4			
Mix 5			

Project No.: STP-009-3(101)--20-30
Plant Name: NORTHWEST READY MIX
Contractor: CHRISTENSON BROS.
SubContractor:
Weather: FOGGY/OVERCAST

Contract ID:
County: DICKINSON
Temp. Min: 33 °F
Temp. Max: 37 °F

Report No.: 1
Date This Report: 11/22/10
Date Of Last Report: NONE
Structures Des. No: 101

Check Mix(x)	
Central	
Ready	

Check One(x)		SEND
Paving		(Daily)
Structure	X	(Weekly)
Noncritical		(Weekly)
Patching		(Weekly)

				Fine Aggregate			Intermediate Aggregate			Coarse Aggregate			Actual Quantities Used - lbs/yd3									Avg	Max
																			Water				
	Mix	Batched yd3	% Of Est. Used	Moist. (%)	T-203 Sp. G.	Wt. SSD lbs	Moist. (%)	T-203 Sp. G.	Wt. SSD lbs	Moist. (%)	T-203 Sp. G.	Wt. SSD lbs	Cement	Fly Ash	GGBFS	Fine	Inter.	Coarse	In Agg.	Plant	Grade	w/c Ratio	w/c Ratio
1	C-4WR	35.00	100.0	3.2	2.66	1,515					2.68	1,531	593			1,565		1,531	50	201.1	6.7	0.435	0.489
2	C-4WR-C20	9.25	100.0	3.2	2.66	1,506					2.68	1,522	474	119		1,556		1,522	50	194.5		0.412	0.489
3																							
4																							
5																							

Coarse	1 1/2"	1"	3/4"	1/2"	3/8"	#4	#8	#200	Comply
	100	95-100		25-60		0-10	0-5	0-1.5	Y/N
11/18/10C.	100	99	79	41	11	3.1	2.3	0.7	Y

Conc. Treatment	(X)	lbs/yd3
Ice		
Heated Water	X	
Heated Materials		

	Batched		
Check One (X)	Today	Week X	Total To Date
Concrete: yd3		44.25	44.25
Cement: tons		12.57	12.57

Intermediate	1 1/2"	1"	3/4"	1/2"	3/8"	#4	#8	#200	Comply
									NA
									NA
									NA

	Brand / Source	Rate	Lot Number
Air Entraining:	POLYCHEM VR/ GRT	7.2 OZ/YD	D101310
Water Reducer:	KB1000/ GRT	18 OZ/YD	E101310
Retarder:			
Calcium Chloride:			
Superplasticizer:			

Fine	1/2"	3/8"	#4	#8	#16	#30	#50	#100	#200	Comply
		100	90-100	70-100		10-60			0-1.5	Y/N
11/18/10FA		100	100	83	60	35	8.8	1.8	0.9	Y

	Type	Sp. Gr.	Source
Cement:	I/II	3.14	ASH GROVE
Fly Ash:	C	2.68	NEBRASKA ASH
GGBFS:			

	Adjusted % Passing Calculated Combined Gradation												
	1 1/2"	1"	3/4"	1/2"	3/8"	#4	#8	#16	#30	#50	#100	#200	Within Target
Target													

	Source	T-203 A #	Grad. No.
Coarse:	HALLETT/DERNER	A-30520	3
Intermediate:			
Fine:	HALLETT/DERNER	A-30520	1

Remarks
11/17 Pier No.2
11/18 Cap Pier No.1

C.P.I.: Joe Tester NW001
Monitor: Jim Knows NW002

Distribution: ____ DME ____ Proj. Eng. ____ Plant

Iowa Department of Transportation

DEVELOPMENTAL SPECIFICATIONS
FOR
QUALITY MANAGEMENT CONCRETE (QM-C)

Effective Date
October 20, 2009

THE STANDARD SPECIFICATIONS, SERIES 2009, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE DEVELOPMENTAL SPECIFICATIONS AND THEY PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

09020.01 DESCRIPTION.

A. This specification identifies a concrete mixture design with an optimum combined aggregate gradation, and the Contractor’s testing and quality control responsibilities. Optimization of the aggregates should produce concrete with low water requirement as well as improved workability and finishing characteristics. While concrete strength is important and is measured, it is not the basis for optimization of the concrete mixture design.

B. Testing and quality control apply to all Contractor produced concrete using the Concrete Design Mixture (CDM). The CDM applies to mainline slip form pavement. At the Contractor’s option, the CDM may apply to any other slip form paving.

09020.02 MATERIALS.

For all materials, meet the quality requirements for the respective items in Division 41 of the Standard Specifications. Compatibility of all material combinations is the Contractor’s responsibility based on acquired field experience with proposed materials.

The Gradation Table in the Appendix of the Standard Specifications may be waived for coarse aggregate if specific gradations are produced to meet requirements of this specification.

09020.03 LABORATORY DESIGN MIXTURE.

A. Develop a CDM based on a unit volume of 1.000 according to industry standard practice, and containing proportions of materials, including admixtures. Base the proportions upon saturated surface dry aggregates to produce a workable concrete mixture meeting the constraints of Table DS-09020.03-1:

Table DS-09020.03-1: Concrete Mixture Constraints

Nominal Maximum Coarse Aggregate Size	Greater than or equal to 1 inch (25 mm)
Gradation	Materials I.M. 532
Cementitious Content	Minimum, 560 pounds per cubic yard* (333 kg/m^3 *)
Fly Ash Substitution Rate	See Article 2301.03, F, 6
Water/Cementitious Ratio	Maximum, 0.45

Air Content	6% ± 1%, Design Absolute Volume = 0.060
28 Day Flexural Strength, Third Point	Minimum, 640 pounds per square inch (4.40 MPa)
* The minimum cement content assumes the use of Type I/II cement with a specific gravity of 3.14 for an absolute volume of 0.106. If cement other than Type I/II is used, use an absolute volume of 0.106 and determine the weight (mass) of cement from the specific gravity of the cement. For Type IP cement, use an absolute volume of 0.111. Cement content may need to be increased to maintain the water to cementitious ratio during hot weather conditions.	

B. Use normal production gradations to determine the relative percentage of each individual aggregate used in the CDM. Select the relative percentage of each individual aggregate to produce the desired combined aggregate gradation using the following sieves: 2 inch, 1.5 inch, 1 inch, 0.75 inch, 0.5 inch, 0.375 inch, No. 4, No. 8, No. 16, No. 30, No. 50, No. 100, and No. 200 (50 mm, 37.5 mm, 25 mm, 19 mm, 12.5 mm, 9.5 mm, 4.75 mm, 2.36 mm, 1.18 mm, 600 µm, 300 µm, 150 µm, and 75 µm).

C. Develop a target combined gradation for each CDM based on normal production gradations and the relative percentages of each individual aggregate. Limit the percent passing the No. 200 (75 µm) sieve to no more than 1.5% for the combined aggregate gradation. When the coarse aggregate used meets the increase in percent passing the No. 200 (75 µm) sieve, according to Article 4115.05 of the Standard Specifications, limit the percent passing the No. 200 (75 µm) sieve to no more than 2.0% for the combined aggregate gradation. The Contractor may use water reducing admixture, Type A, or water reducing and retarding admixture, Type D, in the CDM.

D. Comply with AASHTO T 126 for laboratory development of the CDM. Mix designs may be conducted in a ready mix or central mix batch plant provided the following conditions are met:

- All non-mix design materials are emptied,
- Mix design materials are used, and
- Batch size is at least 3 cubic yards (2 m^3).

E. An Iowa DOT PCC Level III Certified Technician is required to oversee the development of the CDM. Allow the Engineer to witness the development of the CDM. Provide notice 7 calendar days prior to this event. Perform the tests in Table 09020.03-2 in the development of the CDM:

Table DS-09020.03-2: Tests for CDM

Specific Gravity of Each Individual Aggregate	Materials I.M. 307
Gradation of Each Individual Aggregate	Materials I.M. 302
Unit Weight of Plastic Concrete	AASHTO T 121
Air Content of Plastic Concrete	Materials I.M. 318
28 Day Flexural Strength	AASHTO T 97
Temperature of Plastic Concrete	ASTM C 1064

09020.04 MIX DESIGN DOCUMENTATION.

A. At least 7 calendar days prior to the start of paving, submit a CDM report to the District Materials Engineer for approval. Contract extensions will not be allowed due to inadequate or additional CDMs. In the CDM report include the information shown in Table DS-09020.04-1:

Table DS-09020.04-1: Items to Include in CDM Report

Cover Page	Contractor name Project number Date and location of CDM laboratory development Date Submitted Signature of Contractor representative

Material Source Information	Brand Type Source
Material Proportion Information	Specific gravity Relative percentage of each individual aggregate Target combined gradation % passing (Materials I.M. 531) Target combined gradation charts (Materials I.M. 532) Design batch weight (mass) (SSD) As mixed batch weight (mass) (SSD)
Mix Properties	Unit weight (mass) of plastic concrete Air content of plastic concrete 28 day flexural strength Slump Temperature of plastic concrete

B. The District Materials Engineer may approve the mix design without laboratory mixture testing if the proposed mix design proportions fall within Zone II-A of Materials I.M. 532. If the mix design is approved without laboratory testing, the cast a set of three beams on the first day of paving from concrete meeting the mix design criteria. Test the beams for 28 day flexural strength, third point loading. When the coarse aggregate for the mix design is quartzite, cast an additional set of three beams test at 90 days. Submit the strength results to the Engineer.

09020.05 QUALITY CONTROL.

A. General.

1. The Contractor is responsible for quality control of the concrete. An Iowa DOT PCC Level II Certified Technician is required to oversee quality control operations. The individual conducting the testing on grade is required to be an Iowa DOT PCC Level I Certified Technician. Calibrate and correlate testing equipment prior to and during paving operations.

2. At least seven calendar days prior to the preconstruction conference, submit to the Engineer a Quality Control Plan and Project Information Quality Control Plan complying with Materials I.M. 530. Do not begin paving until the plan is reviewed for compliance with the contract documents. Maintain equipment and qualified personnel to direct and perform all field quality control sampling and testing necessary to:

- Determine the various properties of the concrete governed by the contract documents, and
- Maintain the properties described in this specification.

B. Quality Control Testing.

1. Perform all quality control tests necessary to control the production and construction processes applicable to this specification and as set forth in the Quality Control Plan. Take samples for quality control testing in a random manner according to the prescribed sampling rate. Perform the tests listed in Table DS-09020.05-1:

Table DS-09020.05-1: Quality Control Table

	Limits	Testing Frequency	Test Methods
Unit Weight (Mass) of Plastic Concrete	±3% of the CDM	Twice/day	AASHTO T 121
Gradation Combined % Passing	See Paragraph 2 below	1/1500 cubic yard (1/1200 m^3)	Materials I.M. 216, 301, 302, 531
Aggregate Moisture Contents	See Materials I.M. 527	1/1500 cubic yard (1/1200 m^3)	Materials I.M. 308

Table DS-09020.05-1: Quality Control Table

	Limits	Testing Frequency	Test Methods
Air Content Plastic Concrete In Front of Paver	See Article 2301.03, F, 5	1/350 cubic yard (1/275 m^3) See below	Materials I.M. 318
Water/Cementitious Ratio	0.45 maximum	Twice/day	Materials I.M. 527
Vibrator Frequency	See Article 2301.03, A, 3, a, 6, a	With Electronic Vibration Monitoring: Twice/day Without Electronic Vibration Monitoring: Twice/Vibrator/Day	Materials I.M. 384

2. The running average of three combined aggregate gradation tests is required fall within the limits established by the CDM target gradation and the working ranges of Table DS-09020.05-2:

Table DS-09020.05-2: CDM Target Gradations

Sieve Size	Working Range
No. 4 or greater (4.75 mm or greater)	± 5%
No. 8 to No. 30 (2.36 mm to 600 µm)	± 4%
No. 50 (300 µm)	± 3%
No. 100 (150 µm)	± 2%
minus No. 200 (75 µm)	See Article 09020.03

C. Corrective Action.
For QM-C mixes only, plot all process control test results on control charts as described in Materials I.M. 530.

1. Aggregate Tests.
Take corrective action when the running average approaches the working range limits. When a combined gradation test result for a sieve exceeds the working range limits, adjust the target and notify the Engineer. If the verification test result for the minus No. 200 (75 µm) exceeds the limits in Article DS-09020.03 for the combined gradation, the material represented by that test for this sieve will be considered non-complying. Pay factors will be assessed based on Coarseness/Workability Factors as described in Article DS-09020.07.

2. Concrete Tests.
Take corrective action when an individual test result approaches the control limits. Notify the Engineer whenever an individual test result exceeds the control limits.

D. Acceptable Field Adjustments.

1. All mix changes must be mutually agreed upon between the Contractor and Engineer. Document all mix changes on the QM-C Mix Adjustment form. Determine batch weights using a basic water cement ratio of 0.40. When the water cement ratio varies more than ±0.03 from the basic water cement ratio, adjust the mix design to unit volume of 1.000. A change in the source of materials or an addition of admixtures or additives requires a new CDM. The following are small adjustments that may be made without a new CDM being required:

- Increase cementitious content.
- Decrease fly ash substitution rate.
- Aggregate proportions may be adjusted from CDM proportions by a maximum of ± 4% for each aggregate.
- Change water reducer to water reducer retarder.

- Adjustment in water reducer or water reducer retarder admixture dosage.
- Change in source of fly ash.
- Change in source of sand, provided target gradation limits are met.

2. When circumstances arise, such as a cement plant breakdown, that create cement supply problems, a change in cement source may be allowed with the Engineer's approval. Consult the District Materials Engineer for approval of other changes to the mix design. A set of three beams for 28 day flexural strength testing may be required to document the changes. Should conditions beyond the Contractor's control prevent completion of the work with the CDM, a Class C mix, or a mix based on Class C mix proportions using project materials, will be allowed, at no additional cost to the Contracting Authority. Mutual agreement between the Contractor and Engineer is required.

3. Prior to 28 days strength test results, paving with QM-C mix may begin if the Engineer approves when the mix design strength, based on the average of three beams, meets or exceeds 640 psi (4.4 MPa).

E. Hand Finished Pavement.
Use project materials based on Class C or Class M concrete mix proportions. With approval of the Engineer, the Contractor's CDM may be used for hand finished pavement. Quality control, as required in this specification, will not apply to hand finished pavement.

09020.06 METHOD OF MEASUREMENT.
Measurement will be as follows:

A. Quality Management Concrete (QM-C).
Cubic yards (cubic meters) of QM-C computed using the number of batches produced for which quality control and testing were performed. This QM-C quantity will also include: 1) the quantity of QM-C produced at the Contractor's option as referenced in Article DS-09020.01; and 2) Class C mixture used according to Article DS-09020.05, C. The amount of concrete produced for hand finished pavement and waste will be excluded from this quantity.

B. Standard or Slip-Form Portland Cement Concrete Pavement, QM-C.
Square yards (square meters) shown in the contract documents.

C. Portland Cement Concrete Overlay, QM-C, Furnish Only.
Article 2310.04, A, of the Standard Specifications applies.

D. Portland Cement Concrete Overlay, QM-C, Placement Only.
Article 2310.04, B, of the Standard Specifications applies.

E. Class C and Class M Mixtures.
Square yards (square meters) of Standard or Slip-Form Portland Cement Concrete Pavement, QM-C, constructed using Class C or Class M mixtures. For overlays, the Engineer will compute the number of:

- Square yards (square meters) of Portland Cement Concrete Overlay, QM-C, Placement Only, constructed using Class C or Class M mixtures, and
- Cubic yards (cubic meters) of Class C and Class M mixtures used.

09020.07 BASIS OF PAYMENT.
Payment will be the contract unit prices as follows:

A. Quality Management Concrete (QM-C).

1. Predetermined price per cubic yard (cubic meter).

2. Payment is full compensation for furnishing all labor, equipment, and materials for the work required by the Contractor to design, test, and provide process control for the production of QM-C.

B. Standard or Slip Form Portland Cement Concrete Pavement, QM-C.

1. Square yards (square meters) of Standard or Slip-Form Portland Cement Concrete Pavement, QM-C, constructed will be determined from the average coarseness and workability factors for each lot according to Materials I.M. 530.

2. The contract unit price per square yard (square meter) for Standard or Slip-Form Portland Cement Concrete Pavement, QM-C, constructed will be adjusted in the following manner:

Table DS-09020.07-1: Pay Factor Chart

Gradation Zone (Materials I.M. 532)	Pay Factor
II-A	1.03
II-B	1.02
II-C	1.01
II-D	1.00
IV	0.98
I	0.95

C. Portland Cement Concrete Overlay, QM-C, Furnish Only.
Article 2310.05, A, of the Standard Specifications applies. Average coarseness and workability factor for each lot will be determined according to Materials I.M. 530. The contract unit price will be adjusted according to Table DS-09020.07-1.

D. Portland Cement Concrete Overlay, QM-C, Placement Only.
Article 2310.05, B, of the Standard Specifications applies. Average coarseness and workability factor for each lot will be determined according to Materials I.M. 530. The contract unit price will be adjusted according to Table DS-09020.07-1.

E. Class C and Class M Mixtures.

1. Standard or Slip-Form Portland Cement Concrete Pavement, QM-C: per square yard (square meter).

2. Portland Cement Concrete Overlay, QM-C, Placement Only: per square yard (square meter)

3. Portland Cement Concrete Overlay, QM-C, Furnish Only: per cubic yard (cubic meter).

4. Pay Factor incentives/disincentives in Table DS-09020.07-1, will not be applied to Class C and Class M mixtures.

PCC PAVING VERSUS PCC STRUCTURAL

There are not a lot of differences between monitoring a PCC Paving Project and a Structural Project. The main differences will be covered over the next few pages.

Some of these differences include:

- ♦Cement yields do not need to be ran at a ready mix plant unless over 10,000 cubic yards are being poured for the project.
- ♦Sampling frequencies for gradations, moistures, and specific gravities are different.
- ♦Reports are generated weekly for structures compared to daily for paving.
- ♦Ready mix trucks need to have a truck mixer certification in them. This needs to be kept current.
- ♦The ready mix trucks also need to have a TMMB plate attached and the monitor must be able to read it.
- ♦Ready mix trucks need to have a certain number of revolutions before they leave the plant. These specifications are in IM 527.
- ♦The plant books contain slightly different information.

Rev 9/09

English Structural Plant Monitor Book Index

Item Description	Form #
Plant Information Sheet	Plantinf
Project Information	Proj Info
Weekly Monitor Checks	E213
Plant Site Inspection List	E210
QMC Mix Information	QMC Mix
Gradation Sieve Analysis (5)	Grad 1- Grad 5
Gradation Report - Verification	821283C
CPI Gradations	CPI Grad
Beams Made & Tested	E114 or M114
Daily Diary	Daily 3 or 4

Plant Information Sheet

Project No.:	0		
	0	**Contract ID.:**	0
	0		

Prime Contractor:	0
Plant Type:	
Plant Location:	0
Pollution Control:	
Storm Water Permit No.:	
Date Calibrated:	
By:	

Material Sources

0	**0**	**0**
0	**0**	**0**
0	**0**	**0**
0		**0**
0		

		Phone No.	**Fax No.**
Plant Superintendent:			
Certified Plant Inspector:	**0**		
Certification No.:	**0**		
Certified Plant Inspector:			
Certification No.:			
Certified Plant Monitor:	**0**		
Certification No.:	**0**		
Certified Plant Monitor:			
Certification No.:			
Project Engineer:			
Project Manager:			
Project Inspector:			
Materials Inspector:			
Materials Inspector:			

Resident Auditor:		**TC Auditor:**	

Report No.:		05/15/07 tdh
Date This Report:		
Date Last Report:		
Project No.:		
Project No.:		
Project No.:		
Project No.:		
Mix ID:		
Plant Name and Location:		
Contractor:		
Contract ID:		
County:		
Structures Design Number :		
Central Plant (X):		
Ready Mix (X):		
Paving (X):		
Structural (X):		
Incidental (X):		
Patching (X):		
Specification:		
Report Weekly (X):		
Cement Source:		
Fly Ash Source:		
GGBFS Source:		
Air Entraining Brand / Source:		
Water Reducer Brand / Source:		
Retarder Brand / Source:		
Coarse Aggregate Source:		
Coarse Aggregate T-203 A #:		
Coarse Aggregate Gradation No. :		3, 4, 5, 6, or Blank
Intermediate Aggregate Source:		
Intermediate Aggregate T-203 A #:		
Fine Aggregate Source:		
Fine Aggregate T-203 A #:		
Fine Aggregate Gradation No. :		1, 7, or Blank
Plant Monitor's Name:		
Plant Monitor's Certification No.:		
C.A. Specification Limits 1 1/2" Sieve:		
C.A. Specification Limits 1" Sieve:		
C.A. Specification Limits 3/4" Sieve:		
C.A. Specification Limits 1/2" Sieve:		
C.A. Specification Limits 3/8" Sieve:		
C.A. Specification Limits #4 Sieve:		
C.A. Specification Limits #8 Sieve:		
C.A. Specification Limits #200 Sieve:		<=Enter 2.5, if increase in 200 allowed by DME
F.A. Specification Limits 3/8" Sieve:		
F.A. Specification Limits #4 Sieve:		
F.A. Specification Limits #8 Sieve:		
F.A. Specification Limits #30 Sieve:		
F.A. Specification Limits #200 Sieve:		
Contractor CF (QMC):		
Contractor WF (QMC):		
Contractor Lot Pay Zone:		
CPI Name:		
CPI Cert No.:		

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Form E213

Weekly Monitor Checks For Structural Concrete

Page No.: ______________

Project No.: 0

Contract ID.: 0

	Stockpiles				Cement & Fly Ash Agg. & Admixtures				Sampling & Testing			Concrete Test			Proportion Control						Test Equipment				Documentation					
Date	Procedure	Intermingling	Contamination	Segregation	Sources	Certifications	Condition	Documentation	Gradations	Moistures	Specific Grav.	Curing	Molds	Flexural Test	Scale Weights	Scale Operation	Admixture Disp.	Mixing Time	Mixer Revolut.	Batch Weights	Scales	Sieves	Pycnometers	Splitters	Form E800240	Test Results	Quantities	Checks	Daily Diary	By:

Complies = **Y**
Discrepancy = **D**
Not Applicable = **NA**

Refer To Daily Diary For Discrepancies.

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Plant Site Inspection List (PCC)

Page No.: ____________

Project No.: 0 **Contract ID.:** 0

Date Checked	Item	Complies		Remarks
		Yes	No	
	Bins			
	Bin Dividers			
	Bin Supports			
	Screens			
	Guards			
	Ladders			
	Railings			
	Belt Lockouts			
	Sampling Location			
	Aggregate Scales			
	Cement Scales			
	Fly Ash Scales			
	Admixture Dispensers			
	Water Meter			
	Cement Storage			
	Fly Ash Storage			
	Mixing Equipment			
	Lab Location			
	Lab Condition			
	Lab Equipment			
	Air Condition			
	Heating			
	Telephone			
	Water			
	Exhaust Fan			
	Restroom			
	Fax Machine			
	Computer			

If an item does not apply to the project, write (not applicable) in the remarks column.

Mix INFO (BR, HPC-D) - Enter Batch Weights &

	Gradation 1					
	Source	A Number	Batch Weights, SSD	SpG	Abs. Vol.	Agg %
Coarse					0.000	#DIV/0!
Intermediate					0.000	#DIV/0!
Fine					0.000	#DIV/0!
						#DIV/0!

	Gradation 2					
	Source	A Number	Batch Weights, SSD	SpG	Abs. Vol.	Agg %
Coarse					0.000	#DIV/0!
Intermediate					0.000	#DIV/0!
Fine					0.000	#DIV/0!
						#DIV/0!

	Gradation 3					
	Source	A Number	Batch Weights, SSD	SpG	Abs. Vol.	Agg %
Coarse					0.000	#DIV/0!
Intermediate					0.000	#DIV/0!
Fine					0.000	#DIV/0!
						#DIV/0!

	Gradation 4					
	Source	A Number	Batch Weights, SSD	SpG	Abs. Vol.	Agg %
Coarse					0.000	#DIV/0!
Intermediate					0.000	#DIV/0!
Fine					0.000	#DIV/0!
						#DIV/0!

	Gradation 5					
	Source	A Number	Batch Weights, SSD	SpG	Abs. Vol.	Agg %
Coarse					0.000	#DIV/0!
Intermediate					0.000	#DIV/0!
Fine					0.000	#DIV/0!
						#DIV/0!

Date Sampled:

Proj. No.:

Sample ID:					
Orig. Dry Weight:		Sieve Accuracy =	0.0	%	
1 1/2 " Sieve					
1 " Sieve					
3/4 " Sieve					
1/2 " Sieve					
3/8 " Sieve					
#4 Sieve					
#8 Sieve			Total		
Pan			0.0		
Orig. Dry Weight:		W			
Dry Wt. Washed:		A			
Pan		S			
Wash Loss	0.0	H			
Total	0.0				
Compies (Y/N)					

COARSE SAMPLE

% Retd.	% Pass	% Final	Specs
0.1	0.0	0	
0.1	0.0	0	
0.1	0.0	0	
0.1	0.0	0	
0.1	0.0	0	
0.1	0.0	0	
0.1	0.0	0	
0.1			
0.8			
	#200	0.0	

Sample ID:					
Orig. Dry Weight:		Sieve Accuracy =	0.0	%	
1 1/2 " Sieve					
1 " Sieve					
3/4 " Sieve					
1/2 " Sieve					
3/8 " Sieve					
#4 Sieve					
#8 Sieve			Total		
Pan			0.0		
Orig. Dry Weight:		W			
Dry Wt. Washed:		A			
Pan		S			
Wash Loss	0.0	H			
Total	0.0				

INTERMEDIATE SAMPLE

% Retd.	% Pass	% Final	Specs
0.1	0.0	0	N/A
0.1	0.0	0	N/A
0.1	0.0	0	N/A
0.1	0.0	0	N/A
0.1	0.0	0	N/A
0.1	0.0	0	N/A
0.1	0.0	0	N/A
0.1			
0.8			
	#200	0.0	N/A

Sample ID:					
Orig. Dry Weight:		Sieve Accuracy =	0.0	%	
Dry Wt. Washed:					
1/2" Sieve					
3/8 " Sieve					
#4 Sieve					
#8 Sieve					
#16 Sieve					
#30 Sieve					
#50 Sieve					
#100 Sieve					
#200 Sieve					
Pan			Total		
Wash	0.0		0.0		
Compies (Y/N)					

FINE SAMPLE

% Retd.	% Pass	% Final	Specs
0.1	0.0	0	
0.1	0.0	0	
0.1	0.0	0	
0.1	0.0	0	
0.1	0.0	0	
0.1	0.0	0	
0.1	0.0	0	
0.1	0.0	0	
0.1	0.0	0	
0.1			
1.0			

821283 COMPUTER

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Iowa Department of Transportation

Office of Materials

PCC GRADATION TEST REPORT - VERIFICATION

Check Mix(x)		Check One(x)	
Central		Paving	
Ready		Structure	
		Incidental	
		Patching	

Project No.: ____________________

Contract ID: ____________ Report No.: ________

County: ____________ Date This Report: ________

Mix ID: ____________ Date Of Last Report: ________

Structures Des. No: ____________

Contractor: ____________________ Plant Name: ____________________

COARSE AGGREGATE					1 1/2"	1"	3/4"	1/2"	3/8"	#4	#8	#200	
				GRAD NO.:	37.5 mm	25 mm	19 mm	12.5 mm	9.5 mm	4.75 mm	2.36 mm	75 um	Comply
SOURCE:	T-203 A#	AGG %	Date Sampled	Sample ID									Y/N

INTERMEDIATE AGGREGATE					1 1/2"	1"	3/4"	1/2"	3/8"	#4	#8	#200	
					37.5 mm	25 mm	19 mm	12.5 mm	9.5 mm	4.75 mm	2.36 mm	75 um	Comply
SOURCE:	T-203 A#	AGG %	Date Sampled	Sample ID									Y/N
													NA
													NA
													NA
													NA
													NA

FINE AGGREGATE					1/2"	3/8"	#4	#8	#16	#30	#50	#100	#200	
				GRAD NO.:	12.5 mm	9.5 mm	4.75 mm	2.36 mm	1.18 mm	600 um	300 um	150 um	75 um	Comply
SOURCE:	T-203 A#	AGG %	Date Sampled	Sample ID										Y/N

COMBINED AGGREGATE GRADATION															
1.5"	1"	3/4"	1/2"	3/8"	#4	#8	#16	#30	#50	#100	#200	Within Target	Coarseness Factor	Workability Factor	QMC PAY ZONE
											Lot Average - VERIFICATION				O
											Lot Average - CONTRACTOR				

Remarks ____________________

Distribution: _____ DME _____ Proj. Eng. _____ Contractor

Monitor: ____________________ Cert No. __________

Enter CPI QMC or QC gradations for comparison

	D.O.T.			ENTER Prod. / C.P.I.		
Sieve Size	Coarse Aggregate Percent Passing	Intermediate Aggregate Percent Passing	Fine Aggregate Percent Passing	Coarse Aggregate Percent Passing	Intermediate Aggregate Percent Passing	Fine Aggregate Percent Passing
1.5" / 37.5mm	0.0	0.0				
1" / 25.0mm	0.0	0.0				
3/4" / 19.0mm	0.0	0.0				
1/2" / 12.5mm	0.0	0.0				
3/8" / 9.5mm	0.0	0.0	0.0			
#4 / 4.75mm	0.0	0.0	0.0			
#8 / 2.36mm	0.0	0.0	0.0			
#16 / 1.18mm			0.0			
#30 / 600um			0.0			
#50 / 300um			0.0			
#100 / 150um			0.0			
#200 / 75um	0.0	0.0	0.0			

Retained Total	0.0	0.0	0.0	0.0	0.0	0.0

Comments: ______________________________

____

____

____

cc: DME, RCE

Rev 01/98

PC Concrete Beam Record

Form E114

Item Code: ______________ **Page No.:** ______________

Description: ______________ **Category No.:** ______________

Project No.: 0 **Contract ID:** 0

Beams Made Information							Beam Break Information									
Date Made	Mix Number	Beam No.	Time	Air %	Slump (in)	W/C Ratio	Age (Days)	Loc. (in)	Depth (in)	Width (in)	Indicated Load (lbs)	Actual Load (lbs)	Comp. Factor	Mod. Of Rupture (psi)	Spec. psi	By
													0.000000	0		
													0.000000	0		
													0.000000	0		
													0.000000	0		
													0.000000	0		
													0.000000	0		
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													0.000000	0		
													0.000000	0		

Checked By: ______________

Page No.: ____________

Project No.: ____________________________ **Contract ID:** ____________

Date: ____________ **Sunrise:** ____________ **High:** ____________

Day: ____________ **Sunset:** ____________ **Low:** ____________

Weather: ____

By: ________________________

Form 820907
4-94

Iowa Department of Transportation

TRANSIT MIXER
CONDITION CERTIFICATION

In accordance with requirements of Iowa Department of Transportation Standard Specifications Section 2001.21B this certifies the herein described transit mixer was examined on the date shown and was found to be in proper working condition, the fins and blades were not damaged or worn excessively, and the drum interior was free of hardened concrete buildup.

Unit Identification No. ____________________

Home Base ____________________

Owner ____________________

Mixer Manufacturer ____________________

Serial Number ____________________

MMB Rating (Mixing, Cu. Yd.) __________ Year New __________

Truck Manufacturer ____________________

Model ____________________

Year __________ Color __________

Date __________ Signature __________

Date __________ Signature __________

Date __________ Signature __________

Date __________ Signature __________

Date __________ Signature __________

Date __________ Signature __________

Date __________ Signature __________

Date __________ Signature __________

Date __________ Signature __________

Date __________ Signature __________

Date __________ Signature __________

Date __________ Signature __________

Date __________ Signature __________

Form 820020
7-91

Iowa Department of Transportation
MOBILE MIXER CALIBRATION

Contractor/Owner ______ County ______ Date ______
Mixer Serial No. ______ Operating Speed ______ Calibrated By ______
Project No. ______ Design No. ______ Witnessed By ______

MATERIALS AND SETTINGS

Material	Source	Sp. Gr.	Dry Weight	Wet Weight	Gate Setting
Cement					
*Sand					
*Rock					
Water					
Water Reducer					
Air Entraining Agent					

* *(Optional moisture content - Sand 3% Rock 0.5%)*

Determine **CEMENT METER COUNT.** *Run: 50 count ± Model 60 Magnum unit*
100 count ± Standard unit

Trial	1	2	3	4	5	Totals
Counts						
Gross Weight						
Tare Weight						
Net Weight						
Time (sec.)						

$\frac{\text{Total Pounds}}{\text{Total Count}} = \frac{(\quad)}{(\quad)} = \_\_\_\_ \frac{\text{Lb.}}{\text{Meter Count}}$ $\qquad \frac{\text{94 lb. cement}}{\text{Lb./Meter Count}} = \frac{\text{94 lb.}}{(\quad)} = \_\_\_\_ \frac{\text{Counts}}{\text{Bag}}$

AIR ENTRAINING AGENT DILUTION RATE ______
Admixtures

Time per bag = (Counts/Bag) x $\frac{\text{Total seconds}}{\text{Total counts}}$ = ______ Sec./Bag

Water Reducer
Dosage Required (oz./100 lbs. cement) ______
Dilution rate ______
Dilution Req'd (total oz./100 lbs. cement) ______

$\frac{\text{Sand weight}}{\text{1 Bag}} = \frac{\text{Wet weight}}{8.78} = \frac{\_\_\_\_}{8.78} = \_\_\_\_ \frac{\text{Lb.}}{\text{Bag}}$

Divide this by the Count/Bag from Step 1.

$\frac{(\quad) \text{ Lb./Bag}}{(\quad) \text{ Count/Bag}} = \_\_\_\_ \frac{\text{Lb.}}{\text{Count}}$

This is the target value.

The tolerance limits are:

Upper = (   ) x 1.02 = ______
Lower = (   ) x 0.98 = ______

The calibration check average is:

$\frac{\text{Sum of checks}}{\text{No. of checks}} = \frac{(\quad)}{(\quad)} = \_\_\_\_ \frac{\text{Lb.}}{\text{Count}}$

Trial	1	2	Check	Check	Check	Check
Setting						
Counts						
Gross weight						
Tare weight						
Net weight						
Time (sec.)						
Lb./Count						

$\frac{\text{Rock weight}}{\text{1 Bag}} = \frac{\text{Wet weight}}{8.78} = \frac{\_\_\_\_}{8.78} = \_\_\_\_ \frac{\text{Lb.}}{\text{Bag}}$

Divide this by the Count/Bag from Step 1.

$\frac{(\quad) \text{ Lb./Bag}}{(\quad) \text{ Count/Bag}} = \_\_\_\_ \frac{\text{Lb.}}{\text{Count}}$

This is the target value.

The tolerance limits are:

Upper = (   ) x 1.02 = ______
Lower = (   ) x 0.98 = ______

The calibration check average is:

$\frac{\text{Sum of checks}}{\text{No. of checks}} = \frac{(\quad)}{(\quad)} = \_\_\_\_ \frac{\text{Lb.}}{\text{Count}}$

Trial	1	2	Check	Check	Check	Check
Setting						
Counts						
Gross weight						
Tare weight						
Net weight						
Time (sec.)						
Lb./Count						

BRIDGE DECK EVAPORATION REPORT

Contract ID: ____________________ Project No.: ____________________

Contractor: ____________________ Mix No.: ____________________

County: ____________________ Date Placed: __________

Type of Deck (x): New __________ Replace __________ Widened __________

Bridge Type (x): PC Beam __________ Steel __________ Slab __________

Pour: __________ Of __________ Bridge Size & Skew: ____________________

Method Used to Reduce Concrete Temperature: ______________________________

Plant Material Information

	Cement	Flyash	Rock	Sand	Water	Retarder
Brand / Source						
Lbs. / Cu. Yd.						oz/100
Temperatures °F						

Data During Placement

Time	Load Number	Acmltd cu yd	Concrete Temp. (°F)	Air Temp. (°F)	Relative Humidity	Wind Velocity (mph)	Evaporation Rate
		1					
		50					
		100					
		200					
		300					
		400					
		500					

Sketch of Deck Pour

Total Placement Time (Hrs): __________ Total Cubic Yards Placed: __________

Total Down Time (Hrs): __________

Actual Placement Time (Hrs): 0.0 Avg. Cu. Yds. / Hour: 0.0

MONITORING

HOT MIX ASPHALT (HMA)

Preconstruction Conference
Reporting Books
Plant Calibration
Plant site Inspection Sheet
Material Sources
Material Sampling
Material Testing
Plant Monitor Duties
Density Cores
Reporting

HMA MONITOR

AGGREGATE LEVEL I & LEVEL II

HMA LEVEL I

The monitor must have a current certification in Level I HMA to monitor a Level I HMA technician. This certification may be obtained by attending Level I and II Aggregate and Level I HMA training and passing the applicable tests.

STARTING A PROJECT

At the beginning of a project the Monitor should meet with the Certified HMA Technician(s) to review the documentation necessary for the project.


The monitor needs to make sure the Certified HMA Technician has:
Current IM's, Supplemental Specifications, General Supplemental Specifications, Plans, etc..
Electronic Reference Library is a good source for all this information
Proper Forms: Job Mix Formula Form; #956 & #955, Current Lab Qualification approval IM 208, App. B, Forms #193, ect..
Computer Programs: Use the most current versions

Any other supplies, necessary for the project

- Computer, fax, copier and phone
- Supply of boxes to be used for uncompacted mix for delivery to District Materials Lab
- Supply of 4 oz. Tins binder samples
- Bags for cold feed samples, etc…

Iowa Department of Transportation

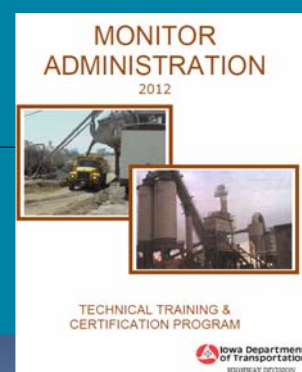
- The Iowa Department of Transportation Office of Materials Website is a very good source where you may obtain the above information :

http://www.iowadot.gov/materials/index.html

The monitor needs to explain the books and forms to the HMA Technician. Stressing the importance of a thorough diary so all activities are documented.

Books

- HMA Certified Technician should keep their books and computer program daily so that the Monitor is able to check the records any day of the week.
- Monitoring should be done a minimum of once a week
-



Daily Diary

- The HMA Technician should keep a good daily diary, since the Monitor makes weekly checks.
- This makes it easy for the Monitor to see what has taken place during that week.
- **As a Monitor, you will have a minimum of one entry per week.**
- **The Monitor needs to keep up their records as well.**

MONITOR DUTIES

- The actual Monitor's duties are listed on the following pages. Although these are the specified duties, there are many duties and issues a Monitor will need to watch for and help with. These could vary from project to project and contractor to contractor.

MONITOR DUTIES

The actual Monitor's duties are listed on the following pages. Although these are the specified duties, there are many duties and issues a Monitor will need to watch for and help with. These could vary from project to project and contractor to contractor.

Some examples:

- ✓ Review HMA Technicians Plant Book and Daily Plant Report for correct entries.
- ✓ Review with Technician the information that you will be requesting on a daily/weekly/or end of project basis. Daily Plant Report, Certified delivery tickets, computer disk of Plant Report and Plant Book.
- ✓ Have with you your IM's, #193's, Job Mix Formula #956 & #955, and all supplies needed to direct and witness sampling.
- ✓ Get familiar with the plant and personal, as well as, stockpiles, bins, sampling locations, and Asphalt binder storage.
- ✓ Review the totalizer tank stick information sheet
- ✓ Monitor mixture temperatures – need to tarp
- ✓ Observe coating of aggregates, mixing time (batch plant). Prevent mixture segregation.
- ✓ Monitor trucks for improper use of cleaning fluids per Specification 2001.01.
- ✓ Monitor check weighing, verification weighing and sensitivity check 1st day and once per week thereafter.
- ✓ Watch for proper sampling and testing techniques.

HMA Independent Assurance Responsibilities

Construction Manual:

Appendix 3-4.3

This section refers to the IAP; which is an Independent check made by the Materials Department.

HMA Independent Assurance Responsibilities

Duty	Task	Performed By / REQ'D. CERT.	Minimum Frequency
1. Aggregate Gradation Independent Assurance.	• Systematically distribute aggregate proficiency samples to contractor technicians who perform QC gradation testing for acceptance and construction technicians who perform verification gradation testing per IM 205. ○ Contractor and Construction certified technicians who perform gradation testing must pick up, test and report results of samples to the Central Lab approximately every three months. • Record sample ID numbers and receiver for each sample distributed.	District Materials	Monthly
2. HMA Independent Assurance.	• Systematically distribute HMA proficiency samples to contractor technicians performing QMA testing of HMA per IM 205. ○ Contractor certified technicians who perform HMA testing must pick up, test and report results of samples to the Central Lab approximately every three months. • Record sample ID numbers and receiver for each sample distributed.	District Materials	Monthly
3. Core Density Independent Assurance.	• Retest one set of cores for density and thickness. • Compare results to construction technician test results. • Report comparison of test results.	District Materials HMA SAMPLER	1/Project

Other Required HMA Acceptance Responsibilities

Construction Manual:

Appendix 3-4.4 and 3-4.5

The duties outlined are part of the monitoring process.

Performed by District Materials or Construction Inspectors.

Required Certifications & Minimum Frequencies are outlined in the C.M. Appendices.

Other Required HMA Acceptance Responsibilities

Duty	Task	Performed By / REQ'D. CERT.	Minimum Frequency
1. Qualify Laboratory.	• Check condition of test equipment. • Check equipment calibration records. • Check for current test methods.	District Materials HMA I	Every Two Years
2. Observe Plant Calibration.	• Check for proper procedures per IM 508. • Check for approved JMF. • Check stockpile certifications. • Check plant settings.	District Materials HMA I	As Per DME
3. Materials Certifications.	• Check for approved aggregate sources. • Check certified aggregate truck tickets. • Check for approved asphalt binder source. • Check certified asphalt binder truck tickets. • Check for approved release agents per IM 491.15.	District Materials HMA I	Check at Time of Calibration and When Material Changes
	• Review entries in Plant Book for certified quantities of materials.	Construction HMA I	Weekly
4. Documentation.	• Review plant calibration. • Review job mix formulas.	District Materials HMA II	At Startup of Each Mix
	• Review entries in the Daily Plant Report. • Review entries in the Plant Book. • Review entries in Plant Program for pay quantities and PWL.	Construction HMA I	First Day and Weekly Thereafter
	• Review quality control charts. • Review PWL data.	District Materials HMA I	Weekly
	• Obtain files of project documentation: ○ Daily Plant Reports ○ Correlation Summary Sheets ○ Quality Control Charts ○ Delivery Tickets ○ Submitted Forms	Construction	At End of Project
5. Inspect Stockpiles.	• Observe stockpiling procedures per IM 508. • Check for segregation. • Check for contamination. • Check for intermingling of stockpiles.	District Materials HMA I	First Day and Weekly Thereafter

Other Required HMA Acceptance Responsibilities

Duty	Task	Performed By / REQ'D. CERT.	Minimum Frequency
6. Aggregate Proportioning.	• Inspect method of securing cold-feed bin gate settings. • Monitor actual cold-feed gate and belt speed settings. • Monitor aggregate proportions. • Monitor interlocks.	District Materials HMA I	At Startup and When Problems Arise

7. Plant Operations.	• Observe coating of aggregates.
	• Observe mixing time (batch plant).
	• Prevent segregation:
	  ○ Observe truck loading.
	  ○ Observe level of mix in the silo.
	  ○ Observe operation of hopper/silo gates.
		District Materials or Construction
		HMA I
			At Startup and
			When Problems Arise

	• Monitor trucks for improper use of cleaning fluids per specification 2001.01.	District Materials or Construction HMA I	At Startup and Weekly Thereafter
8. Plant Adjustments.	• Participate in discussion of mix design adjustments. • Document proportion changes.	District Materials HMA II	Each Occurrence
9. Inspect Plant Facility.	• Check if lab qualification is current. • Check for all required test equipment. • Check for computer, fax, copier, and phone.	District Materials HMA I	At Startup
10. Check Weighing Equipment.	• Monitor check weighing. • Monitor verification weighing. • Monitor sensitivity check.	Construction HMA I	First Day and Once Per Week Thereafter
	• Witness truck tare weighing at random.	Construction HMA I	Once Per Project
11. Asphalt Binder Quantity Determination.	• Monitor tank sticking procedures. • Witness the 4-hour meter calibration if In-Line Flow Meter is being used for asphalt binder quantity.	Construction HMA I	First Day and Weekly Thereafter

HMA Verification Responsibilities

C.M. Appendix 3-4.1 & 3-4.2

Many of these duties can be shared by the District Materials and Construction (Agency) Personnel

HMA Verification Responsibilities

Duty	Task	Performed By / REQ'D. CERT.	Minimum Frequency
1. Verify Aggregate Gradation.	• Direct and witness contractor sampling and splitting of cold feed combined aggregate. • Secure and identify split sample for delivery to District Lab or take possession of split sample.	Construction HMA SAMPLER & AGG. I	First Day Only
	• Test combined aggregate sample for gradation. • Compare results to contractor test results per IM 216. • Report validation results.	District Materials or Construction AGG. II	First Day Only
	• Investigate validation issues.	District Materials	As Needed
2. Verify Aggregate Quality.	• Obtain independent sample. • Send sample to Office of Materials with documentation.	District Materials AGG. I	1/20,000 Tons
3. Verify Asphalt Binder Quality.	• Direct and witness contractor sampling of asphalt binder. • Secure and identify sample for delivery to District Lab.	Construction HMA SAMPLER	1/Day
	• Test asphalt binder samples on DSR. • Report binder test results.	District Materials	First Day then 1/Week
	• Obtain binder sample from the pumping line with assistance from the contractor. • Send sample to Office of Materials with documentation.	District Materials HMA SAMPLER	1/20,000 Tons
4. Verify Uncompacted Mixture Properties.	• Select random sample locations. • Direct and witness contractor paired sampling of uncompacted mix as per IM 322 and IM 511. • Secure and identify one of each paired sample for delivery to District Lab.	Construction HMA SAMPLER	1/Sublot
	• Randomly select paired sample for testing. • Test selected sample for required mix properties. • Compare results to contractor test results per IM 216. • Report validation results.	District Materials HMA I	HMA Properties: 1/Day Extracted Gradation: First Day and 20% Thereafter
	• Investigate validation issues.	District Materials	As Needed

HMA Verification Responsibilities

Duty	Task	Performed By / REQ'D. CERT.	Minimum Frequency
5. Verify Compacted Pavement Properties.	• Select random sample locations. • Direct and witness contractor coring. • Inspect cores for damage and thickness and direct replacement coring of damaged or unusable cores. • Take possession of cores and transport to the contractors lab or secure core samples if contractor is transporting the cores. • Measure cores for thickness. • Test cores for density and record weights. • Provide copy of thickness and weights to contractor for reporting.	Construction HMA SAMPLER	8 Cores/Lot
	• Select random sections for smoothness testing. • Perform independent smoothness testing. • Compare results to contractor test results per IM 216. • Report validation results.	District Materials PROFILOMETER	10% of Project
	• Investigate validation issues.	District Materials	As Needed

(IDOT Logo)

HMA PLANT MONITOR CHECKLIST
Plant Calibration - Initial Startup

Project Number ______________________
Contractor ______________________
Plant Monitor ______________________
Date ______________________

		YES	NO
1	**HMA plant calibrated with supporting documentation** *Articles 2001.07, 2001.22; IM 508; C.M. 3.50*		
2	**Contarctor Lab qualified with supporting documentation** *Articles 2520, 2521; IM 208*		
3	**Contractor QMA Technicians possess proper certifications** *IM's 213, 511, C.M. Appendix 3-4*		
4	**Contractor QM-A Technicians currentin IAP program** *IM 207*		
5	**Contractor Lab using current version of SHADES/Plant Book software** *IM 511, Iowa DOT Website*		
6	**Project Information (Project No., Mix Design, etc.) correct in Plant Book**		
7	**Contractor Lab equipped to send reports electronically** *Articles 2520, 2521; IM 511*		
8	**Agency Monitor has sample security supplies** *IM 205*		
9	**Aggregate/RAM stockpiles properly identified** *IM 508*		
10	**Aggregate/RAM stockpile locations stable and drainable** *IM 508*		
11	**Bin Dividers installed to prevent aggregate intermingling** *IM 508*		
12	**Each RAM source has separate totalizer** *Articles 2520, 2521; IM 511*		

COMMENTS AND OBSERVATIONS

____
Project Monitor

(IDOT Logo)

HMA PLANT MONITOR CHECKLIST

Daily Plant Monitoring

Project Number ______________________

Contractor ______________________

Plant Monitor ______________________

Date ______________________

		YES	NO
1	Aggregate tickets indicate correct materials being used in mix design		
2	Asphalt binder tickets indicate proper source and correct PG grade		
3	Asphalt binder has correct anti-strip additive and dosage, if required		
4	QM-A Technician performing moisture tests on RAM products		
5	QM-A Technician providing daily dry RAM totalizer quantities		
6	Plant scales, gate settings checked/monitored		
7	Aggregate Stockpiles free of contamination, segregation, degradation		
8	Aggregate deliveries to correct stockpiles		
9	Loader operator working entire face of stockpile		
10	Loader tires/tracks not tracking mud into stockpile area		
11	Loader operator avoiding getting base material in load		
12	Loader operator assuring proper aggregate loadout into proper bin		
13	No contamination of aggregate on belt		
14	Proper loading of HMA trucks (multiple dump)		
15	Approved release agent used - NO DIESEL used as release agent		
16	Daily field cores sampled, secured, and tested		
17	Daily binder sampling witnessed and sample secured		
18	Cold feed aggregate sampling witnessed and secured (if required)		
19	Tank stick/flow meter witnessed periodically as required		
20	Daily plant report received and reviewed promptly		

COMMENTS AND OBSERVATIONS

____

Project Monitor

HMA Plant Monitor Checklist (Weekly)

Example:

Iowa Department of Transportation

HMA Project Monitor Checklist

Contractor:

Project Number:

Project Inspector:

Project Technician(s): Certifications:

Start Date:

Observe calibration when possible. Check if laboratory qualification is current. Obtain a copy of all calibration data, JMF (955 & 956). Check for approved sources and certifications for all materials.

Calibration Of Plant:	References:		
Observe construction of Stockpiles, bin foundations, sampling locations, gate settings, aggregate feeders, binder delivery system: tank stick, or witness in-Line Flow Meter 4-hour calibration. Weigh hopper, Batch Scales, and Load Cells Approval.	Specification: 2303 , I.M. 508 *(Stockpiles)(Lab Equip)* Specification: 2520, 2521; I.M.'s 208,213,214 *(Lab Qual)* Specification: 2303.02; I.M. 509 *(Binder Delivery)* Specification: 2001.07; I.M. 508 App B, C.M. 3.50 *(Weighing Equipment)* Specification: 2303.04; I.M.'s 322, 301, 204, 437 *(Sampling & Testing of Agg., HMA, & Binder)*		
Weekly Monitor Duties:			
Stockpiles *Spec. 2303 I.M. 508*	Date	Monitored Yes No	Comments \ Discrepancies
Procedure: Intermingling: Contamination: Segregation:		☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐	
Plant & Mix Control *Spec. 2001.07 & 2303, I.M.'s 508, 509, 511*			
Check Weighing / Verification Weighing *0.3% or less / 0.1%*	Date	Monitored Yes No	Comments \ Discrepancies
Scale Checks: Monitor 1[st] day, Once a week Sensitivity : *Spec. 2001.07 tolerances* Proportions: *Spec. 2001.22* Gate Settings: *Spec. 2001.22* Silo Gates: *Spec. 2001.22* Observe Agg. Coating: *Spec. 2303 I.M. 508* Temperatures, Mix Time: *Spec. 2303.02 ,IM 508*		☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐	

Confidential
HMA Project Monitor Checklist

HMA Plant Book (QMA) Index

HMA English Plant Book - 2007 ver. 2.2	By: Danny Steenhard and John Hinrichsen
Plant Information Sheet	Info
Asphalt Binder Shipment Log 1	AB 1
Asphalt Binder Shipment Log 2	AB 2
Tack Shipment Log	Tack
Hydrated Lime (If Applicable)	Lime
Plant Scale Checks	Scale
Plant Site Inspection List (HMA)	Insp
Daily RAP Record (If Applicable)	RAP
Daily Check List	Daily
Aggregate Certification No. 1	Agg 1
Aggregate Certification No. 2	Agg 2
Aggregate Certification No. 3	Agg 3
Aggregate Certification No. 4	Agg 4
Aggregate Certification No. 5	Agg 5
Aggregate Certification No. 6	Agg 6
Aggregate Certification No. 7	Agg 7
Aggregate Certification No. 8	Agg 8
Plant Moistures (Pan Dry)	Moist
Sample Log	Sample
Mix Adjustments Mix 1	Adjust 1
Mix Adjustments Mix 2	Adjust 2
Mix Adjustments Mix 3	Adjust 3

HMA Plant Monitor Book Index

Item Description	Form #	Page
Plant Information Sheet	Plantinf	
Job Mix Formula	955 & 956	
Weekly Monitor Checks	E224	
Daily Monitor Checks	E225	
Plant Site Inspection List (HMA)	E221	
Sieve Analysis Worksheet (If Applicable)	820180	
Sieve Analysis Worksheet With RAP (If Applicable)	E226	
Acceptance Gradation & I.M. 216 Comparison Report	E201	
Daily Diary	Daily 3 or 4	

Rev 01/98

Form E224

Weekly Monitor Checks (HMA Paving)

Page No.: ____________

Project No.: ____________ **Contract ID.:** ____________

	Stockpiles				Plant & Mix Control							Sampling & Testing				Documentation				
Date	Procedure	Intermingling	Contamination	Segregation	Scale Checks	Sensitivity	Proportions	Gate Settings	Temperatures	Truck Loading	Silo Gates	Gradations	Moistures	AC & Tack	Cores	Plant Report	Tank Sheets	Quantities	Sources & Cert.	By

Complies = Y **Discrepancy = D** **Not Applicable = NA** **Refer To Daily Diary For Discrepancies.**

Daily Monitor Checks (HMA Paving)

Page No.: ________________

Project No.: ________________ **Contract ID.:** ________________

Date	Non QMA & QMA Plants: Agg. Coating	Mixing Time	Control Charts	Summary Sheets	AC Mix Sampling	By:

Date	Non QMA & QMA Plants: Agg. Coating	Mixing Time	Control Charts	Summary Sheets	AC Mix Sampling	By:

Complies = **Y**

Discrepancy = **D**

Not Applicable = **NA**

Refer To Daily Diary For Discrepancies

Plant Site Inspection List (HMA)

Page No.: ____________

Project No.: ______________________________ **Contract ID.:** ________________

Date Checked	Item	Complies Yes	Complies No	Remarks	By
	Foundations				
	Bins				
	Bin Dividers				
	Supports				
	Screens				
	Guards				
	Ladders				
	Railings				
	Belt Lockouts				
	AC Storage				
	Tank Measuring Sticks				
	Pollution Control				
	Dryer				
	Material Scales				
	Thermometer Equipment				
	Sample Location				
	Silo Gates				
	Hopper Gates				
	Lab Location				
	Lab Condition				
	Lab Equipment				
	QMA Testing Equipment				
	Computer				
	Fax Machine				
	Copying Machine				
	Phone				

If an item listed does not apply to the project, write (not applicable) in the remarks column.

Sieve Analysis Worksheet

Form E820180

Lab. No.:	
Orig. Dry Mass:	
Dry Mass Washed:	
Total Minus #4 (W1):	
Reduced Minus #4 (W2):	
Conversion Factor:	

Project		
Date		
Tons when Sampled		
Sample Type		Cold Feed

Only use green colored cells when(Using Box & 8 in. Sieves).

Sieve Size	Reduced Minus #4	Total or Calc Mass Retd.	% Retd.	% Passing	Reported Final	Composite % Psg.	Reported Final	Specs.
1 1/2 in.						#DIV/0!		
1 in.						#DIV/0!		
3/4 in.						#DIV/0!		
1/2 in.						#DIV/0!		
3/8 in.						#DIV/0!		
#4						#DIV/0!		
#8						#DIV/0!		
#16						#DIV/0!		
#30						#DIV/0!		
#50						#DIV/0!		
#100						#DIV/0!		
#200						#DIV/0!		
Pan								
Wash								
Totals								
Tolerances								

Sieve Analysis Worksheet
Combined Gradation with RAP   Form E226

Rev 01/98 Form E226

IOWA DEPARTMENT OF TRANSPORTATION

Sieve Analysis Worksheet

Combined Gradation With Rap

Lab. No.	
Material	
Co. & Proj. #	
Producer	
Contractor	
Sampled By:	Date:
Sample Loc.	

☐ I.M. 304 ☐ Advisory

☐ I.M. 305 ☐ Acceptance

COARSE

Orig. Dry Weight:	
Dry Wt. Washed:	

Sieve Acc. = ______

Sieve Size	Wt. Retd.	% Retd.		% Psg. Final	Reported Final	% Vir. Agg.	% Virgin Psg.	RAP Gradation	% Rap Agg.	% RAP Psg.	Composite % Psg.	Reported Final	Specs.
1 1/2"													
1"													
3/4"													
1/2"													
3/8"													
# 4													
Total 4													
Pan													
Total													

Remarks: ______

3-22

FINE

Orig. Dry Weight:	
Dry Wt. Washed:	
Washing Loss:	

Sieve Acc. = ______

Sieve Size	Wt. Retd.	% Retd.	% Retd. Final	% Psg. Final	Reported Final	% Vir. Agg.	% Psg.	RAP Gradation	% Rap Agg.	% RAP Psg.	Comb. % Psg.	Reported Final	Specs.
3/8"													
# 4													
# 8													
# 16													
# 30													
# 50													
# 100													
# 200													
Wash													
Pan													
Total													
Less + # 4													
Passing # 4													

Date Reported:	Cert. No.:
Tested By:	

Page No.: ___________

roject No.: ____________________ **Contract ID:** ___________

Date: ___________ **Sunrise:** ___________ **High:** ___________

Day: ___________ **Sunset:** ___________ **Low:** ___________

Weather: ______________________________

By: ____________________

Page No.: ____________

roject No.: ____________________ **Contract ID:** ____________

Date: ____________ **Sunrise:** ____________ **High:** ____________

Day: ____________ **Sunset:** ____________ **Low:** ____________

Weather: ________________________________

By: ____________________

Date: ____________ **Sunrise:** ____________ **High:** ____________

Day: ____________ **Sunset:** ____________ **Low:** ____________

Weather: ________________________________

By: ____________________

Sample Log

Project No.: NHS-6-3(41)--12-77 **Contract ID.:** 77-0006-41

All Samples Obtained by Contractor									
Date	Sample	Sample Type ("X" appropriate box)					Samples Submitted to D.O.T.		
Sampled	I. D.	Aggr.	Tested?	HMA	Binder	Cores	Date Sent	By	Comments
06/18/05	SU6-18A			X			06/18/05	jr	Sent to DOT hot
06/18/05	Grad 1-A	X	Y				06/18/05	jr	
06/18/05	AB 1-A				**X**		06/18/05	jr	
06/18/05	SU6-18B			X					
06/18/05	SU6-18C			X					
06/18/05	SU6-18D			X					
06/19/05	Core6-18					X	06/19/05	jr	

Mix Adjustments Mix 1

Project No.: NHS-6-3(41)--12-77 **Contract ID.:** 77-0006-41 **Original G_{sb}:** 2.598

Original Aggregate Proportions: 40-32-23-5 **Original Total % Binder:** 5.40 **Original Added % Binder:** 5.40

Sieves:	1 1/2"	1"	3/4"	1/2"	3/8"	#4	#8	#16	#30	#50	#100	#200
Original Target Gradation:	100	100	100	90	83	50	28	17	11	6.7	4.1	3.3

Date	Time	Reason For Adjustment	New Total % Binder	New Added % Binder	New Aggr. Proportions	Approved Revised Gradation Targets	New G_{sb}	Mix Design & Revision Number	Comments
06/20/05	7:00 AM	low voids			35-35-25-5		2.601	ABD5-1005R1	

Calibration

Standard Specification 2001.07

All pay quantity scales must be certified to produce materials for a state project

Calibration of scales must be done every time a portable plant is moved and annually for stationary plants.

Plants must be calibrated for each mix design

Calibration is done by the contractor

The Materials Office must be notified of calibrations so they have the opportunity to witness.

Calibration sheet must be available at all plants.

Form 820916
6-95

Iowa Department of Transportation

CALIBRATION OF PLANT EQUIPMENT
Cold Feed and Asphalt Cement Delivery
(Continuous - Batch - Drum)

County ____________

Project ____________

Contract No. ____________

Date ____________

Proj. Eng. ____________

Contractor ____________ Plant Location ____________ Material ID ____________ & %______ Moisture ______%

Plant Type and Name ____________ Pollution Control ____________ Material ID ____________ & %______ Moisture ______%

Mix Type ____________ Class ____________ Mix Size ____________ Material ID ____________ & %______ Moisture ______%

Asphalt Type and Grade ____________ RPM Feeder/ RPM Plant/Master ____________ Plant Set For ______ mg/hr (TPH) Material ID ____________ & %______ Moisture ______%

Bin Number Material ID												
Pump vernier setting/gate opening in mm(in)Dial setting												
Run number	1	2	3	1	2	3	1	2	3	1	2	3
Revolutions delivered/Time delivered												
Total wet mass(wt.) aggregate delivered mg/hr (TPH) wet												
Total weight A.C. delivered Total dry mass(wt.) aggregate delivered Dry												
Dry mass (wt.) aggregate per revolution												
Dry mass (wt.) aggregate per minute												
Average dry mass (wt.) agg. per (Minute-Rev.)/Tach set point												

Date scale was certified ____________

The above data is furnished as set forth in the Standard Specifications for plant operations, for informational purposes only. The Contracting Authority makes no representations as to accuracy, either expressed or implied, which are to be construed to relieve the Contractor from the responsibiity to comply with the specifications.

Calibrated by ____________ Witnessed by ____________
Name Name

Contractor ____________ Title ____________

Distribution: White Copy - Plant Inspector; Canary Copy - Contractor; Pink Copy - Transportation Center Materials Engineer; Goldenrod Copy - Project Engineer
Send Copy To: Central Materials on City and County Projects.

Form 820915
5-95

Iowa Department of Transportation
CALIBRATION OF PLANT EQUIPMENT
(DRUM MIX PLANT)

County ______________________

Project ______________________

Date ______________________

Proj. Eng. ______________________

Contractor ______________________ Plant Location ______________________

Plant Type and Name ______________________ Pollution Control ______________________

Mix Type ______________________ Class ______________________ Mix Size ______________________

Asphalt Type and Grade ______________________ Temperature ° F ______________________ A.C. kg/L (lb/Gal) ______________________

WEIGHT BELT				A.C. PUMP				WEIGHT SILO			
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2	[illegible]	[illegible]	[illegible]	2	3
Span				Meter Er. liters (Gals.)							
Fine Zero				Corrected liters (Gals.)							
Total weight aggregate kg (lbs.)				Metered kg (lbs.)				Total weight kg (lbs.)			
Truck total weight aggregate kg (lbs.)				Truck kg (lbs.)				Truck kg (lbs.)			
Difference				Difference				Difference			
% Error				% Error				% Error			

Date scale was certified ______________________

____

____

____

The above data is furnished as set forth in the Standard Specifications for plant operations, for informational purposes only. The Contracting Authority makes no representations as to accuracy, either expressed or implied, which are to be construed to relieve the Contractor from the responsibiity to comply with the specifications.

Calibrated by ______________________ Witnessed by ______________________
Name Name

Contractor ______________________ Title ______________________

Distribution:
White Copy - Plant Inspector
Canary Copy - Contractor
Pink Copy - Transportation Center Materials Engineer
Goldenrod Copy - Project Engineer

Send copy to Central Materials on city and county projects.

Material Sources

Ask where the materials for the project are coming from:

- All Material hauled to the plant MUST have proper documentation - IM 209 Truck Tickets
- Look at the tickets – ALL the correct information must be on the tickets
- Remind the HMA Technician to keep a copy of all tickets at the plant
- Always have your T-203 with you: T-203 is a list of aggregate sources
- Review material deliveries recorded in the plant book.

RAP Totalizer Tonnage (Daily)

- The HMA Plant will print out the dry RAP totalizer tonnage daily.
- The QMA Technician and the Monitor shall each receive a copy.
- The printout from the totalizer is therefore project documentation and a copy needs to be provided to the Engineer daily.

MATERIAL SAMPLING

SAFETY FIRST!

•Make sure that everything is safe where samples are taken.

•Check to make sure the location where you get your streamflow is safe.

•Remember binder and the mix are very hot! Be sure to wear protective clothing when sampling.

UPCOMPACTED MIXTURE: HOTBOX

- Frequency as per Section 2303. **Directed and Witnessed** by the RCE/Project Engineer and sampled by Contractor.
- "Paired Sample" per IM 511, sample size 40 lbs.
- Make out Sample Identification Form #193 and submit it with sample to District Materials Engineer.
- RCE/Project Engineer will take possesion of one of each paired 40 lb. random samples, secure it with a Security ID Tag, and then return it to the Contractor.
- Contractor will be responsible to deliver **ALL** the secured samples to the District Materials Engineer the next working day.
- District Materials Engineer will **randomly** test one sample per day and report the results to the Contractor.
- RCE/Project Engineer will provide the Security ID Tag, the Contractor will supply the cardboard box for the 40 lb. submitted sample.
- Contractor should begin sampling within 15 minutes of being directed to do so, and should be completed within 30 minutes.
- Agency Inspector labels the samples.

TACK SAMPLING

- One quart per project, sampled by the RCE/Project Engineer. A plastic bottle is required. Usually the road inspector will get this sample.

- The delivery tickets will usually come into the plant. Method of acceptance is Approved Source per IM 360.

- Make out the Sample Identification Form #193 and submit it with sample to District Materials Department, along with a copy of the Certified Delivery ticket.

- The District Materials Engineer staff will test the sample and report the findings to the RCE/Project Engineer and Contractor. Report will state if it complies or non-compliance.

LIQUID ASPHALT BINDER SAMPLES

- One 4 oz. tin sample per day. **Directed and Witnessed** by the RCE/Project Engineer and sampled by the Contractor.

- The delivery tickets will come into the plant. Method of acceptance is Approved Source per IM 437, Certification D and test report.

- Make out Sample Identification Form #193 and submit it with sample to District Materials Engineer.

- RCE/Project Engineer will take **possession of the sample**, secure it with a Security ID Tag, and then return it to the Contractor.

- Contractor will be responsible to deliver the secured sample to the District Materials Engineer by the next working day.

- District Materials Engineer will test the sample on the DSR and report the findings to the RCE/Project Engineer and Contractor. Report will state if it complies or non-compliance.

- RCE/Project Engineer will provide Security ID Tag, the Contractor will supply the 4 oz. tin for sampling.

MIX – HOTBOX

- The hotbox is sampled by the contractor on QMA projects.
- These will be split down in the Lab Trailers.
- First sample first day is sent directly to the Materials Lab for testing.
- Subsequent samples will be directed by the Materials Lab.
- Each area may be different in what they want sent in, so the monitor will need to find out what is required in the area they are working.
- The monitor needs to keep in touch with the Materials Lab. If they are having problems, they may require more mix.

COLDFEEDS

- Sample cold-feed only on the first day of production of the mix (unless requested by the DME), directed and witnessed by the RCE/Project Engineer and sampled by the contractor.
- Cold-feed aggregate gradation sampling by the contractor is still required to be done at a minimum frequency of once per day, and the contractor must test all the samples.
- RCE/Project Engineer will **witness** the splitting of the sample.
- Make out Sample Identification Form #193 and submit it with sample to District Materials Engineer.
- RCE/Project Engineer will **take possession of one half of sample**, secure it with a Security ID Tag, and then return it to the Contractor.
- Contractor will be responsible to deliver the secured sample to the District Materials Engineer the next working day.
- RCE/Project Engineer will provide the Security ID Tag, the Contractor will supply the sample sacks.
- The individual obtaining the coldfeed sample must be Level I Aggregate certified and the technician running the gradation must be Level II Aggregate certified.
- The DME will test the split sample and compare the results to the gradation obtained from a mix sample tested in the ignition oven to determine a correction factor. The District Lab may reduce ignition oven testing to 20%, or about once a week.
- When DME requires, it will be necessary to direct and witness cold-feed samples if a new correction factor is needed and for all new mix designs.

Material Testing

Materials need to be tested according to the Instructional Memorandums. The Testing IM's are located in Volume II.

- **Aggregate**
  - IM 302- Sieve Analysis
  - IM 306- Material Finer than No. 200
  - IM 336- Reducing Samples
  - IM 508- Moisture (Drum Plant)
  - IM 324 & 381- Determining the moisture content of RAP for use in HMA

Material Testing

- **HOT MIX**
- IM 321- Density
- IM 325G- Gyratory
- IM 350- Maximum Specific Gravity
- IM 357- Splitting
- IM 511- Control of Asphalt Mixtures
- IM 338- Ignition Oven

*****GENERAL REWRITE – PLEASE READ CAREFULLY.*****

RAP STOCKPILE REPORT (Form 820009r)

820009r (January 2010)

RAP Stockpile Report			**RAP Stockpile ID #**		
□ **Classified**	□ **Certified**				
Stockpile Owner:					
SOURCE OF RAP (Classified only)	Project No.		Dates of Removal		
Route No.	From Milepost		To Milepost		
Removal Depth	JMF No(s)	Mix Type / Size	Crushed Particle %		

LOCATION OF RAP STOCKPILE:			
County	Section	Township	Range
Description of stockpile base:			
Processing remarks:			

STOCKPILE QUANTITY INVENTORY LOG

Date	Quantity	Disposition (Project No. and use)
		Total initial stockpile quantity

Average EXTRACTION TEST RESULTS		**Aggregate Characteristics**	
Gradation	Lab Report nos.		
3 / 4	Moisture % =	Aggregate Type	
1 / 2			
3 / 8	Pb =	Crushed Particles	%
No. 4			
No. 8	Gsb =	Aggr Friction Type 2	%
No. 16			
No. 30	Abs% =	Aggr Friction Type 3	%
No. 50			
No. 100	FAA =	Aggr Friction Type 4	%
No. 200			

Shaded boxes to be completed by the District Materials Engineer

Stockpile Owner Representative		Date
District Materials Representative		Date

DENSITY CORES

IM 321 Density
IM 511 Control of Hot Mix Asphalt Mixtures
IM 204, Appendix F

♦Per each lot, the Contracting Authority weighs and measures cores using Contractors lab and equipment.

♦The Contracting Authority determines locations and observes the cutting of the cores.

♦Contracting Authority will record and retain their results on a worksheet and then have the HMA Technician enter information in the Plant Report program which will calculate density.

♦Contracting Authority shall obtain a copy of the generated Daily Plant Report and put it with their worksheet and keep in their project file.

♦District Materials Lab will test one set of cores per project. HMA Technician will get the requested cores ready to be sent in.

♦A copy of the Daily Plant Report must be sent in with the cores.

♦The Monitor will give the Project Engineer a copy of the HMA Core Sampling and Testing Worksheet each day.

Station	<Select	RANDOM CORE SAMPLES version 1.04			
		*Use for PWL lots and test strips under PWL			Enter

For Class I Compaction, only the quantity within the 12.0 ft area is included for a PWL field voids lot

						Enter Number of Cores Desired for Each Section Below
PROJECT	IMX-35-5(97)121--02-77	MAT THICKNESS	2.00	IN.		
COURSE LAID	Intermediate	TRAVEL LANE(S) WIDTH	12.0	FT.	<REQUIRED	
		WIDTH OF PAVER UNIT	12.0	FT.	<REQUIRED	
DATE LAID	10/26/2012	DATE CUT	10/27/2012			

							Direction /Lane	↓
STATION	482.00	To STATION	582.00	=	10000	L.F.	NB/OL	8
STATION		To STATION		=	0	L.F.		
STATION		To STATION		=	0	L.F.		
STATION		To STATION		=	0	L.F.		
		TOTAL		=	10000	L.F.	(DAY'S LOT)	8
	10000	L.F. DIVIDED BY 8 SAMPLES		=	1250.000	L.F.	(PER SUBLOT)	

CORE # 1:	1250.000	X	0.840	=	1049.756	+ STA.	482.00	=	**STATION**	**492.50**
	12.0	X	0.697	=	**8.4**	**FT.**	(Offset)			
CORE # 2:	1250.000	X	0.049	=	60.665	+ STA.	494.50	=	**STATION**	**495.11**
	12.0	X	0.355	=	**4.3**	**FT.**	(Offset)			
CORE # 3:	1250.000	X	0.953	=	1191.398	+ STA.	507.00	=	**STATION**	**518.91**
	12.0	X	0.398	=	**4.8**	**FT.**	(Offset)			
CORE # 4:	1250.000	X	0.976	=	1220.202	+ STA.	519.50	=	**STATION**	**531.70**
	12.0	X	0.855	=	**10.3**	**FT.**	(Offset)			
CORE # 5:	1250.000	X	0.723	=	904.300	+ STA.	532.00	=	**STATION**	**541.04**
	12.0	X	0.871	=	**10.5**	**FT.**	(Offset)			
CORE # 6:	1250.000	X	0.803	=	1004.165	+ STA.	544.50	=	**STATION**	**554.54**
	12.0	X	0.271	=	**3.3**	**FT.**	(Offset)			
CORE # 7:	1250.000	X	0.915	=	1143.634	+ STA.	557.00	=	**STATION**	**568.44**
	12.0	X	0.737	=	**8.8**	**FT.**	(Offset)			
CORE # 8:	1250.000	X	0.033	=	40.648	+ STA.	569.50	=	**STATION**	**569.91**
	12.0	X	0.314	=	**3.8**	**FT.**	(Offset)			

Flexible Paving Mixture Core Sampling and Testing Worksheet

Plant Report Number: ______

Project Number: ______ **Contract ID Number:** ______ **Mix Design Number:** ______

Lift: ______ **Intended Thickness:** ______ **Field Voids Limits** 3.5 - 8.5

Date Laid: ______ **Date Tested:** ______ **Sampled By:** ______ (Witness)

*When approved

	Core # 1	Core # 2	Core # 3	Core # 4	Core # 5	Core # 6	Core # 7	Core # 8	*Core # 9	*Core # 10	*Core # 11	*Core # 12
Side:												
Station:												
CL Offset:												

Dry Weight:												
Weight in Water:												
SSD Weight:												

Thickness:												

70% of Intended Thickness = ______ 150% of Intended Thickness = ______

Comments: ______

Tested By: ______ **Contractor:** ______

PWL

Section 2303

PWL is now included in the 2012 Standard Specifications

Section 2303 of the October 18, 2010 General Supplemental Specifications was revised to include the Percent Within Limits (PWL) method for determination of payment to the contractor. PWL is based on the level of quality provided based on quality control and quality assurance testing. **All projects let on and after this date will use this specification.**

Type	2009 Specification Book Section 2303	Current PWL Specification
General	Contractor QC required for contracts with 5000 tons or more of HMA. (2303.03,A)	Contractor QC required for bid items with more than 1000 tons of HMA. (2303.03,D)
General	Class 1A, 1B and 1C compaction requiring 96%, 95% and 94% of lab density (G_{mb}) respectively. (2303.03,C,5)	Class 1 compaction requiring a minimum of 91.5% and a maximum of 96.5% of maximum specific gravity (G_{mm}) for all mainline paving. (2303.03,C,5)
General	Average percent field air voids on cores shall not exceed 8.0%. (2303.03,C,5)	No maximum **average** field voids. QI and PWL calculated for field voids based on 8.5% maximum and 3.5% minimum field voids limits. (2303.03,D,4)
General	Test strips required for intermediate and surface courses on Interstate highways and surface courses on Primary highways if total quantity is over 3000 tons. (2303.03,C,5)	Test strips required same as 2303 if total quantity is more than one day's production with additional test strips optional for the contractor. (2303.03,C,5)
General	Test strips limited to 750 tons for lift thicknesses of 2 inches or less or 1000 tons for lifts greater than 2 inches. (2303.03,C,5)	Test strips limited to one half of a day's normal production. (2303.03,C,5)
General	No contractor Quality Control and Testing plan required.	Contractor Quality Control and Testing plan required prior to pre-con as per IM 511, Appendix D. (2303.03,D,3,b)
Sampling	7 cores required per lot. (IM 204 Ap. F)	8 cores required per lot. (IM 204 Ap. F)
Sampling	30 pounds minimum HMA sample. (IM 204 Ap. F)	40 pounds minimum HMA sample. (IM 204 Ap. F)
Sampling	Cold-feed aggregate samples directed and witnessed by the Engineer daily. (2303.03,D,3)	Cold-feed aggregate samples directed and witnessed by the Engineer on the first day only. (2303.03,D,3)
Sampling	Contractor must obtain samples within 15 minutes of being notified to sample. (2303.03,D,3,b)	Sampling must be initiated within 15 minutes and completed within 30 minutes of being notified to sample. (2303.03,D,3,b)

<table>
<tr><th>Type</th><th>2009 Specification Book
Section 2303</th><th>Current PWL
Specification</th></tr>
<tr><td>Sampling</td><td>Loose HMA samples for lots of 2000 tons or greater will be obtained from sublots. The first sublot will be 500 tons with three additional sublots determined by dividing the remainder by three. (2303.03,D,3,b)</td><td>No 500 ton first sublot, equal sublots determined by dividing the estimated tonnage by the number of sublots in following table: (2303.03,D,3,b)
<table>
<tr><th>Estimated Tons (Mg)</th><th>No. of Sublots</th></tr>
<tr><td>101-500</td><td>1</td></tr>
<tr><td>501-1250</td><td>2</td></tr>
<tr><td>1251-2000</td><td>3</td></tr>
<tr><td>2001-4500</td><td>4</td></tr>
<tr><td>Over 4500</td><td>5</td></tr>
</table></td></tr>
<tr><td>Sampling</td><td>For lots less than 2000 tons, the first sublot will be 500 tons and the remaining sublots will be 750 tons each. (2303.03,D,3,b)</td><td>Equal sublots. Same as above table. No 500 ton first sublot. (2303.03,D,3,b)</td></tr>
<tr><td>Sampling</td><td>Maximum of 4 sublots per lot. (2303.03,D,3,b)</td><td>May have 5 sublots if tonnage exceeds 4500 tons per day. (2303.03,D,3,b)</td></tr>
<tr><td>Testing</td><td>Lab voids (P_a) tolerance of -0.5 to +1.0 from the target value. (Table 2303.03-4)</td><td>Tolerances for lab voids (P_a) are ±1.0% from the target value. (2303.03,D,3,b)</td></tr>
<tr><td>Testing</td><td>Each day’s production of a mix design will be considered a lot. (2303.03,D,3,b)</td><td>Irregular production placed in irregular areas will be combined into weekly lots. (2303.03,D,3,b)</td></tr>
<tr><td>Testing</td><td>Moving average of four tests used for lab voids acceptance. (2303.03,D,3,c)</td><td>Weekly lots of lab voids used to calculate PWL if 8 to 20 tests are run. Weeks may be combined to obtain 8 to 20 tests. AAD calculated for lots with less than 8 lab voids tests and irregular production. (2303.03,D,3,b)</td></tr>
<tr><td>Testing</td><td>Shut-down required if moving average of lab voids is outside the tolerances. (2303.03,D,3,c)</td><td>No shut down required if lab voids are out of tolerance.</td></tr>
<tr><td>Testing</td><td>Validation of contractor’s cold-feed gradation by the District Lab is performed on split samples. (2303.03,D,3,b)</td><td>Validation of contractor’s cold-feed gradation by the District Lab is performed by comparing the contractor’s results to an ignition oven gradation. (2303.03,D,3,b)</td></tr>
<tr><td>Testing</td><td>No gradation correction factors required.</td><td>Correction factors determined on first day of production by comparing a cold-feed sample to an ignition oven sample. (2303.03,D,3,b)</td></tr>
</table>

Type	2009 Specification Book Section 2303	Current PWL Specification
Payment	If lot average gradation is outside tolerances, price adjustment schedule is applied. (2303.03,D,3,c)	No price adjustment for gradation. Target change or JMF adjustment required if gradation is outside tolerances. (2303.03,D,3,c)
Payment	If filler/bitumen ratio is outside the tolerances, price adjustment schedule is applied. (2303.03,D,3,c)	No price adjustment for filler/bitumen ratio. If filler/bitumen ratio is outside the tolerances contractor must adjust to start production the next day. (2303.03,D,3,c)
Payment	If QI for field density cores is less than 0, the Engineer may declare the lot defective. (2303.03,D,4,a) or 75% maximum pay. (2303.05,A)	If PWL for field voids is less than 50%, the Engineer may declare the lot or parts of the lot deficient or unacceptable. (2303.03,D,4,a) or 75% maximum pay. (2303.05,A)
Payment	No incentive paid for field density. Price adjustments based on 4 step QI pay schedule. (2303.05,A,3)	Incentive paid for field voids PWL greater than 95% up to a maximum of 4%. Shoulders paved as part of the mainline not included. Price adjustments based on equations. (2303.05,A,3)
Payment	No price adjustments or incentive paid for lab voids.	Incentive paid for lab voids PWL greater than 95% up to a maximum of 3%. Price adjustments based on equations. Price adjustments based on AAD schedule when PWL does apply with no incentive pay. (2303.05,A,3)
Payment	If the percent of asphalt binder in the mix is outside the tolerances, price adjustment schedule is applied. (2303.03,D,3,c)	No price adjustment for binder content. Contractor may adjust binder content as needed to achieve a uniform mix. (2303.03,D,3,c)
Payment	Test strips paid for same as rest of mix. (2303.05,A,2)	Special pay schedule for test strips. (2303.05,A,3)
Payment	When Contractor's test results cannot be validated, the Engineer's test results will be used in place of the Contractor's. (IM 511)	When Contractor's test results cannot be validated, statistical procedures are used to determine how to use the Engineer's test results. (IM 511)

800241 - 6/27/12 ver.7.17

IOWA DOT ASPHALT PAVING DAILY PLANT REPORT

11/2/12 12:16 PM — CHECK

Date:	10/22/2012	Contractor:	Quality Asphalt, Inc.	Active Placement:	Intermediate (Travel Lane)
Project No.:	IMX-35-5(97)121--02-77	County:	Polk	Mix Type:	30M Int 1/2 (HMA)
Contract ID:	77-0355-097	Recycle Source:	10% ABD2-1010 RAP (4.8 % AC)	Active Bid Item:	2303-0062500 30M int 1/2in (HMA)
Mix Design No.:	1BD10-045	Report No.:	2	Lab Voids Target:	4.0
				Design Gyrations:	109

UNCOMPACTED MIXTURE

Hot Box I.D.	Date Sampled	Time	Station	Side	Sample (Tons)	Sublot (Tons)	G_{mb}	G_{mm}	Pa (%)	Limits (%)
IN10-22A	10/22/12	11:07 AM	228+15	NB Rt	500.00	700.00	2.416	2.513	3.9	4.0 ± 1.0
IN10-22B	10/22/12	12:33 PM	241+00	NB Rt	976.12	700.00	2.416	2.516	4.0	4.0 ± 1.0
IN10-22C	10/22/12	2:05 PM	275+00	NB Rt	1,546.00	700.00	2.421	2.506	3.4	4.0 ± 1.0
IN10-22D	10/22/12	4:06 PM	315+00	NB Rt	2,128.19	831.28	2.424	2.510	3.4	4.0 ± 1.0
						Contractor Average	2.419	2.511	3.7	Calc AAD/PWL
				District Results for Box #		IN10-22D	2.422	2.516	3.7	
						Validation?	Yes	Yes		

COMPACTED MIXTURE

☐ Hide Core Data

Core	Station	CL Reference	W1 Dry (g)	W2 in H20 (g)	W3 Wet (g)	Diff.	G_{mb}	% of Gmm	Pa (%)	Thickness (in.)
1	194+53	8.7 N/EDrv	964.5	554.3	964.8	410.5	2.350	93.6	6.4	2.00
2	214+31	1.9 N/EDrv	906.1	517.5	906.6	389.1	2.329	92.8	7.2	2.00
3	221+13	5.8 N/EDrv	925.2	533.1	925.6	392.5	2.357	93.9	6.1	2.00
4	245+49	8.9 N/EDrv	919.5	528.0	919.9	391.9	2.346	93.4	6.6	2.10
5	257+49	6.1 N/EDrv	956.3	549.9	956.8	406.9	2.350	93.6	6.4	2.00
6	287+29	4.4 N/EDrv	906.5	526.1	907.1	381.0	2.379	94.7	5.3	1.88
7	292+13	8.7 N/EDrv	1,004.8	575.5	1,005.3	429.8	2.338	93.1	6.9	2.25
8	309+62	4.3 N/EDrv	964.4	559.8	964.9	405.1	2.381	94.8	5.2	2.13

Course Placed: Intermediate (Travel Lane)
Intended Lift Thickness: 2.00
Date Placed: 10/22/12
Test Date/By: 10/23/12 Mike Jenkins

Thickness QI: 1.45
Avg. Field Density: 2.354
Avg. % of Gmm: 93.738
Avg. % Field Voids: 6.26

Q.I. (lower) = $\frac{(0.965 \times 2.511) - 2.354}{0.018}$ = **3.84** → PWL (lower) = 100.0

Q.I. (upper) = $\frac{2.354 - (0.915 \times 2.511)}{0.018}$ = **3.14** → PWL (upper) = 100.0

PWL (total) = 100.0 + 100.0 — 100.0 = **100.0**

Pay Factor = 1.040

Tons of Mix for PWL Field Voids Analysis (400.00 deducted)= 2,531.28 Field Voids Incentive = $4,556.30

GRADATION (%Passing)

☐ Use DOT

Sieve	Specs	INTCF-1			Avg	District
1 in.	100	100.0			100.0	100
3/4 in.	100	100.0			100.0	100
1/2 in.	89-100(96)	96.0			96.0	99
3/8 in.	77-91(84)	85.0			85.0	86
* #4	38-52(45)	45.0			45.0	46
* Dev	± 7.0	0			0	1
*#8	25-35(30)	30.0			30.0	31
*Dev	± 5.0	0			0	1
#16		20.0			20.0	20
*#30	8-16(12)	13.0			13.0	13
* Dev	± 4.0	1.0			1.0	1.0
#50		7.9			7.9	8.8
#100		5.3			5.3	5.9
*#200	1.2-5.2(3.2)	4.4			4.4	5.1
*Dev	± 2.0	1.2			1.2	1.9
Gradation Compliance?		Yes			Yes	Yes
DBR	0.6 - 1.4	1.04			1.04	1.21
% +4 Type 4		8.2			8.2	8.3
% +4 Type 3					0.0	
(+4/-4) Type 2		01.2/00.3			01.2/00.3	1.2/0.3

USE D.O.T. RESULTS

(Enter an 'X')

TEST STRIP

(Enter an "X")

FILM THICKNESS (FT) [8.0-15.0]	
FT, µm	10.2
Price Adjustment	$0.00

VMA [13.4-15.4]	
VMA, %	13.5

QUANTITY FOR PAYMENT	
Mix Unit Price ($/ton)	$45.00
Binder Unit Price ($/ton)	$550.00
Tons of Mix on Road	2,931.28
Tons to Other Bid Item(s)	
Tons of Binder	152.79
Tons of Waste	144.34
Tons of Binder to Date	253.52
Tons of Mix to Date	4,825.31

TEMPERATURE, °F

Time	7:00	9:00	11:00	1:00	3:00	5:00	7:00	Spec	Comply?
Air Temp			77	78	84	84			
Binder Temp			306	299	280	288		260-330 °F	Yes
Plant Temp			294	295	299	283		225-330 °F	Yes
Mat Temp			245	255	250	240		225-330 °F	Yes

☐ Re-start after mandatory shutdown ☐ Break Down ☐ Rain Out

Mix Change Information (when changes are made to start the day, identify them on previous day's report):

Target Change	New Target	Tons	Agg	Initial %	New %	Agg	Initial	New %

Comments: Add Certification Statement

BINDER

	Target	Actual	Spec	Comply?
% Added Binder	4.74	4.76	N/A	
% Total Binder	5.20	5.21	4.90-5.50	Yes
% RAP	10.00	9.90%	≤100%	Yes
% RAS				
% Binder Replacement	9.23%	8.69%	≤ 100%	Yes
PG Grade	64-22		64-22	Yes

Gb: 1.03690 Gsb: 2.652 Pbe (%): 4.22

PLACEMENT RECORD

From Station	To Station	Lane	Width (ft)
182+15	317+80	NB/EB Drive Ln	12

Certified Tech: Bob Anderson Cert. No. CI-1234
Certified Tech: Andy Robertson Cert. No. CI-2345
Distribution: ____ Dist. Materials ____ Proj. Engineer ____ Contractor

INCENTIVE/DISINCENTIVE REPORT

800241 - 9/12 ver. 7.16

ASPHALT PRODUCTION INCENTIVE/DISINCENTIVE REPORT

Project No.:	IMX-35-5(97)121--02-77	Contractor:	Quality Asphalt, Inc.	Bid Item:	2303-0062500 30M int 1/2in (HMA)
Contract ID:	77-0355-097	County:	Polk	Mix Type:	HMA (30M ESAL), INT, 1/2
Date:	11/5/2012	Placement:	Intermediate (Travel Lane)	Contract Mix Price ($/ton) :	$45.00
Letting Date:	10/16/2012		IMPORT	Bid Item Plan Quantity (tons) :	25,906.00

Field Voids (FV)

Lot	Date	Description	Lot Size	Pay (1) Schedule	Pa (avg)	Pa (stdev)	PWL	QI	PF	Tons	I/D
1	10/21/2012	Test Strip	8	AVG	7.0	1.186			1.000	1,894.03	$0.00
2	10/22/2012	Intermediate (T	8	PWL	6.3	0.709	100.0		1.040	2,531.28	$4,556.30
3	10/23/2012	Intermediate (T	8	PWL	5.6	1.018	99.4		1.035	2,003.16	$3,154.98
4	10/24/2012	Intermediate (T	8	PWL	7.9	0.738	79.8		0.998	3,029.92	-$272.69
5	10/25/2012	Intermediate (T	8	PWL	6.8	0.899	98.8		1.030	3,003.71	$4,055.01
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											
25											
26											
27											
28											
29											
30											
									Total	12,462.10	$11,493.60

Pay Schedule

Class I PWL

PWL	Pay Factor (PF)
95.1 to 100.0	PF = 0.008000*PWL + 2.40
80.0 to 95.0	1.000
50.0 to 79.9	PF = 0.008333*PWL + 0.3333
< 50.0	0.750

Test Strip

Average Field Voids (Pa), %	Pay Factor (PF)
0.0 to 9.0	1.000
9.1 to 9.5	PF = 10 - Pa
> 9.5	0.500 maximum

Class I Non-PWL

Average Field Voids (Pa), %	Pay Factor
0.0 to 8.0	1.000
8.1 to 9.5	PF = (11-Pa)/3
> 9.5	0.500 maximum

% Gmb Density Method

QI	Pay Factor (PF)
> 0.72	1.000
0.40 to 0.72	0.95
0.00 to 0.39	0.85
<0.00	0.75 maximum

Engineer Waives Penalty for Non-PWL?

Lab Voids (LV)

Lot	Description	Lot Size	Pay (1) Schedule	Pa (avg)	Pa (stdev)	PWL	AAD	PF	Tons	I/D
1	Test Strip	3	AAD	3.2	0.493		0.80	1.000	1,894.03	$0.00
2	Intermediate (Travel Lane)	17	PWL	3.6	0.324	98.3		1.020	13,869.05	$12,482.15
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
								Total	15,763.08	$12,482.15

Go to Square Yards

Pay Schedule

PWL

PWL	Pay Factor (PF)
95.1 to 100.0	PF = 0.006000*PWL + 0.430
80.0 to 95.0	1.000
50.0 to 79.9	PF = 0.008333*PWL + 0.3333
< 50.0	0.750

AAD (Non-Test Strip)

AAD	Pay Factor (PF)
0.0 to 1.0	1.000
1.1 to 1.5	0.900
1.6 to 2.0	0.750
> 2.0	0.500 maximum

AAD (Test Strip)

AAD	Pay Factor (PF)
0.0 to 1.5	1.000
1.6 to 2.0	PF = 2.5 - AAD
> 2.0	0.500 maximum

Non-PWL
PF = 1.0
Mandatory shutdown when moving AAD exceeds 1.0

Mat Thickness

Lot	Intended Thickness, in	Lot Size	Min	Max	Avg	QI	PF	SY	I/D
1	2	8	1.88	2.25	2.05	1.46			
2	2	8	1.88	2.25	2.04	1.45			
3	2	8	1.75	2.38	1.93	0.70			
4	2	8	1.88	2.26	2.06	1.50			
5	2	8	1.88	2.25	2.06	1.50			
6									
7									
8									
9									
10									
11									
12									
13									
14									
							Total	0.00	$0.00

Asphalt Film Thickness (AFT)

Rpt	Date	Description	Mix Design	FT, µm	PF	Tons	I/D	New JMF?
1	10/21/2012	Test Strip	1BD10-045	9.1	1.000	1,894.03	$0.00	No
2	10/22/2012	nediate (Travel L	1BD10-045	10.2	1.000	2,931.28	$0.00	No
3	10/23/2012	nediate (Travel L	1BD10-045	9.7	1.000	2,003.16	$0.00	No
4	10/24/2012	nediate (Travel L	1BD10-045	9.9	1.000	4,494.10	$0.00	No
5	10/25/2012	nediate (Travel L	1BD10-045	8.7	1.000	4,440.51	$0.00	No
								No
								No
								No
								No
								No
								No
								No
								No
								No
								No
								No
								No
								No
								No
								No
								No
								No
								No
								No
								No
								No
								No
								No
								No
								No
					Total	15,763.08	$0.00	

Film Thickness Pay Schedule

Location	Price Adjustment Factor (PAH)(2)
Base	0.15
Intermediate	0.20
Surface	0.25
Shoulders	0.15

$PF_{upper} = 1 - [PAH \times (15.0 - FT)]$

$PF_{lower} = 1 - [PAH \times (FT - 8.0)]$

PF = Pay Factor

FT = Film Thickness, µm

NET INCENTIVE
$23,975.75

Calculate Area

VALIDATE
x

Notes
(1) PWL = Percent Within Limits, AAD = Absolute Average Deviation, AVG = Average, QI = Quality Index, Cert = Certification
(2) Represents the price adjustment per µm outside the specification limits

DME

Clear All

Remember to use the current version of the Plant Report and Shades Program.

The Iowa Department of Transportation Website: Office of Materials

http://www.iowadot.gov/materials/acc.htm

Supplemental Specifications for Flexible Paving Mixtures

SS-12005

SS-12005 will effect:
RAP
Moisture Sensitivity
Joint Density

Supplemental Specification SS-12005 has been developed for asphalt mixes and is expected to apply to all asphalt contracts beginning in January 2013.

SS-12005
(New)

Iowa Department of Transportation

SUPPLEMENTAL SPECIFICATIONS
FOR
FLEXIBLE PAVEMENT

Effective Date
~~January 16, 2013~~

THE STANDARD SPECIFICATIONS, SERIES 2012, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SUPPLEMENTAL SPECIFICATIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

Replace Section 2303 of the Standard Specifications and GS-12001 with the following:

Section 2303. ~~Hot Mix Asphalt Mixtures~~ Flexible Pavement

2303.01 DESCRIPTION.

A. Design, produce, place, and compact flexible paving (HMA and warm mix asphalt (WMA)) mixtures. Use proper quality control practices for the construction of surface, intermediate, or base course on a prepared subbase, base, or pavement to the dimensions specified in the contract documents.

B. A surface course is the upper lift for a wearing surface of a designated thickness. An intermediate course is the next lower lift or lifts of a designated thickness. Use intermediate course mixtures for leveling, strengthening, and wedge courses. A base course is the lift or lifts placed on a prepared subgrade or subbase.

C. WMA refers to asphalt concrete mixtures produced at temperatures approximately 50°F (28 °C) or more below those typically used in production of HMA, but no higher than ~~280°F (135 °C)~~ that shown in Article 2303.03, C, 3, d, 3, a. Temperature reductions may be achieved through additives or water injection systems approved by the Bituminous Engineer. The goal with WMA is to produce mixtures with similar or better strength, durability, and performance characteristics as HMA using substantially reduced production temperatures.

D. Unless explicitly stated, produce and place WMA mixtures meeting the same requirements established for HMA mixtures. Equivalent WMA mixtures may be substituted for HMA mixtures unless it is prohibited by the specifications.

2303.02 MATERIALS.
Use materials meeting the following requirements:

A. **Asphalt Binder.**
The Performance Graded asphalt binder, PG XX-XX, will be specified in the contract documents to meet climate, traffic, and pavement conditions. Use asphalt binder meeting requirements of Section 4137. Unless otherwise specified in the contract documents, use PG 58-28 for shoulder mixtures.

B. **Aggregates.**
1. **Individual Aggregates.**
   a. Use virgin mineral aggregate as specified in Materials I.M. 510 and meeting requirements of Section 4127.

SS-12005
(New)

SUPPLEMENTAL SPECIFICATIONS FOR FLEXIBLE PAVEMENT

Effective Date
January 16, 2013

THE STANDARD SPECIFICATIONS, SERIES 2012, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SUPPLEMENTAL SPECIFICATIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

Replace Section 2303 of the Standard Specifications and GS-12001 with the following:

Section 2303. ~~Hot Mix Asphalt Mixtures~~ Flexible Pavement

2303.01 DESCRIPTION.

A. Design, produce, place, and compact flexible paving (HMA and warm mix asphalt (WMA)) mixtures. Use proper quality control practices for the construction of surface, intermediate, or base course on a prepared subbase, base, or pavement to the dimensions specified in the contract documents.

B. A surface course is the upper lift for a wearing surface of a designated thickness. An intermediate course is the next lower lift or lifts of a designated thickness. Use intermediate course mixtures for leveling, strengthening, and wedge courses. A base course is the lift or lifts placed on a prepared subgrade or subbase.

C. WMA refers to asphalt concrete mixtures produced at temperatures approximately 50°F (28 °C) or more below those typically used in production of HMA, but no higher than ~~280°F (135 °C)~~ that shown in Article 2303.03, C, 3, d, 3, a. Temperature reductions may be achieved through additives or water injection systems approved by the Bituminous Engineer. The goal with WMA is to produce mixtures with similar or better strength, durability, and performance characteristics as HMA using substantially reduced production temperatures.

D. Unless explicitly stated, produce and place WMA mixtures meeting the same requirements established for HMA mixtures. Equivalent WMA mixtures may be substituted for HMA mixtures unless it is prohibited by the specifications.

2303.02 MATERIALS.
Use materials meeting the following requirements:

A. Asphalt Binder.
The Performance Graded asphalt binder, PG XX-XX, will be specified in the contract documents to meet climate, traffic, and pavement conditions. Use asphalt binder meeting requirements of Section 4137. Unless otherwise specified in the contract documents, use PG 58-28 for shoulder mixtures.

B. Aggregates.
1. Individual Aggregates.
a. Use virgin mineral aggregate as specified in Materials I.M. 510 and meeting requirements of Section 4127.

b. When frictional classification of the coarse aggregate is required, the contract documents will specify the friction level and location. Furnish friction aggregate from sources identified in Materials I.M. T203. Limestone aggregate sources defined as containing less than 15% magnesium oxide (MgO) are identified in Materials I.M. T203.

1) Friction Classification L-2.

a) On Interstates and all mixtures designed for 30,000,000 ESALS and higher (cross-overs and detours with posted speeds below 60 mph excluded), if 40% or more of the total aggregate is a limestone, use a combined aggregate such that:

1) At least 80% of the combined aggregate retained on the No. 4 (4.75 mm) sieve is Type 4 or better friction aggregate,

(2) At least 30% of the combined aggregate retained on the No. 4 (4.75 mm) sieve is Type 2 or better friction aggregate,

(3) At least 25% of the combined aggregate passing the No. 4 (4.75 mm) sieve is Type 2 or better friction aggregate, and

(4) The fineness modulus of the combined Type 2 aggregate is at least 1.0. Calculations for fineness modulus are shown in Materials I.M. 501.

b) For all other mixtures that do not satisfy Article 2303.02, B, 1, a, use a combined aggregate such that:

(1) At least 80% of the combined aggregate retained on the No. 4 (4.75 mm) sieve is Type 4 or better friction aggregate, and

(2) At least 25% of the combined aggregate retained on the No. 4 (4.75 mm) sieve is Type 2 or better friction aggregate, and

(3) For Interstates and all mixtures designed for 30,000,000 ESALS and higher, the fineness modulus of the combined Type 2 aggregate is at least 1.0. Calculations for fineness modulus are shown in Materials I.M. 501.

2) Friction Classification L-3.

Use a combined aggregate such that:

- At least 80% of the combined aggregate retained on the No. 4 (4.75 mm) sieve is Type 4 or better friction aggregate, and
- At least 45% of the combined aggregate retained on the No. 4 (4.75 mm) sieve is Type 3 or better friction aggregate, or if Type 2 is used in place of Type 3, at least 25% of the combined aggregate retained on the No. 4 (4.75 mm) sieve is Type 2.

3) Friction Classification L-4.

Use a combined aggregate such that at least 50% of the combined aggregate retained on the No. 4 (4.75 mm) sieve is Type 4 or better friction aggregate.

2. Blended Aggregates.

a. Use a blended aggregate meeting the combined aggregate requirements in Materials I.M. 510.

b. When mixtures include RAP, use a blended mineral aggregate gradation consisting of a mixture of RAP aggregate combined with virgin aggregate.

C. Recycled Asphalt Materials.

1. Recycled Asphalt Materials (RAM) includes Recycled Asphalt Pavement (RAP) and Recycled Asphalt Shingles (RAS). RAP is salvaged asphalt pavement. Use RAP from a source designated in the contract documents, or furnish Classified RAP, Certified RAP, or Unclassified RAP from the Contractor's stockpile. The designations Classified , Certified, and Unclassified are exclusively for the use of RAP in HMA.

2. Identify each RAP stockpile and document Classified and Certified RAP stockpiles as directed in Materials I.M. 505. Include the following information when documenting Classified RAP material in a stockpile for future use in HMA:

- Identification of the project from which the material was removed,
- Mix data from the original project including mixture type,
- Aggregate classification,
- Location and depth in the pavement structure,
- Extracted gradation information, if available, and
- Description of stockpile location and quantity.

Do not add material to a Classified or Certified RAP stockpile without the approval of the District Materials Engineer.

3. The Engineer may reject a RAP stockpile for non-uniformity based on visual inspection. Work the stockpiles in such a manner that the materials removed are representative of a cross section of the pile.

4. Place stockpiles of RAP on a base sufficient to prevent contamination, as directed in Materials I.M. 505. Do not use RAP stockpiles containing concrete chunks, grass, dirt, wood, metal, coal tar, or other foreign or environmentally restricted materials. RAP stockpiles may include PCC (not to exceed 10% of the stockpile) from patches or composite pavement that was milled as part of the asphalt pavement. Track equipment may operate on the stockpile during its construction.

5. When RAP is taken from a project, or is furnished by the Contracting Authority, the contract documents will indicate quantity of RAP expected to be available and test information, if known. Salvage this material. Unless otherwise specified in the contract documents, RAP not used in HMA becomes the property of the Contractor.

6. For mix design purposes, the Contracting Authority will test samples of the RAM. The aggregate gradation and amount of asphalt binder in the RAM will be based on the Contracting Authority's extraction tests. For mixtures containing RAM, adjust the contract binder grade as directed in Materials I.M. 510. No adjustments will be made to the contract unit price for required changes to the asphalt binder grade.

a. Classified RAP.

1) Classified RAP is from a documented source with the aggregate meeting the appropriate quality requirements in Materials I.M. 510, and properly stockpiled.

2) Classified RAP may be used in the base, intermediate, and surface mixtures for which the RAP aggregate qualifies. Classified RAP may be used in accordance with Table 2303.02-1.

3) Credit for frictional aggregate may be given for virgin aggregates used in the original pavement to be reclaimed. Types 4 and 5 frictional aggregate content in the RAP may be given full credit, while Types 2 and 3 content may be given credit for half the proportion in the original pavement. Credit may be used toward the total frictional aggregate requirement. No frictional credit shall be given beyond one generation of the RAP's service life.

4) Credit may be given for crushed particles in the original pavement to be reclaimed as determined in the paving history (or mix design when paving history is unavailable).

b. Certified RAP.

Any stockpiled RAP not meeting the requirements of Classified RAP or from an unknown source may be given a Certified status when meeting quality control sampling, testing, and reporting requirements in Materials I.M. 505. Certified RAP may be used in accordance with Table 2303.02-1.

c. Unclassified RAP.

1) Any stockpiled RAP not meeting the requirements of Classified RAP or Certified RAP shall be designated as Unclassified RAP. Unclassified RAP may be used in accordance with Table 2303.02-1. No frictional aggregate credit or aggregate crushed particles credit will be given for Unclassified RAP.

2) When an Unclassified RAP stockpile is characterized by sampling and testing for mix design, no material can be added to the stockpile until the project is completed.

Table 2303.02-1: Allowable RAP Usage

Mix Designation	Aggregate Quality Type	Maximum ~~Allowance~~ Allowable Usage		
		Unclassified RAP	Certified[2] RAP	Classified RAP
HMA 100K S	B	0%	10%	No limit[1]
HMA 100K I	B	10%	20%	No Limit
HMA 100 K B	B	10%	20%	No Limit
HMA 300K S	B	0%	10%	No limit[1]
HMA 300 K I	B	10%	20%	No Limit
HMA 300K B	B	10%	20%	No Limit
HMA 1M S L-4	A	0%	0%	No limit[1]
HMA 1M S	A	0%	0%	No limit[1]

HMA 1M I	B	10%	20%	No Limit
HMA 1M B	B	10%	20%	No Limit
HMA 1M B (shoulder)	B	10%	20%	No Limit
HMA 3M S L-4	A	0%	0%	No limit[1]
HMA 3M S L-3	A	0%	0%	No limit[1]
HMA 3M S	A	0%	0%	No limit[1]
HMA 3M I	A	0%	0%	No Limit
HMA 3M B	B	10%	20%	No Limit
HMA 10M S L-3	A	0%	0%	No limit[1]
HMA 10M I	A	0%	0%	No Limit
HMA 10M B	B	10%	20%	No Limit
HMA 30M S L-3	A	0%	0%	No limit[1]
HMA 30M S L-2	A	0%	0%	No limit[1]
HMA 30M I	A	0%	0%	No Limit
HMA 30M B	B	10%	20%	No Limit
HMA 100M S L-2	A	0%	0%	No limit[1]
HMA 100M I	A	0%	0%	No Limit
HMA 100M B	B	10%	20%	No Limit
Note: 1. At least 70% of the total asphalt binder in the surface mix shall be virgin. 2. Certified RAP meeting Type A quality for alumina per Section 4127 shall have the same maximum allowable usage as Classified RAP for all mixes.				

7. Pre-consumer or post-consumer shingles that have been processed, sized, and ready for incorporation into an asphalt mixture constitute RAS material.

8. Up to 5% RAS by weight of total aggregate may be used in the design and production of an asphalt mixture. The percentage of RAS used is considered part of the maximum allowable RAP percentage. Unless explicitly stated otherwise in this specification or Materials I.M. 505, use RAS according to the same requirements as prescribed for RAP material.

9. RAS shall be certified from an approved supplier designated in Materials I.M. 506. Material processed prior to DOT source approval will not be certified.

D. Flexible Paving Mixture.

1. The job mix formula (JMF) is the percentage of each material, including the asphalt binder, to be used in the HMA mixture. Ensure JMF gradation is within control points specified for particular mixture designated. Use JMF to establish a single percentage of aggregate passing each required sieve size.

2. The basic asphalt binder content is the historical, nominal mixture asphalt binder content, expressed as percent by weight (mass) of asphalt binder in total mixture. Apply values in Table 2303.03-1, based on mixture size and type.

3. If asphalt binder demand for the combination of aggregates submitted for an acceptable mix design exceeds the basic asphalt binder content (see Table ~~2302.02-1~~ 2303.02-2) by more than 0.75%, include an economic evaluation with the mix design. ~~Base this evaluation on past job mix history, possible aggregate proportion changes, and aggregate availability and haul costs for any changes or substitutions considered.~~ For economic evaluation, provide an alternate mix design utilizing aggregates which results in an optimum binder content not exceeding basic asphalt binder content by more than 0.75% and documentation of costs associated with hauling both proposed aggregates and alternate aggregates to plant site. Alternate JMF shall meet requirements of Section 2303.

Table 2303.02-2: Basic Asphalt Binder Content (%)

Size	Aggregate Type	1 inch (25 mm)	3/4 inch (19 mm)	1/2 inch (12.5 mm)	3/8 inch (9.5 mm)
Intermediate and Surface	Type A	4.75	5.50	6.00	6.00
Intermediate and Surface	Type B	5.25	5.75	6.00	6.25
Base	Type B	5.25	6.00	6.00	6.25

4. Use a mixture design meeting gyratory design and mixture criteria corresponding to the design level specified in the contract documents. The Engineer may approve the substitution of any mixture which meets requirements for a higher mixture than specified in the contract documents, at no additional cost to the Contracting Authority. When a commercial mix is specified, use a 1/2 inch (12.5 mm) 300K surface mixture or higher for JMF approval.

5. Use 1,000,000 ESAL HMA base mixture for shoulders placed as a separate operation. For outside shoulders on Interstate projects, the Contractor has the option to substitute the mainline intermediate or surface mixture for a specified base mixture, at the Contractor's expense.

6. Unless otherwise indicated on the contract documents, use a 1/2 inch (12.5 mm) or 3/4 inch (19 mm) 1,000,000 ESAL HMA Base mixture (or higher ESAL) for base widening. When an adjoining surface is designed for 300,000 ESALS or less and is paved during same project, use a base mixture at same ESAL level used in surface mixture.

7. Prepare gyratory mixture designs for base, intermediate, and surface mixtures. Follow the procedure outlined in Materials I.M. 510. Submit a mixture design complying with Materials I.M. 510. Propose both a production and a compaction temperature between 215ºF (102ºC) and 280ºF (138ºC) for WMA mixture designs.

8. Use a gyratory ~~compacter~~ compactor for design and field control meeting ~~the protocol for Superpave gyratory compactors~~ AASHTO T 312. ~~Compactors for which compliance with this protocol is pending may be used at the discretion of the District Materials Engineer~~.

E. Other Materials.

1. Tack Coat.
Tack coat may be SS-1, SS-1H, CSS-1, or CSS-1H. Do not mix CSS and SS grades. RC-70 and MC-70 may also be used after October 1, at the Contractor's option.

2. Anti-strip Agent.

a. Perform a moisture sensitivity evaluation of the proposed asphalt mixture design in accordance with ~~Materials I.M. 507~~ Appendix A of this specification for the following mixtures when placed in travelled lanes:

1) Mixtures for Interstate and Primary highways designed for 30,000,000 ESALS and higher

2) Mixtures for Interstate and Primary highways containing quartzite, granite, or other siliceous (not a limestone or dolomite) aggregate obtained by crushing from ledge rock in at least 40% of the total aggregate (virgin and recycled) or at least 25% of the plus No. 4 (4.75 mm).

~~**3)** All WMA mixtures placed in travel lanes designed for 10,000,000 ESALS and higher. For the purpose of evaluating moisture sensitivity of a proposed mix design, the Contractor may test the proposed JMF from plant produced material placed off-site at no additional cost to the contracting authority.~~

For the purpose of evaluating moisture sensitivity of a proposed mix design, Contractor may test proposed JMF from plant produced material placed off-site at no additional cost to the Contracting Authority.

b. Sample and test plant produced mixture for moisture susceptibility in accordance with Materials I.M. 204 and ~~Materials I.M. 507~~ Appendix A of this specification for bid item plan quantities of more than 1000 tons (1000 Mg) as follows:

1) For mixtures satisfying Article 2303.02, E, 2, a.

2) For conditions satisfied in Article 2303.02, E, 2, ~~g~~ f.

c. Moisture susceptibility testing ~~of plant produced mixture~~ will not be required for base repair, patching, temporary pavement, or paved shoulders. Moisture susceptibility testing for mixture bid items of 1000 tons (1000 Mg) or less is only required on the mix design for mixtures satisfying Article 2303.02, E, 2, a.

d. Use the following minimum stripping inflection point (SIP) requirements for plant produced material:

PG High Temperature, °C	SIP, Number of Passes[1]	
	< 3,000,000 ESALS	≥ 3,000,000 ESALS
58	10,000	14,000
64	10,000	14,000
70	10,000	14,000

Note 1: If ratio between creep slope and stripping slope as defined in Appendix A of this specification is less than 2.00, the SIP is invalid.

~~A minimum tensile strength ratio (TSR) of 80.0% is required on plant produced mixture~~. When notified of non-compliant results, the Engineer may suspend paving operations until an approved “significant mix change” is implemented.

~~**e.** For mixture bid items of more than 1000 tons (1000 Mg), when the Contractor’s mix design TSR results are greater than or equal to 80% and less than 90%, an anti-strip agent will be required until the Contracting Authority’s TSR results on the plant produced mixture are equal to or exceeding 80%. Plant produced material without anti-strip shall be tested without penalty to confirm the need for an anti-strip agent. See Materials I.M. 510 Appendix C for additional information.~~

~~f~~ e. When the Contractor’s mix design ~~TSR~~ SIP results are below ~~80.0%~~ the minimum specified in Article 2303.02, E, 2, d, an anti-strip agent will be required. Plant produced material with anti-strip shall be tested to verify the minimum ~~TSR~~ SIP is achieved. ~~See Materials I.M. 510 Appendix C for additional information.~~

~~g~~ f. The Engineer may require an evaluation of the test method in ~~Materials I.M. 507~~ Appendix A of this specification for plant produced mixture as follows:

1) When there is a “significant mix change” to a mix satisfying Article 2303.02, E, 2, a.
2) When there is contamination and/or coating of the aggregate for any mixture placed in a travel lane.
3) When aggregates are inadequately dried during production of any mixtures placed in a travel lane.

~~h~~ g. The following anti-strip agents may be used:

1) **Hydrated Lime.**
Meet the requirements of AASHTO M 303, Type I or ASTM C 1097, Type S. Do not apply Section 4193. Hydrated lime will not be considered part of the aggregate when determining the job mix formula and the filler/bitumen ratio.

2) Liquid Anti-strip Additives.
For each JMF, obtain approval for liquid anti-strip additives blended into the binder. Approval will be based on the following conditions:

a) The asphalt binder supplier provides test results that the additive does not negatively impact the asphalt binder properties, including short term and long term aged properties.
b) The design is to establish the ~~optimum~~ additive rate ~~when comparing the dry strength of specimens prepared with asphalt binder not containing the anti-strip additive to conditioned specimens prepared with asphalt binder containing the anti-strip additive~~ that produces the optimum (maximum) SIP value. ~~See Materials I.M. 510 Appendix C for additional information.~~
~~**c)** A dosage rate can be selected such that the conditioned indirect tensile strength can be improved by at least 10% while meeting all other requirements.~~

3) Polymer-based Liquid Aggregate Treatments.
For each JMF, obtain approval for polymer-based liquid aggregate treatments. Approval will be based on the design establishing the optimum additive rate when comparing the dry strength of specimens prepared without the anti-strip additive to conditioned specimens prepared with asphalt binder containing the anti-strip additive. See Materials I.M. 510 Appendix C for additional information.

3. Sand for Tack Coats.
Use sand meeting the requirements of Gradation No. 1 of the Aggregate Gradation Table in Article 4109.02.

4. **Fabric Reinforcement.**
Use fabric reinforcement meeting the requirements of Article 4196.01, B, 4.

5. **WMA Technologies.**
Chemical additives, organic additives, or water injection systems approved by the Bituminous Engineer may be used at the rate established by the mixture design in the production of WMA. Once production of a bid item has begun with a WMA technology, continue its use throughout the remainder of the bid item's production unless otherwise approved by the District Materials Engineer.

2303.03 CONSTRUCTION.

A. **General.**

1. Contractor is responsible for all aspects of the project.

2. Provide quality control management and testing, and maintain the quality characteristics specified.

3. Apply Quality Management - Asphalt (QM-A) to asphalt mixture bid items when the plan quantity is greater than 1000 tons (1000 Mg) and all Interstate contracts. Follow the procedures and meet the criteria established in Articles 2303.02 and 2303.03, B; Section 2521; and Materials I.M. 510 and 511.

4. Apply Article 2303.03, E, for asphalt mixture bid items that have a plan quantity of 1000 tons (1000 Mg) or less as well as any patching bid items. For items bid in square yards (m^2), apply Article 2303.03, E when the plan quantity by weight (estimated with a unit weight of 145 pounds per cubic foot (2323 kg/m^3) unless otherwise stated on the plans) does not exceed 1000 tons (1000 Mg). Article 2303.03, E applies to Interstate patching as well as Interstate bid items of less than 1000 tons (1000 Mg), all of which are placed in a non-travel lane.

B. **Equipment.**
Provide sufficient equipment of the various types required to produce, place, and compact each layer of mixture as specified, such that the mixture is workable at the minimum placement and compaction temperature desired, regardless of storage or haul distance considerations.

Modify the asphalt mixing plant as required by the manufacturer when introducing a WMA technology. Plant modifications may include additional plant instrumentation, the installation of water injection systems and/or WMA additive delivery systems, tuning the plant burner and adjusting the flights in order to operate at lower production temperatures and/or reduced tonnage.

Use equipment meeting the requirements of Section 2001 with the following modifications:

1. **Plant Calibration.**
   - **a.** Calibrate each plant scale and metering system before work on a contract begins. Use calibration equipment meeting the manufacturer's guidelines and Materials I.M. 508.
   - **b.** The Engineer may waive calibration of permanent plant scales when a satisfactory operational history is available. The Engineer may require any scale or metering system to be recalibrated if operations indicate it is necessary.
   - **c.** Make calibration data available at the plant.
   - **d.** Calibrate each aggregate feed throughout an operating range wide enough to cover the proportion of that material required in the JMF. Make a new calibration each time there is a change in size or source of any aggregate being used.
   - **e.** For continuous and drum mixing plants, calibrate the asphalt metering pump at the operating temperature and with the outlet under pressure equal to that occurring in normal operations.

2. **Paver.**
Apply Article 2001.19. Spreaders described in Article 2001.13, D, may be used to place paved shoulders. Spreaders used to place the final lift of paved shoulders shall meet additional requirements of Article 2001.19.

3. **Rollers.**
   - **a.** For initial and intermediate rolling, use self-propelled, steel tired, pneumatic tired, or vibratory rollers meeting the requirements of Article 2001.05, B, C, or F. Their weight (mass) or tire pressure may be adjusted when justified by conditions.

b. For finish rolling, use self-propelled, steel tired rollers or vibratory rollers in the static mode that meet the requirements of Article 2001.05, B, or F.

4. Scales.
Apply Article 2001.07, B, to paving operations regardless of the method of measurement.

C. HMA Construction.

1. Maintenance of the Subgrade and Subbase.

a. Maintain completed subgrade and subbase to the required density, true cross section, and smooth condition, prior to and during subsequent construction activities.

b. If rutting or any other damage occurs to the subgrade or subbase as a result of hauling operations, immediately repair the subgrade and subbase. Such repair will include, if necessary, removal and replacement, at no additional cost to the Contracting Authority.

c. Should traffic by others authorized to do work on the project be specifically permitted by the Engineer to use loads which exceed the Contractor's established limit, the Contracting Authority will pay repair costs for repairs directed by the Engineer.

2. Preparation of Existing Surfaces.

a. Cleaning.
Clean and prepare existing surface according to Article 2212.03, B, 1.

b. Tack Coats.

1) Apply tack coats when the entire surface area on which the coat is to be applied is free of moisture. Do not apply them when the temperature on the surface being covered is less than 25°F (-4°C).

2) Place a tack coat to form a continuous, uniform film on the area to be covered. ~~Unless directed otherwise, spread the tack coat at an undiluted rate of 0.02 to 0.05 gallon per square yard (0.1 to 0.2 L/m²). The tack coat may be diluted with water to improve application.~~ Unless directed otherwise, spread tack coat at the following undiluted rates:

- New HMA Surface — 0.03 to 0.05 gallon per square yard (0.14 to 0.23 L/m^2)
- Milled HMA Surface — 0.05 to 0.07 gallon per square yard (0.23 to 0.32 L/m^2)
- PCC/Existing HMA Surface — 0.04 to 0.06 gallon per square yard (0.18 to 0.27 L/m^2)

Tack coat may be diluted with water to improve application.

3) Allow tack coat to adequately cure prior to placement of HMA to assure bond to the underlying surface and avoid damage of the HMA being placed. If tack coat surface becomes dirty from weather or traffic, thoroughly clean and, if necessary, retack. A light application of sand cover may also be required, but this is anticipated only for excessive application rates, breakdowns, and short sections remaining at the end of a day's run.

4) On highways being constructed under traffic, use procedures that provide safety and convenience to the public (without soiling their vehicles) as controlling factors. Limit tack coat application lengths to minimize inconvenience to the public. Keep applications within the hot mixture placing work area that is controlled by flaggers at each end. Plan applications so they will be covered with hot mixture when the work area is opened to traffic at the end of the day's work.

5) Tack the vertical face of exposed, longitudinal joints as a separate operation at a rate from 0.10 to 0.15 gallon per square yard (0.5 to 0.7 L/m^2). Tack before the adjoining lift is placed. Lightly paint or spray vertical surfaces of all fixtures, curbs, bridges, or cold mixture with which the hot mixture will come in contact to facilitate a tight joint with the fresh mixture.

c. Fabric Reinforcement.

1) When fabric reinforcement is required, the locations will be designated in the contract documents.

2) Do not place fabric on wet or damp surfaces, or when the road surface is less than 50°F (10°C).

3) Apply fiberglass fabric only with an adhesive recommended by the manufacturer.

4) Place fabrics with an adhesive backing according to the manufacturer's recommendations.

5) Place other fabrics with a heavy coat of asphalt binder at a rate of 0.20 to 0.25 gallons per square yard (0.9 to 1.1 L/m^2). Use the same binder grade used in the asphalt concrete mixture. For binders containing a WMA technology, place at a temperature between 260ºF and 315ºF (127ºC and 160ºC), otherwise place at a temperature between 295°F and 315°F (145°C and 160°C).

6) Place fabric reinforcement according to the contract documents (full width or individual crack or joint treatment). Place fabric immediately following the adhesive or asphalt binder placement under the fabric. Placement may be by hand or by a mechanical method designed for this purpose.

7) Take precautions to avoid wrinkles in the fabric and to ensure that air bubbles are removed without breaking the fabric. Cut and lap wrinkles or folds which cannot be removed by brushing in order to provide a smooth surface.

8) Additional adhesive or asphalt binder may be required to produce a tight, bonded surface. When applied full lane width, use a minimum 12 inch (300 mm) transverse and longitudinal lap.

9) Avoid applying tack coat over longitudinally placed fabric.

10) To avoid damage to fabric, do not allow traffic over fabric during placement and during curing of the adhesive material. A light application of HMA mix may be hand sprinkled on the fabric to prevent damage from necessary equipment traffic.

11) When directed by the Engineer, repair damaged or soiled fabric prior to HMA overlay, at no additional cost to the Contracting Authority. The Engineer may also require sanding during this period, at no additional cost to the Contracting Authority.

3. Handling, Production, and Delivery.

Ensure plant operation complies with the following requirements:

a. Handling Mineral Aggregate and RAP.

1) Keep various aggregate products used separate from one another. Make adequate provisions to prevent intermingling.

2) Handle stockpiling and processing in a manner to ensure uniform incorporation of the aggregate into the mix.

3) Feed various aggregates separately in their proper proportions using feeders to the cold elevator. Feed them at a rate to permit correct and uniform temperature control of heating and drying operations.

b. Handling Asphalt Binder.

Bring asphalt binder to a temperature of 260°F to 330°F (125°C to 165°C) before being measured for mixing with the aggregates. The temperature between these limits may be further regulated according to the characteristics of the mixture, method of proportioning, and viscosity of the asphalt binder. Heat modified asphalt binder according to the supplier's recommendations.

c. Handling Anti-strip Agents.

1) Hydrated Lime.

Accurately proportion lime using a method acceptable to the Engineer.

a) Added to a Drum Mixer.

(1) Add hydrated lime at the rate of 0.75% by weight (mass) of the total aggregate (virgin and RAP) for Interstate and Primary projects. Add hydrated lime to a drum mixer using one of the following methods:

(a) Add to virgin aggregate on the primary feed belt, as a lime water slurry.

(b) Thoroughly mix with the total combined aggregate if the aggregate contains at least 3% total moisture.

(c) Add to the outer drum of a double drum system away from heated gas flow and prior to the addition of the virgin asphalt binder.

(2) Alternative methods for mixing will be allowed only with the Engineer's approval. Do not introduce hydrated lime directly into a single drum mixer by blowing or by auger.

b) Added to a Batch Plant.

Add hydrated lime at the rate of 0.5% by weight (mass) of the total aggregate (virgin and RAP) for Interstate and Primary projects. Introduce it to a batch plant using one of the methods below. In any case, introduce the lime prior to the start of the dry mix cycle.

(1) Place on the recycle belt which leads directly into the weigh hopper.

(2) Add directly into the pugmill.

(3) Add directly into the hot aggregate elevator into the hot aggregate stream.

c) Added to the Aggregate Stockpile.

Add hydrated lime at a rate established by the ~~AASHTO T 283 test~~ optimization of the SIP as determined by Appendix A of this specification. ~~The instructions for establishing the rate are discussed in Materials I.M. 510.~~ Add it to the source aggregates defined in Article 2303.02, E, 2, thoroughly mixed with sufficient moisture to achieve aggregate coating, and then place in the stockpile.

2) **Liquid.**

a) When liquid anti-strip additives are used, employ equipment complying with the anti-strip manufacturer's recommended practice to store, measure, and blend the additive with the binder.

- **b)** The additive may be injected into the asphalt binder by the asphalt supplier or the Contractor. If the Contractor elects to add the liquid anti-strip agent, they assume the material certification responsibilities of the asphalt binder supplier. Ensure the shipping ticket reports the type and amount of additive and time of injection.
- **c)** Ensure the asphalt supplier provides the Contactor and Engineer with the shelf life criteria defining when the anti-strip additive maintains its effectiveness. Do not use binder that has exceeded the shelf life criteria.
- **d)** When using polymer-based aggregate treatment, comply with the manufacturer's recommended specifications and guidelines.

d. Production of Hot Mix Asphalt Mixtures.

1) Regulate the exact proportions of the various materials to be within the limits specified to produce a satisfactory bituminous coating and mixture. First dry mix the aggregates, then add the asphalt binder.

- **a)** In batch plants, add the asphalt binder in an evenly spread sheet over the full length of the mixer box.
- **b)** In continuous plants, spray the asphalt binder evenly into the aggregate within the first 30% of the length of the mixer box using a positive pressure spray.
- **c)** In drum mixing plants, spray the asphalt binder evenly into the aggregate using a positive pressure spray.

2) Operate the mixer so that the mixture is of consistently uniform temperature, and when discharged from the mixer does not vary more than 20ºF (11ºC).

3) Do not allow the temperature of the mixtures to fall outside the following parameters:

- **a)** Keep the production temperature of WMA mixtures between 215ºF (102ºC) and 280ºF (138ºC) until placed on the grade. Maximum production temperature for WMA is 330ºF (165ºC) after October 1st.
- **b)** Do not produce WMA mixtures more than 10ºF (6°C) below the target temperature designated in the JMF without the approval of the Engineer.
- **c)** Keep the production temperature of HMA mixtures between 225ºF (102ºC) and 330ºF (165ºC) until placed on the grade. Do not discharge HMA into the hopper when its temperature is less than:
  - **(1)** 245 ºF (118ºC) for a nominal layer thickness of 1 1/2 inches (40 mm) or less, or
  - **(2)** 225 ºF (102ºC) for a nominal layer thickness of more than 1 1/2 inches (40 mm).
- **d)** Flexible paving mixtures not meeting these requirements will be rejected.
- **e)** **P**roduction temperature limits apply starting at point of discharge from mixer.

~~5~~ 4) Use a rate of production that will not exceed the manufacturer's rated capacity for the mixer and will provide uniform coating. For batch mixers, use a dry mixing time of no less than 5 seconds and a wet mixing time of no less than 25 seconds. For continuous mixers, use a mixing time of no less than 30 seconds.

~~6~~ 5) Control handling and manipulation of the hot mixture from the mixer to the final spread on the road in order to maintain uniform composition and minimize segregation of coarser particles. Minimize segregation to the extent that it cannot be visibly observed in the compacted surface. Apply only approved release agents to trucks and equipment, as specified in Article 2001.01.

~~7~~ 6) Except for an unavoidable delay or breakdown, provide continuous and uniform delivery of hot HMA to any individual spreading unit. Deliver at a rate sufficient to provide as continuous an operation of the spreading unit as practical. Keep the paver hopper sufficiently full at all times to prevent non-uniform mixture flow to the screed.

4. Placement.

- **a.** Clean the surface of each layer according to Article 2212.03, B, 1. If necessary, retack to provide bond with the succeeding course.
- **b.** Prior to placing the final lift, correct bumps or other significant irregularities that appear or are evident in the intermediate course or other lower course.
- **c.** Do not place HMA mixtures under the following circumstances:
  - **1)** On a wet or damp surface.
  - **2)** When road surface temperature is less than that shown in Tables 2303.03-1 and 2303.03-2.

Table 2303.03-1: Base and Intermediate Course Lifts of Asphalt Mixtures

Nominal Thickness - inches (mm)	Road Surface Temperature, ºF (ºC)
1 1/2 (40)	40 (4)
2 - 3 (50 - 80)	35 (2)
Over 3 (Over 80)	35 (2)

Table 2303.03-2: Surface Course Lifts of Asphalt Mixtures

Nominal Thickness - inches (mm)	Road Surface Temperature, ºF (ºC)
1 (30)	HMA: 50 (10) / WMA: 40 (4)
1 1/2 (40)	HMA: 45 (7) / WMA: 40 (4)
2 and greater (50 and greater)	40 (4)

3) After November 15, except with the Engineer's approval.

d. The Engineer may further limit placement if, in the Engineer's judgment, other conditions are detrimental to quality work.

e. When placing the mixture, maintain a finishing machine forward speed that will provide a continuous uniform operation. Minimize stopping.

f. Use a wire or string line to guide finishing machine and maintain alignment. Correct edge alignment irregularities immediately.

g. The contract documents will show the total thickness to be placed. Spread the mixture at a rate such that, when compacted, the layer(s) will be the required thickness.

h. Base the minimum layer thickness on Table 2303.03-3. Minimum layer thickness does not apply to leveling/scratch courses.

Table 2303.03-3: Minimum Lift Thickness

Design Mix Size - inches (mm)	Minimum Lift Thickness - inches (mm)
3/8 (9.5)	1 (25)
1/2 (12.5)	1 1/2 (40)
3/4 (19)	2 (50)
1 (25)	3 (75)

i. Ensure the compacted thickness of the top layer does not exceed 3 inches (75 mm). This restriction does not apply to HMA shoulders.

j. The maximum compacted thickness of lower layers may exceed 4 inches (100 mm) if it is demonstrated that the thicker layers have satisfactory density. The riding characteristics of the thicker layers must be within conformance to that expected from a 3 inch (75 mm) layer.

k. Complete each layer to full width before placing succeeding layers.

l. While operating on the road surface, do not use kerosene, distillate, other petroleum fractions, or other solvents, for cleaning hand tools or for spraying the paver hopper. Do not carry containers of cleaning solution on or near the paver. When a solvent is used, do not use the paver for at least 5 hours after cleaning. Collect and remove all cleaning materials and cleaning residue from the project and plant site. The cleaning material and residue becomes the property of the Contractor.

m. Whenever practical, spread mixtures using a finishing machine. Irregular areas may be spread by hand. Spread the hot mixture uniformly to the desired depth with hot shovels and rakes. Do not dump loads faster than they can be spread properly. Do not allow workers to stand on the loose mixture while spreading.

n. After spreading, carefully smooth to remove all segregated coarse aggregate and rake marks. Use rakes and lutes designed for use on HMA mixtures.

o. Unless stated elsewhere in the contract documents, when placing two adjacent lanes, pave no more than 1 day of rated plant production before paving the adjacent lane(s). Place the adjacent lane to match the first lane during the next day of plant production.

p. Do not spread more mixture than can be compacted in the specified working hours of the same working day.

q. At the close of each working day, clear all construction equipment from the roadbed.

r. Prior to opening a lane to traffic, place fillets or full width granular shoulders according to Article 2121.03, C, 4. Place the material adjacent to and equal in thickness to the resurfacing. Fillet removal is incidental to the HMA mixture.

5. Compaction.

a. **General.**

1) Promptly and thoroughly compact each layer. Use mechanical tampers for areas inaccessible to the rollers.

2) Use a rolling procedure and compactive effort that will produce a surface free of ridges, marks, or bumps. Obtain the Engineer's approval for the rolling procedure and compactive effort.

b. Class I Compaction.

1) Applications.

a) Use Class I compaction for base, intermediate, and surface courses for the traffic lanes, ramps, and loops on all roadways.

b) For Class I compaction, the quality characteristic is in-place air void content and will be based on the theoretical maximum specific gravity (Gmm) obtained from the Quality Control Program for that day's mixture.

2) Test Strip Construction for Class I Compaction.

a) For the purpose of evaluating properties of the HMA mixtures and for evaluating an effective rolling pattern:

(1) Construct a test strip of the surface mixture prior to its placement on the surface course for Interstate highways, Primary highways, and ramps connecting Interstate and Primary highways.

(2) Construct a test strip of the intermediate mixture at the start of its placement on the intermediate course for Interstate highways, interstate-to-interstate ramps.

(3) Test strips for base mixtures may be constructed, but are not required.

b) When the contract documents specify both intermediate and surface courses and a test strip is required, place a surface course test strip in lieu of intermediate mixture in a section of the intermediate course prior to actual surface course placement. If surface course and intermediate course are not placed the same calendar year, then place test strip at beginning of surface mix production.

c) Test strips are not required when the entire production of the mixture bid item is placed in a single day.

d) The quantity of HMA mixture subject to the test strip production, will be pre-established with the Engineer and limited to a half day's production:

e) Only one test strip will be allowed for each mixture and shall be declared to the Engineer prior to placement. The Engineer may require additional test strips if a complying HMA mixture or rolling pattern was not established.

f) Use procedures and documentation during test strip construction that allow the Engineer and Contractor to confirm mixture design properties and effectiveness of compaction procedures.

g) Use test strip production control that meets the requirements of Article 2303.03, D, 3, c. The test strip will be an independent lot. Determine sublots in accordance with Table 2303.03-4.

c. Class II Compaction.

Intended for paved shoulders, temporary crossovers, onsite detours, and other situations where Class I is not specified.

1) For all rollers, make initial contact with the hot mixture using the power driven wheels or drum.

2) Perform initial rolling at a temperature so the mixture will compact without excessive distortion. Except on longitudinal joints and super-elevated curves, begin rolling with the initial roller at the outer edges of the pavement. With each successive pass, progress inward toward the center. For each reverse trip, lap all but 4 to 6 inches (100 to 150 mm) of the previous track. When reversing direction, stop the initial roller at an angle with the longitudinal direction.

3) Following the initial rolling, give the layer an intermediate rolling with a pneumatic tired roller before the temperature falls below 225°F (110°C). Cover the area no less than six times with the intermediate roller.

4) Use a finish, steel tired roller to smooth out all marks and roughness in the surface.

5) For areas inaccessible to rollers, use mechanical tampers or other approved compaction methods.

6. Joints and Runouts.

a. Construct longitudinal joints for courses on resurfacing projects directly above the longitudinal joint in the existing pavement. Limit the offset distance between longitudinal joints in succeeding full depth HMA paving courses to 3 inches (75 mm) or less. Adjust hot mixture spreading along longitudinal joints to secure complete joint closure and full compression of the mixture with a smooth surface and joint after compaction.

b. Separate transverse construction joints in succeeding courses by at least 6 feet (1.6 m). Do not use wood or metal headers to form joint edge during rolling of the fresh mixture. Saw header to a straight line at right angles to the center line to provide a full thickness vertical edge before continuing paving. Provide a 10 foot (3 m) straightedge for checking transverse construction joints for smoothness. Before compaction, use hand methods to correct surface variations at transverse construction joints indicated by the straightedge.

c. When a transverse construction joint is open to traffic, install a temporary runout 10 feet (3 m) long per 1 inch (25 mm) of lift thickness. Use suitable paper or burlap (not sand, dirt, or wood) under the taper to prevent adhesion.

d. When required to end paving for winter shutdown, locate runouts adjacent to each other. Install a winter shutdown runout 25 feet (8 m) long per 1 inch (25 mm) of lift thickness.

e. For temporary runouts open to traffic for periods greater than 4 weeks or winter shutdown runouts, the Contractor may reduce the amount of top size aggregate in the transition taper. Remove temporary runouts and winter shutdown runouts before commencing paving. Runout removal is incidental to the HMA mixture.

7. Miscellaneous Operations.

a. Leveling and Strengthening Courses.

1) The contract documents will show course thickness. Place strengthening and leveling courses as indicated in the contract documents. Use the same mixture specified for the base or intermediate course.

2) When the width of strengthening or leveling course is 8 feet (2.4 m) or more, spread using a finishing machine.

3) Compact leveling courses and intermediate mixtures placed as leveling/scratch courses (less than or equal to 1 inch (25mm) plan thickness) using Class II compaction, except make all passes with a pneumatic roller.

b. Wedge Courses.

1) Use the base or intermediate mixture to construct wedge courses used to secure desired curve super-elevation. When possible, spread using a finishing machine.

2) Place wedge courses in compacted layers no thicker than 3 inches (75 mm). Avoid crushing the coarse aggregate. Place wedge courses to the full width of the pavement.

3) On super-elevated curves which require wedge course placement, stage the shoulder construction. After completing each day's wedge placement operations and prior to suspending that day's construction activities, construct a full width shoulder on the high side up to the completed wedge course elevation. Shoulder construction staging will be considered incidental to shoulder construction.

4) The Engineer may waive field void sampling for wedge courses provided compaction has been thorough and effective.

c. Fixtures in the Pavement Surface.

1) Adjust manholes, intakes, valve boxes, or other fixtures encountered within the area to be covered by HMA to conform to the final adjacent finished surface. Payment for adjustment of manholes or intakes will be per Section 2435. Payment for adjustment of valve boxes and other fixtures will be per Section 2554. Unless specified otherwise in the plans, adjust fixtures:

- Between placing the surface course and the layer preceding the surface course, or
- After placing the surface course using a composite patch or PCC patch.

2) Use PCC and HMA patch material complying with the requirements of Section 2529. Make patches large enough to accommodate the structure being adjusted.

3) Construct patches to be square. Orient them diagonally to the direction of traffic flow. Ensure the elevation of the adjusted fixture and patch does not differ from the elevation of the surrounding pavement surface by more than 1/4 inch (6 mm).

4) When shaping and compacting resurfacing near inlets to storm sewer intakes, shape to ensure maximum drainage into intakes.

d. Fillets for Intersecting Roads and Driveways.

1) Shape, clean of loose material, and tack coat the surface adjacent to the pavement being surfaced when fillets are designated in the contract documents for driveways to homesteads and commercial establishments and at intersecting roads. On the tack coated surface, place and compact the hot mixture in layers equal to the adjacent layer. Extend from the edge of the pavement as shown on the plans.

2) Place and compact fillets at intersecting roads at the same time as the adjacent layer.

3) Entrance fillets that are 8 feet (2.4 m) or wider may be placed as a separate operation. Pave fillets which are 8 feet (2.4 m) or wider with a self propelled finishing machine described in Article 2001.19.

4) The Engineer may approve other equipment for placement of fillets, based on a demonstration of satisfactory results.

e. Stop Sign Rumble Strips.
If the plans include the bid item Rumble Strip Panel (In Full Depth Patch), apply Section 2529. To meet the requirements of placing Stop Sign Rumble Strips before opening roadway sections to traffic, the Contractor may construct temporary rumble strip panels meeting the final pattern and location of the Stop Sign Rumble Strip indicated in the plans

f. Paved HMA Shoulders.

1) Compact paved HMA shoulders using one of the following methods:

a) Class II compaction (Article 2303.03, C, 5, c),

b) Rolling pattern established during the first day of shoulder placement to achieve Class I compaction (Article 2303.03, C, 5, b), or

c) Same rolling pattern established for adjoining mainline or ramp driving lane, as determined by density coring.

2) Shoulder area will not be included in Percent Within Limits (PWL) calculations for field voids on adjoining mainline or ramp driving lane. A price adjustment may be applied to shoulder areas that do not adhere to the established roller pattern.

D. Quality Assurance Program.
For ~~interstate mixtures placed in a travel lane and~~ each mixture bid item that has a plan quantity of more than 1000 tons (1000 Mg) (patching excluded) apply requirements of this article.

For items bid in square yards (m^2), apply the requirements of this article when the plan quantity by weight (estimated with a unit weight of 145 pounds per cubic foot (2323 kg/m^3) unless otherwise specified in the plans) exceeds 1000 tons (1000 Mg).

HMA mixture bid items with plan quantities of 1000 tons (1000 Mg) or less and patching bid items are both defined as small quantities. For those bid items, meet the requirements of Article 2303.03, E. For items bid in square yards (m^2), when the plan quantity by weight (estimated with a unit weight of 145 pounds per cubic foot (2323 kg/m^3) unless otherwise specified in the plans) does not exceed 1000 tons (1000 Mg), meet the requirements of Article 2303.03, E.

1. General.
Follow the procedures and meet the criteria established in Articles 2303.02 and 2303.03, B, Section 2521, and Materials I.M. 510 and 511.

2. Mix Design - Job Mix Formula.

a. The Contractor is responsible for the JMF for each mixture.

b. Submit a completed JMF, using the computer format of Form 956, for approval to the materials lab designated by the Contracting Authority. Submit supporting documentation demonstrating the design process was followed and how the recommended JMF was determined. Include an economic evaluation when required. Include trial and final proposed aggregate proportions (Form 955) and corresponding gyratory data. In addition, submit sufficient loose mixture and individual material samples for approval of the design.

c. Personnel preparing the JMF shall be Iowa DOT certified in bituminous mix design.

d. If the JMF is not satisfactory, submit another JMF for review. An approved JMF will be required prior to beginning plant production. The Contractor will be charged $1000 for each JMF approval requested and performed which exceeds two per mix size, type, and proposal item on any individual project or group of tied projects.

3. Plant Production.

a. **General.**

1) Perform sampling and testing to provide the quality control of the mixture during plant production. Certified Plant Inspection according to Section 2521 is required.

2) Personnel performing production quality control testing shall be Iowa DOT certified for the duties performed.

3) Provide easy and safe access for Iowa DOT staff to the location in the plant where samples are taken.

4) All of the following qualify as a “significant mix change”:

- A single occurrence of an aggregate interchange of greater than 5%.
- An aggregate interchange of greater than 5% from last approved JMF.
- A single occurrence of an asphalt content change greater than 0.2%.
- An asphalt content change greater than 0.2% from last approved JMF.
- A deletion or introduction of a new material into the mix.

- A change of additive dosage rate.
- A change of binder, aggregate, or additive source.

b. Sampling and Testing.
Submit a testing plan meeting the requirements of Materials I.M. 511, Appendix D prior to the preconstruction meeting.

1) Asphalt Binder
Sample and test asphalt binder to verify the quality of the binder grade. Take asphalt binder samples at random times as directed and witnessed by the Engineer according to Materials I.M. 204.

2) Aggregate Gradation

a) Use cold feed or ignition oven gradation for aggregate gradation control to assure materials are being proportioned according to the specifications. Take aggregate quality control samples at random times in accordance with Materials I.M. 204.

b) Take a minimum of one aggregate gradation for each day's production that exceeds 100 tons (Mg). ~~Higher testing frequencies may be used when defined by a pre-determined quality control plan approved by the Engineer.~~ When more than one sample in a day's production is tested, use the average gradation to determine compliance of the daily lot.

c) Engineer will verify Contractor gradation with an ignition oven or a split cold feed sample. When cold feed quality control is verified with the ignition oven, ~~S~~split a cold feed sample with the Engineer on the first day's production of each mixture. The Engineer will determine the need for a correction factor for the cold feed gradation based on the Engineer's cold feed gradation and ignition oven results. The Engineer may require additional cold feed split samples to evaluate the need or value of a correction factor for the cold feed and ignition oven gradation.

d) Secure aggregate gradation samples transported to the agency lab for ~~determination of the ignition oven correction factor~~ testing in accordance with Materials I.M. 511.

3) Uncompacted Asphalt Mixture

a) Sample the hot HMA mixture at random locations as directed and witnessed by the Engineer according to Materials I.M. 322. Secure and test the samples according to Materials I.M. 511. Modify sampling location to include placement with mix stored from a prior day's production.

b) Sampling frequency will be determined by the estimated daily production of each mixture placed. The number of sublots is defined in Table 2303.03-4:

Table 2303.03-4: Uncompacted Mixture Sublot Size

Estimated Daily Production, Tons (Mg)	Number of Sublots
101-500	1
501-1250	2
1251-2000	3
2001-4500	4
Over 4500	5

c) The Contractor may request to have a quality control plan that indicates a higher testing frequency if pre-approved by the Engineer at the preconstruction meeting.

d) Assist the Engineer with material sampling for verification testing. When the Engineer provides notification that a sample is to be taken, initiate sampling within 15 minutes. Sampling should normally be completed within 30 minutes of notification.

e) Do not take paired samples from the first 100 tons (100 Mg) of mix produced each day or the first 100 tons (100 Mg) of mix following a significant mix change. When paving operations are staged so each day of placement is less than 100 tons (100 Mg) for the entire production of the bid item, establish a sampling plan with the Engineer that includes a minimum of one sample per 2500 tons (2500 Mg).

f) For PWL analysis of laboratory voids, each mixture bid item will constitute a lot. Lot size is defined as follows:

(1) No less than 8 and no more than 20 sequential tests will constitute a lot (exceptions stated below).

(2) After the 8th test, all subsequent samples collected over the remainder of that week will also be included in the lot up to a maximum of 20.

(3) Once a lot has been established with at least 8 tests, a new lot will begin at the start of the following week or the day following the 20th sample, whichever occurs first. Lots shall not contain partial days. When the 20th sample is reached, include all samples taken that day in the lot.

- **(4)** When determining PWL lot size for lab voids, Sunday through Saturday defines a week.
- **(5)** If the bid item's production has ended and fewer than 8 tests are available, those tests may be combined with the previous lot provided the maximum lot size has not already been reached. When combining results, if the day to be combined contains the 20th sample, include all samples for that day. Do not combine partial day's results.
- **(6)** If samples cannot be combined with the previous lot due to maximum lot size restrictions or if fewer than 8 tests are available for the entire production of a bid item, combine those tests into a single lot and use the AAD analysis in Materials I.M. 501.
- **(7)** Test strips will be considered a separate lot.
- **(8)** When the same mix type is produced for multiple bid items in one day, assign all box samples to each bid item's existing PWL lot for lab voids. Assign the quantity of each bid item produced to its respective lot.

g) Test the quality control sample of each production paired sample as follows:

- **(1)** Prepare and compact two gyratory specimens according to Materials I.M. 325G. Compact loose WMA field samples, transported to the laboratory, at 240ºF (115ºC).
- **(2)** Determine the the bulk specific gravity of compacted mixture (G_{mb}) at N_{design} for each specimen according to Materials I.M. 321. G_{mb} will be determined by compacting specimens to N_{design}. Average the results.
- **(3)** Determine the Theoretical Maximum Specific Gravity of the uncompacted mixture according to Materials I.M. 350.
- **(4)** Determine laboratory air voids for each sample according to Materials I.M. 501.

h) Use the target laboratory voids listed in Materials I.M. 510 Appendix A unless otherwise specified in the contract documents.

i) Use the following methods of acceptance for laboratory voids:

- **(1)** For base widening, non-high speed ramps, ~~non-interstate~~ shoulders, recreational trails, and other mixture bid items not placed in travel lanes of a permanent pavement, acceptance for laboratory voids will be based on a moving average absolute deviation (AAD) from target as defined in Materials I.M. 501. Use the production tolerance in Table 2303.03-5. At any time, if more than 100 tons (100 MG) of the bid item is placed in an area not listed above, apply Article ~~2303.03, D, 3, b, 3, ix, b~~ 2303.03, D, 3, b, 3, i, 2, for entire production of bid item.
- **(2)** For all other mixture bid items, determine PWL for each lot as defined in Materials I.M. 501. Use 1.0% below the target air voids as the lower specification limit and 1.0% above the target air voids as the upper specification limit. Lot size is defined in Article ~~2303.03, D, 3, b, 3, vi~~ 2303.03, D, 3, b, 3, f. When the same mix type is placed in both PWL and AAD areas in a single day, include all samples for that day in the PWL lot as well as the quantity of the mixture bid item produced and placed in the PWL area.
- **(3)** When same mix type is produced for multiple bid items in a single day from a single plant, apply all samples for that day to the lot for each bid item.

j) For mixture bid items in a PWL lot, determine the pay factor using the average absolute deviation (AAD) procedure described in Materials I.M. 501 for proportions of a mixture bid item which are produced in irregular intervals and placed in irregular areas. The following items qualify as such and shall be combined into a single lot:

- Asphalt mixture produced and placed on gores, detours, cross-overs, temporary pavements, turning lanes, and fillets,
- Asphalt mixture produced and placed on ramps that are not high-speed ramps,
- Asphalt mixture produced and placed on ~~non-interstate~~ shoulders.

To be considered irregular, the production rate for mixture bid items described above is not to exceed 1000 tons (1000 Mg) ~~(10,000 square yards (8400 m^2) for items bid in square yards~~ in a single day.

4) Moisture Susceptibility

a) The Engineer may obtain plant produced samples for moisture susceptibility testing in accordance with ~~Materials I.M. 507~~ Appendix A of this specification at any time for mixtures identified in Article 2303.02, E, 2, ~~A~~ a or Article 2303.02, E, 2, ~~G~~ f, to verify the minimum ~~TSR~~ requirement in Article 2303.02, E, 2, d, has been achieved.

b) When liquid anti-strip additives are added by the Contractor at the plant, satisfy one of the following methods to regulate the quantity of additive:

- **(1)** Present certification that the equipment used to measure and blend the liquid anti-strip additive:
  - Meets the anti-strip supplier's recommended practice,
  - Is directly tied to the asphalt binder supply system, and

- Has been calibrated to the equipment manufacturer's guidelines.

(2) Test the binder to measure the quantity of liquid anti-strip additive in the binder for every 5000 tons (5000Mg) of HMA production. Obtain the Engineer's approval for the supplier's test method prior to use of the test.

(3) Run the test method in ~~Materials I.M. 507~~ Appendix A of this specification during production. If unable to certify or test for the presence and quality, run the test method in ~~Materials I.M. 507~~ Appendix A of this specification each 10,000 tons (10,000 Mg) of production to measure the effectiveness of the additive. Ensure test results satisfy ~~80% TSR when compared to the dry strength of specimens prepared with asphalt binder containing the additive~~ the minimum requirement in Article 2303.02, E, 2, d**.**

c. Production Control.

1) After the JMF is established, the combined aggregate furnished for the project, the quantity of asphalt binder, and the laboratory air voids should consistently comply with the JMF, as target values. Control them within the production tolerance given in Table 2303.03-5.

Table 2303.03-5: Production Tolerances

Measured Characteristic	Target Value (%)	Specification Tolerance (%) [a]
Cold feed gradation No. 4 (4.75 mm) and larger sieves	by JMF	± 7.0
Cold feed gradation No. 8 (2.36 mm)	by JMF	± 5.0
Cold feed gradation No. 30 (600 µm)	by JMF	± 4.0
Cold feed gradation No. 200 (75 µm)	by JMF	± 2.0 [b]
Field laboratory air voids absolute deviation from target [c]	0.0	≤ 1.0
Daily asphalt binder content	by JMF	± 0.3
VMA [e]	by JMF	± 1.0 [f]

(a) Based on single test unless noted otherwise.
(b) Maintain the filler/bitumen ratio of the plant produced mixture between 0.6 and 1.4.
(c) When lab voids acceptance is not based on PWL.
(e) Restricted to an asphalt film thickness as specified for the level of HMA mixture. May be waived per Materials I.M. 510, Appendix A.
(f) Based on the daily lot average.

2) Control plant production so that the plant produced HMA mixture will meet mixture design criteria (within the test tolerances given in Table 2303.03-5) for Air Voids and VMA at N_{design} gyrations of the gyratory compactor. Monitor the slope of the gyratory compaction curve of plant produced material. Slope variations in excess of ±0.40 of the mixture design gyratory compaction curve slope may indicate potential problems with uniformity of the mixture.

3) The gyratory mix design gradation control points for the size mixture designated in the project plans will not apply to plant production control.

4) Strive for the target value of the percent air void and asphalt binder by adjusting gradation and asphalt binder content.

5) Produce a uniform composition mixture complying with the JMF.

6) Adjustments to the JMF target gradation and asphalt binder content values may be made.

a) The Contractor determines from quality control testing that adjustments are necessary to achieve the specified properties.

b) Consult with the Engineer regarding adjustments to the JMF.

c) Notify the Engineer if the average daily gradation for a mixture bid item is outside the production tolerances. If other production tolerances and mixture requirements of Materials I.M. 510 Appendix A are acceptable, a change in gradation target can be requested.

d) If filler/bitumen ratio exceeds the limits listed in Table 2303.03-5, change the JMF at the start of the next day's production for that mixture.

- **e)** The Contractor's adjustment recommendations prevail, provided all specifications and established mix criteria are being met for plant production.

7) Measure estimated film thickness and voids in the mineral aggregate (VMA) for specification compliance every day of HMA production.

8) Prepare quality control charts according to Materials I.M. 511. Keep the charts current and available showing both individual sample results and moving average values for both lab voids and absolute deviation from target. Base moving average values on four consecutive sample results. The moving average absolute deviation from target may restart only in the event of a mandatory plant shutdown for failure to maintain the average within the production tolerance. Include the target value and specification tolerances on control charts.

9) Calculate laboratory voids for individual samples according to Materials I.M. 501. Use the individual density and individual maximum specific gravity determined for each sample. To determine the moving average of laboratory voids, use the average of the last four individual sample laboratory voids. Calculate absolute deviation from target lab voids according to Materials I.M. 501 of this specification. To determine the moving average absolute deviation from target laboratory voids, use the average of the last four individual sample absolute deviations from target laboratory voids.

10) Monitor the test results and make mix adjustments, when appropriate, to keep the mixture near the target values. Notify the Engineer whenever the process approaches a specification tolerance limit. When acceptance for lab voids is not based on PWL, cease operations when the moving average point for absolute deviation from target lab voids is outside the specification tolerance limit. Assume responsibility to cease operations, including not incorporating material which has not been placed. Do not start the production process again until notifying the Engineer of the corrective action proposed.

4. Construction.

a. Field Voids for Class I Compaction.

1) Take samples to determine field voids from the compacted mixture and test no later than the next working day following placement and compaction.

2) A lot is considered to be one layer of one mixture bid item placed during a day's operation. The Engineer may approve classifying multiple layers of construction placed during a single day as a lot provided only one mixture was used.

3) For the following situations sampling for field voids may be waived by the Engineer provided compaction has been thorough and effective, or sampling may be modified by mutual agreement to include more than one day's production provided samples are taken prior to trafficking:

- When the day's operation is not more than 2500 square yards (2500 m^2) excluding areas deducted from the field voids lot,
- When the day's operation is not more than 500 tons (500 Mg) excluding quantities deducted from the field voids lot,
- When the mixture is being placed in irregular areas, or
- When placing wedge or strengthening courses.

4) The Engineer will obtain and test samples for each lot according to Materials I.M. 204 Appendix F. The Contractor may request to have a quality control plan that indicates a higher testing frequency at no additional cost to the Contracting Authority if pre-approved by the Engineer at the preconstruction meeting. The Engineer will determine the core locations. The length laid in each lot will be divided into approximately equal sublots. Obtain one sample at a random location, as directed and witnessed by the Engineer, in each sublot. Determine a new random location for the sublot when the designated core location falls on a runout taper at an existing pavement, bridge, or bridge approach section where the thickness is less than the design thickness.

5) If a sample is damaged or measures less than 70% or more than 150% of the intended thickness, an alternate sampling location will be determined and used. Take samples from no less than 1 foot (300 mm) from the edge of a given pass of the placing equipment, from run-outs, or from day's work joints or structures.

6) Use the following methods of acceptance for field voids:

a) For mixture bid items placed in the following areas:

- Base widening placed in a travel lane,
- Non high-speed ramps,
- Bridge approaches placed as a separate operation,
- Non-interstate travel lanes intended to be in service for fewer than 12 months,
- State Park and Institutional roadways,

- Recreational trails,
- Irregular areas identified by the Engineer that may include areas not suitable for continuous paving, and
- Wedges,

the Engineer will accept the field voids lot based on the average test results or an established effective rolling pattern when approved by the Engineer. Do not exceed 8% average field voids. The Engineer may modify the sample size and frequency provided compaction is thorough and effective. The Engineer may apply the pay schedule in 2303.05, A, 3, b, 3 to areas where thorough and effective compaction is not achieved.

b) For all other areas of Class I compaction, determine PWL, as defined in Materials I.M. 501, for each lot using a lower specification limit (LSL) of 3.5% voids (96.5% of G_{mm}) and an upper specification limit (USL) of 8.5% voids (91.5% G_{mm}).

7) When the PWL falls below 80.0, use the procedure outlined in Materials I.M. 501 to identify outliers with 1.80 as the quality index criterion. Only one core may be considered an outlier in a single lot. If an outlier is identified, recalculate the PWL with the results of the remaining cores and determine whether the PWL is improved. Use the larger of the original and recalculated PWL to determine the pay factor.

8) When the PWL falls below 50.0, the Engineer may declare the lot or parts of the lot deficient or unacceptable.

9) Use maximum specific gravity (Gmm) results in field voids calculations as follows:

a) When cores represent one day's production and more than one Gmm test result is available, use the average Gmm in the field voids calculation for all cores.

b) When cores represent one day's production and only one Gmm test result is available, use the single Gmm test result in the field voids calculation for all cores.

c) When the cores represent more than one day's production, use the average of all Gmm test results from all days corresponding with the cores.

b. Longitudinal Joint Compaction.

1) When PWL is used for Class I field voids acceptance and placement of lot results in the formation of a longitudinal joint(s) matching one or more lanes, obtain and test samples taken directly on each joint created.

2) Using random core locations determined for field voids lot, Engineer will randomly select four of these locations to be sampled for joint density. At each of the four locations (longitudinal station/milepost), obtain one sample for each longitudinal joint being formed as directed and witnessed by the Engineer. Take samples using a 6 inch (150 mm) diameter bit centered on top of the visible line between the two lanes.

3) Do not sample when matching new paving to pre-existing lanes.

4) Use average of all validated Gmm test results from all days corresponding with the cores, when calculating field voids of the joint(s).

5) Include results on daily plant report.

~~b~~ c. Thickness.

1) The Engineer will measure cores, exclusive of sealcoat, according to Materials I.M. 337. ~~All areas of uniform thickness and width for the project will be divided into lots.~~ Sampling frequency and lot definitions are as follows:

a) Thickness cores sampled from completed course shall be taken full depth and divided into lots based on areas of uniform thickness and width. Use frequency specified for taking density samples from surface lift.

b) Density cores sampled as part of a field voids lot will be combined into daily lots based on cores' intended thickness.

2) ~~Use the frequency specified for taking G_{mb} samples from the surface lift when measuring for completed thickness.~~ Samples for thickness not tested for G_{mb}, because they are less than 70% of the intended thickness, are included for thickness. In these particular instances, do not measure the thickness of additional sufficiently thick samples used to determine field voids. ~~Take thickness samples full depth of the completed course. After measurement, remove the G_{mb} samples for the top layer from the core.~~ When measuring density of top lift from a full depth core, measure thickness before trimming core for density testing.

3) For full depth cores taken from completed course, intended thickness is designated in the contract documents. For all other cores, intended thickness is established by the Contractor meeting requirements in Articles 2303.03, C, 4, h through j. If any of the measurements for a lot is less than the designated thickness, the quality index for thickness of that lot will be determined by the following formula:

(English)

$$QI_{Thickness} = \frac{\text{Average Thickness}_{Measured} - (\text{Thickness}_{\cancel{Plan}\ Intended} - 0.5)}{\text{Maximum Thickness}_{Measured} - \text{Minimum Thickness}_{Measured}}$$

(Metric)

$$QI_{Thickness} = \frac{\text{Average Thickness}_{Measured} - (\text{Thickness}_{\cancel{Plan}\ Intended} - 12.7)}{\text{Maximum Thickness}_{Measured} - \text{Minimum Thickness}_{Measured}}$$

4) Provided there is reasonable assurance that the pavement complies with the required thickness, the Engineer may waive sampling for thickness for the following situations:
a) When the day's operation is 2500 square yards (2500 m^2) or less.
b) When the mixture is being placed in irregular areas.
c) When the mixture is being placed next to structures.
5) When the quality index falls below 0.00 and final lift of the course has been placed, the Engineer may declare the lot or parts of the lot defective.

c. Smoothness.
Construct pavement to have a smooth riding surface according to the following:
1) Apply Section 2317 to HMA surface mixture bid items of a Primary project if any individual HMA mixture bid item is 1000 tons (1000 Mg) or greater or 5000 square yards (4200 m^2) or greater. Apply Section 2316 to all other Primary projects with a surface course and when specifically required for other projects.
2) When neither Section 2316 nor Section 2317 is applied to a project, periodically check the riding surface longitudinally with a 10 foot (3 m) straightedge. The surface shall not deviate from a straight line by more than 1/8 inch in 10 feet (3 mm in 3 m). If a deviation is present, correct the area according to Article 2316.03, B, 2.

5. Sampling and Testing.
a. **General.**
1) Maintain and calibrate the quality control testing equipment using prescribed procedures. Sample and test according to the specified procedures as listed in the applicable Materials I.M. and Specifications. When the results from a Contractor's quality control lab are used as part of product acceptance, the Contractor's quality control lab is required to be qualified.
2) Identify, store, and retain all quality control samples and field lab gyratory specimens used for acceptance until the lot is accepted. The Contracting Authority will prescribe the method of securing the identity and integrity of the verification samples according to Materials I.M. 511. Store verification samples for the Contracting Authority until delivery to the Contracting Authority's lab.
3) Identify all samples using a system the Engineer approves.

b. Individual Materials and Uncompacted Mixture.
1) Complete the following as designated by the Engineer:
- Identify samples of asphalt binder, aggregate, and tack coat material.
- Secure and promptly deliver the samples to the appropriate laboratory.

2) Take paired samples of uncompacted HMA mixture (each box of the pair weighing at least 30 pounds (14 kg)) according to Materials I.M. 322.
3) Conduct quality control tests for mixture properties using representative portions of the mix from the quality control sample of each sublot.
4) Split samples for specimen preparation according to Materials I.M. 357.
5) Paired sampling may also be accomplished by taking a bulk sample and immediately splitting the sample according to Materials I.M. 322 on the grade.
6) Record and document all test results and calculations on data sheets approved by the Contracting Authority. Record specific test results on the Daily Plant Report the Contracting Authority provides. Also include a description of the quality control actions taken (adjustment of cold feet percentages, changes in JMF, and so forth) on the Daily Plant Report.
7) ~~Facsimile, or deliver by other methods the Engineer approves,~~ Deliver Daily Plant Report to the Engineer and designated laboratory daily as directed in Materials I.M. 511. At project completion, provide Engineer a copy of electronic file(s) containing project information generated during the progress of the work.
8) When sampling for moisture susceptibility testing, obtain a 70 pound (35 kg) sample according to Materials I.M. 322. ~~If the Contractor's TSR results from the mixture design are less than 90%, sample at a minimum frequency of 1/10,000 tons of plant production until a complying test result is achieved, after which the minimum frequency may be reduced to 1/50,000 tons.~~

Each sample shall constitute a separate lot and include all quantities placed from beginning of bid item's production (or previous sampling point) to next sampling point (or 10,000 tons, whichever is less). The Engineer will select, at random, the sample location. Split the sample and deliver half to the Central Materials Laboratory.

c. Compacted Pavement Cores.

1) Cut and trim samples under the direction of and witnessed by the Engineer for tests of G_{mb}, thickness, or composition by using a power driven masonry saw or by drilling a minimum 4 inch (100 mm) nominal diameter core.

2) Restore the surfaces the same day. Dry, fill with the same material, and properly compact core holes.

3) Pavement core samples will be identified, taken possession of by the Engineer, and delivered to the Contractor's quality control field laboratory.

4) The Engineer may either:

- Transport the cores directly to the lab, or
- Secure the cores and allow the Contractor to transport the cores to the lab.

5) The compacted HMA pavement will be tested in a timely manner by the Engineer's personnel who are Iowa DOT Certified to perform the test.

6) Prepare and test the cores according to Materials I.M. 320, 321, and 337.

d. Verification and Independent Assurance Testing.

1) The Contractor's quality control test results will be validated by the Engineer's verification test results on a regular basis using guidelines and tolerances set forth in Materials I.M. 216 and 511.

2) If the Engineer's verification test results validate the Contractor's test results, the Contractor's results will be used for material acceptance. Disputes between the Contractor's and Engineer's test results will be resolved according to Materials I.M. 511.

3) The Engineer will randomly select one or more of the daily production verification samples. Some or all of the samples selected will be tested in the materials laboratory designated by the Engineer. The Engineer will use the verification test results to determine if the Contractor's test results can be used for acceptance.

4) The Engineer will test each lot of cores at the Contractor's field quality control laboratory. Cores may also be tested by the Contractor; however, the Contractor's test results will not be used for material acceptance.

5) Personnel and laboratories performing tests used in the acceptance of material are required to have participated in the statewide Independent Assurance Program according to Materials I.M. 208.

E. Quality Control for Small HMA Paving Quantities.

1. Mix Design.

Prepare the JMF. Prior to HMA production, obtain the Engineer's approval for the JMF. Comply with Article 2303.02 and Materials I.M. 510.

For mixtures meeting the criteria in Article 2303.02, E, 2, a:

a. An anti-stripping agent is required when ~~TSR on mix design is less than 90%~~ the optimum dosage is greater than 0%.

b. Use ~~Materials I.M. 507~~ Appendix A of this specification to optimize the design dosage rate.

c. When prior-approved designs have demonstrated acceptable field ~~TSR~~ SIP values, the anti-stripping agent and dosage from the JMF may be used in lieu of optimization testing.

2. Plant Production.

a. Ensure HMA production plant calibration for the JMF is current and no more than 12 months old.

b. Use certified asphalt binder and approved aggregate sources meeting the JMF. Ensure the plant maintains an asphalt binder log to track the date and time of binder delivery. Ensure HMA delivery tickets identify the JMF.

c. Monitor the quality control test results and make adjustments to keep the mixture near the target JMF values.

3. Construction.

a. Take compacted mixture G_{mb} measurements, except when Class II compaction is specified, no later than the next working day following placement and compaction. Use the field quality control laboratory compaction for field G_{mb} control, as specified in Article 2303.03, D. The Engineer may accept the void content of the compacted layer based on cores or calculations from density gauge measurements. The Engineer may waive field void sampling provided the compaction has been thorough and effective.

b. For small quantities, a lot will be the entire quantity of each HMA mixture bid item.

c. The PWL for field voids will not apply to small quantities.

4. Sampling and Testing.

a. Material sampling and testing is for production quality control only. Acceptance of mixture is based on Contractor certification. Perform a minimum of one aggregate cold-feed and one uncompacted HMA test per lot. Sampling and testing of uncompacted HMA mixture is only required for mechanically placed mixture. Sample and test according to the Standard Specifications and Materials I.M.s using certified technicians and qualified testing equipment. The Engineer may approve alternative sampling procedures or may waive sampling of uncompacted mix and gradation if Contractor can provide plant reports from other recent project(s) demonstrating the JMF has been produced within specification. Take the sample between the first 100 to 200 tons (100 to 200 Mg) of production. No split samples for agency verification testing are required.

b. Asphalt binder will be accepted based on the asphalt supplier's shipment certification. No binder sampling or testing is required.

c. Material sampling or testing is not required for daily HMA production of less than 100 tons (100 Mg) of any small quantity mixture ~~on any project~~ bid item.

d. Moisture susceptibility testing on plant produced mixture is not required.

5. Certification.

a. Provide a certification for the production of any mixture in which the requirements in this article are applied. Place the test results and the following certification statement on the Daily HMA Plant Report (Form 800241).

> "The HMA mixture contains certified asphalt binder and approved aggregate as specified in the approved mix design and was produced in compliance with the provisions of Article 2303.03, E."

b. The Daily HMA Plant Report for certified HMA may be submitted at the end of the project for all certified HMA quantities, or submitted at intervals for portions of the certified quantity.

2303.04 METHOD OF MEASUREMENT.

A. Hot Mix Asphalt Mixture.

1. General.

a. Removal of fillets is incidental to the contract unit price for the mixture.

b. If the Contractor chooses to place intermediate or surface mixture in lieu of base for the outside shoulders, the quantity will be calculated from the pavement and shoulder template. If placed as a separate operation, the quantity will be calculated from scale tickets. If the substitute mixture placed on the shoulder is for an intermediate course fillet only, include the quantity in the fillet for payment in the quantity placed in the adjacent intermediate course.

c. Payment for the quality control requirements for small quantities will not be measured separately.

d. Unless stated otherwise, equivalent WMA mixtures may be substituted for specified HMA mixtures.

2. Measurement by Weight (Mass).

a. The quantity of the type specified, expressed in tons (megagrams), will be determined from the weight (mass) of individual loads, including fillets, measured to the nearest 0.01 tons (0.01 Mg).

b. Loads may be weighed in trucks, weigh hoppers, or from the weight (mass) from batch plants computed by count of batches in each truck and batch weight (mass). Article 2001.07 applies. Segregate the weights (mass) of various loads into the quantities for each pay item.

3. Measurement by Area.

a. The quantity of the type specified, expressed in square yards (square meters), will be shown in the contract documents to the nearest 0.1 square yard (0.1 m^2). The area of manholes, intakes, or other fixtures will not be deducted from the measured pavement area.

b. When constructing shoulders on a basis of payment of square yards (square meters), inspection of the profile and elevation will be based on the completed work relative to the pavement edge. The Contractor is responsible for the profile and elevation of the subgrade and for thickness.

B. Asphalt Binder.

1. Measure the amount of asphalt binder used from batch plants, continuous plants, or drum mixing plants by stick measurement in the Contractor's storage tank or in-line flow meter reading, according to Article 2001.07, B.

2. Compute the asphalt binder quantity added to the storage tank using a supplier certified transport ticket accompanying each load.

3. The quantity of asphalt binder not used in the work will be deducted.

4. When the quantity of asphalt binder in a batch is measured by weight (mass) and is separately identified by automatic or semi-automatic printout, the Engineer may compute the quantity of asphalt binder used from this printout. By mutual agreement, this method may be modified when small quantities or intermittent operations are involved.

5. The Engineer will calculate and exclude the quantity of asphalt binder used in mixtures in excess of the tolerance specified in Article 2303.03, D, 3, c.

6. When payment for-HMA is based on area, the quantity of asphalt binder used will not be measured separately for payment.

C. Recycled Asphalt Pavement.

1. A completed Daily HMA Plant Report with the certification statement is required for measurement and payment for Contractor Certified HMA. The quantity of asphalt binder will be based on the approved JMF and any plant production quality control adjustments.

2. The quantity of asphalt binder in RAP incorporated into the mixture, will be calculated in tons (megagrams). This quantity shall be based on the actual asphalt binder content determined for the mix design from the results of the Engineer's extraction tests.

3. The quantity of asphalt binder in RAP, which is incorporated into the mix, will be included in the quantity of asphalt binder used.

D. Anti-strip Agent.
Will not be measured separately. The quantity will be based on tons (megagrams) of HMA mixture with anti-strip agent added.

E. Tack Coat.
Will not be measured separately.

F. Fabric Reinforcement.
The quantity, in square yards (square meters) to the nearest 0.1 square yard (0.1 m^2), will be shown in the contract documents.

G. Hot Mix Asphalt Pavement Samples.
Will not be individually counted for payment if furnished according to Article 2303.03, D, 5, or required elsewhere in the contract documents,

H. Recycled Asphalt Shingles.
67% of the asphalt binder from RAS which is incorporated into the mixture will be included in the quantity of asphalt binder used.

2303.05 BASIS OF PAYMENT.

The costs of designing, producing, placing, and testing bituminous mixtures and the cost of furnishing and equipping the QM-A field laboratory will not be paid for separately, but are included in the contract unit price for the HMA mixes used. The application of tack coat and sand cover aggregate are incidental and will not be paid for separately. Pollution testing is at the Contractor's expense. The installation of temporary Stop Sign Rumble Strips will not be paid for separately, but is incidental to the price bid for the HMA course for which it is applied.

The quality control requirements for small quantities are incidental to the items of HMA mixtures in the contract.

A. Asphalt Concrete Mixture.

1. Payment will be the contract unit price for Hot Mix Asphalt Mixture of the type specified per ton (megagram) or square yard (square meter). Unless stated otherwise, equivalent WMA mixtures may be substituted for specified HMA mixtures with no change in the contract unit price.

2. Payment for test strips will be the contract unit price for the test strip mixture bid item per ton (megagram) regardless of lift placement.

3. Payment will be adjusted by the following Pay Factor for field voids and laboratory voids determined for the lot.

Multiply the unit price for the HMA bid item by the Pay Factor rounded to 3 decimal places.

a. Laboratory Voids

1) Payment when PWL is used for acceptance:

PWL	Pay Factor
95.1 – 100.0	PF = 0.006000*PWL + 0.430
80.0 – 95.0	1.000
50.0 – 79.9	PF = 0.008333*PWL + 0.3333
Less than 50.0	0.750

When PWL is less than 50.0, the Engineer may declare the lot or parts of the lot deficient or unacceptable.

2) Payment when AAD is used for acceptance:

AAD from Target Air Void	Pay Factor
0.0 to 1.0	1.000
1.1 to 1.5	0.900
1.6 to 2.0	0.750
Over 2.0	0.500 maximum

When the AAD is more than 2.0, the Engineer may declare the lot or parts of the lot deficient or unacceptable.

3) Use the following payment schedule when a test strip is constructed:

AAD from Target Air Void	Pay Factor
0.0 to 1.5	1.000
1.6 to 2.0	PF = 2.5 - AAD
Over 2.0	0.500 maximum

When the AAD is more than 2.0, the Engineer may declare the lot or parts of the lot deficient or unacceptable.

b. Field Voids

1) Payment when PWL is used for acceptance:

PWL	Pay Factor
95.1 – 100.0	PF = 0.008000*PWL + 0.240
80.0 – 95.0	1.000
50.0 – 79.9	PF = 0.008333*PWL + 0.3333
Less than 50.0	0.750

When PWL is less than 50.0, the Engineer may declare the lot or parts of the lot deficient or unacceptable.

2) Payment when a test strip is constructed:

Average Field Voids (Pa), %	Pay Factor
0.0 to 9.0	1.000
9.1 to 9.5	PF = 10 - Pa
Over 9.5	0.500 maximum

When the average air void content from a test strip exceeds 9.5%, the Engineer may declare the lot or parts of the lot deficient or unacceptable.

3) Payment when PWL is not used for acceptance:

Average Field Voids (Pa), %	Pay Factor
0.0 to 8.0	1.000
8.1 to 9.5	PF=(11-Pa)/3
Over 9.5	0.500 maximum

When the average air void content exceeds 9.5%, the Engineer may declare the lot or parts of the lot deficient or unacceptable.

4. When the basis of payment is by area, payment will be further adjusted by the appropriate percentage in Table 2303.05-2 below according to the quality index for thickness determined for that lot:

Table 2303.05-2: Payment Adjustment (by Area) for Thickness

Quality Index (Thickness) 8 Samples	Percent of Payment (Previously Adjusted for Field Voids)
Greater than 0.34	100
0.14 to 0.34	95
0.00 to 0.13	85
Less than 0.00	75 maximum

5. Payment for courses for which quality index (thickness) is not determined because of size or shape, and courses which are found to be deficient in average width, will be according to Article 1105.04.

~~**6.** When moisture susceptibility testing in accordance with Materials I.M. 507 is performed on plant produced mixture, the payment for asphalt mixture will be adjusted according to Table 2303.05-3:~~

~~**Table 2303.05-3: Asphalt Mixture Payment Adjustment for Moisture Susceptibility**~~

~~Contracting Authority's Results (Percent TSR)~~	~~Pay Factor~~
~~TSR ≥ 80~~	~~1.00~~
~~70 < TSR < 80~~	~~PF = 0.025*TSR - 1~~
~~TSR ≤ 70~~	~~0.75 maximum~~

B. Asphalt Binder.

1. Payment will be the contract unit price per ton (megagram) for the number of tons (megagrams) of asphalt binder used in the work.

2. Payment for asphalt binder will be for new asphalt binder the asphalt binder in the RAP which is incorporated in the mixture, and 67% of the asphalt binder from RAS which is incorporated into the mixture. The quantity of asphalt binder in RAM, which is incorporated into the mix, will be calculated in tons (megagrams) of asphalt binder in the RAM. This will be based on the actual asphalt binder content determined for the mix design from the results of the Engineer's extraction test.

3. When the basis of payment for HMA is in square yards (square meters), compensation for asphalt binder will be included in the contract unit price per square yard (square meter).

C. Recycled Asphalt Pavement.
RAP owned by the Contracting Authority will be made available to the Contractor for the recycled mixture at no cost to the Contractor other than loading, hauling, and processing as required for incorporation into the mix.

D. Anti-strip Agent.

1. When anti-strip agent is required, the incorporation of the anti-strip agent into the asphalt mixture will be considered as extra work ordered by the Engineer if the Contracting Authority's ~~TSR~~ test results from the field produced mixture meet or exceed the minimum requirement ~~and the conditioned indirect tensile strength is improved by at least 10% over that from the plant mixture without anti-strip (or original JMF conditioned strength when plant mix without anti-strip is not available)~~ established in Article 2303.02, E, 2, d. Payment will be made at the rate of $2.00 per ton (megagram) of asphalt mixture in which the anti-strip agent is incorporated. ~~WMA mixtures designed for 10,000,000 ESALS and higher must satisfy Articles 2303.02, E, 2, a, 1 or 2 to be eligible for anti-strip payment. For mix designs (small quantities excluded) with a TSR greater than or equal to 80%, payment will stop when the Contracting Authority's TSR results of the field produced mixture without the agent are greater than or equal to 80% and any remaining asphalt binder containing the agent in the current tank is consumed.~~

2. Payment will be full compensation for designing, adding, and testing for anti-strip agent.

E. Tack Coat.
Incidental to HMA.

F. Fabric Reinforcement.

1. Payment will be the contract unit price for Fabric Reinforcement per square yard (square meter).

2. Payment is full compensation for furnishing all materials, labor, and equipment necessary for installing the fabric as required, including the adhesive or heavy tack coat of asphalt binder used as the adhesive.

G. Hot Mix Asphalt Pavement Samples.

1. Payment will be the lump sum contract price for cutting HMA Pavement Samples to determine field voids or thickness according to the specifications, when either of these is the responsibility of the Contractor, and elsewhere when required by the contract documents.

2. Payment is full compensation for furnishing all such samples for all courses or items of work, and for delivery of samples as specified in Article 2303.03, D, 5.

APPENDIX A - MOISTURE SENSITIVITY TESTING OF ASPHALT MIXTURES

SCOPE

This test method identifies the Iowa DOT modifications to AASHTO T 324, Hamburg Wheel-Track Testing of Compacted Hot-Mix Asphalt (HMA). Moisture susceptibility of asphalt paving mixtures is based on the stripping inflection point (SIP) calculated from test measurements.

REFERENCES

AASHTO R 30, Standard Practice for Mixture Conditioning of Hot-Mix Asphalt (HMA)
Materials I.M. 322, Sampling Uncompacted Hot Mix Asphalt
Materials I.M. 350, Determining Maximum Specific Gravity of Hot Mix Asphalt (HMA) Mixtures
Materials I.M. 325G, Method of Test for Determining the Density of Hot Mix Asphalt (HMA) Using the Superpave Gyratory Compactor (SGC).
AASHTO T 324, Hamburg Wheel-Track Testing of Compacted Hot-Mix Asphalt (HMA)

APPARATUS

See AASHTO T 324, Hamburg Wheel-Track Testing of Compacted Hot-Mix Asphalt (HMA)

SPECIMEN PREPARATION

For plant produced material, collect a 70 pound (32 kg) sample according to Materials I.M. 322. Prepare two gyratory test specimens according to Materials I.M. 325G for each test wheel conforming to the mold geometrics. Compact specimens to 7% (± 1%) air voids (93% of G_{mm} per Materials I.M. 350). For Mix Design, age the specimens according to AASHTO R 30 prior to compaction.

PROCEDURE

1. Place molds containing the specimens into the mounting trays, compacted side up.
2. The test temperature shall be 50°C. Condition specimens for 30 minutes after achieving test temperature. At no time should specimens be submerged longer than 35 minutes prior to test initiation.
3. Lower wheel onto specimens
4. Set the wheel-tracker to shut off after 20,000 passes or when the maximum LVDT displacement is 20 mm.
5. Perform the HWT test as per equipment manufacturer's instructions.

STRIPPING INFLECTION POINT

Use the most current version of the Iowa DOT Hamburg Software to determine the SIP. For each sensor, the deformation curve is characterized by a 6th degree polynomial determined through least-squares multiple regression. If the curve has an R^2 greater than or equal to 98.0%, the creep and stripping slopes are calculated. If not, the sensor is considered invalid and is not used in the analysis.

The SIP, creep slope, and stripping slope are calculated for each valid sensor for each wheel. The final SIP and slopes are the average of both wheels provided both sides of the device contain the same mix. If the ratio between the average stripping slope and the average creep slope is less than 2.0, the SIP is invalid and the mix is considered passing.

Details: The creep slope represents the rate of rutting in the linear region of the deformation curve prior to the onset of tertiary flow. The stripping slope is the rate of rutting in the linear region of the post tertiary deformation curve to the end of the test. The stripping inflection point (SIP) is the point of intersection of these two slopes.

Stripping Slope: The stripping slope is calculated prior to the creep slope. First, the maximum rutting slope (absolute value) near the end of the test is found. This is accomplished by using Solver to find the pass number nearest the end of the test (strip pass) at which the first derivative of the deformation curve is smallest (rutting is a negative value). The slope of the curve is then evaluated at this pass number to give the stripping slope. The stripping slope intercept is then found using point slope form. Note: the first derivative is synonymous with slope.

Creep Slope: To calculate the creep slope, the pass at which the absolute value of the rutting slope is the smallest prior to the strip pass is first found. This is accomplished first using Solver to find the pass (creep pass) at which the second derivative is zero (prior to the strip pass). The first derivative of the deformation curve is then evaluated at the creep pass, resulting in the creep slope.

SIP: The intersection of the creep slope and the stripping slope is found mathematically setting the equations for both lines equal and solving for the pass number.

I.M. 508

Hot Mix Asphalt (HMA) Plant Inspection

Plant Inspector Duties

* **The general areas of procedures requiring attention:**
  * Construction of the Stockpiles – S.S. 2303.03 C. 3
  * Plant & Mix Control – S.S. 2001.07 & 2303
  * Sampling & Testing – S.S. 2303.03 & 2303.04
  * Documentation – IM 508, 509, 510, 511 and T-203

JOB MIX FORMULA (JMF) Form 956

October 16, 2012
Supersedes October 18, 2004

Matls. IM 508

Form 956 ver. 6.0r

Iowa Department of Transportation
Highway Division - Office of Materials
HMA Gyratory Mix Design

County : Monona
Mix Size (in.) : 3/4 Type A
Mix Type: HMA 30M L - 2
Intended Use : Surface

Project : IM-29-5(89)106--13-67
Contractor : Quality Construction
Design Life ESAL's : 15,000,000
Project Location : Southbound from MP 105.61 to 112.71

Mix No. : ABD4-001
Contract No. : 12345
Date Reported : 03/12/04

A

Aggregate	% in Mix	Source ID	Source Location	Beds	Gsb	%Abs	FAA
3/4 Cr. Lmst.	25.0%	A19512	Quality Aggregate	10-12	2.643	1.75	47.3
3/4 Clean Lmst.	15.0%	A19513	Quality Aggregate	14-21	2.624	1.21	45.0
3/8 Qtz. Chip	20.0%	A19515	Quality Aggregate	2-3	2.628	0.34	48.0
Man. Sand	25.0%	A19517	Quality Aggregate	5-12	2.662	2.09	49.3
Natural Sand	15.0%	A19518	Quality Aggregate		2.636	0.60	41.2

B

Job Mix Formula - Combined Gradation (Sieve Size in.)

	1"	3/4"	1/2"	3/8"	#4	#8	#16	#30	#50	#100	#200
Upper Tolerance	100	100	93	87	65	42		21			6.1
	100	100	86	80	58	37	26	17	9.0	5.4	4.1
Lower Tolerance	100	93	79	73	51	32		13			2.1

C

Asphalt Binder Source and Grade: Quality Binder PG 64-28

Gyratory Data

% Asphalt Binder	3.85	4.35	4.85	4.87	5.35	Number of Gyrations
Corrected Gmb @ N-Des.	2.347	2.370	2.389	2.390	2.415	N-Initial
Max. Sp.Gr. (Gmm)	2.532	2.509	2.490	2.490	2.476	8
% Gmm @ N- Initial	84.8	86.3	87.4	87.5	88.5	N-Design
%Gmm @ N-Max	93.7	95.5	97.1	97.2	98.8	109
% Air Voids	7.3	5.5	4.1	4.0	2.5	N-Max
% VMA	14.6	14.2	13.9	13.9	13.5	174
% VFA	49.8	60.9	70.9	71.2	81.7	Gsb for Angularity
Film Thickness	7.27	8.56	9.70	9.74	10.69	Method A
Filler Bit. Ratio	1.26	1.07	0.95	0.94	0.86	2.647
Gsb	2.641	2.641	2.641	2.641	2.641	Pba / %Abs Ratio
Gse	2.687	2.682	2.682	2.685	2.687	0.49
Pbe	3.20	3.78	4.28	4.29	4.71	Slope of Compaction
Pba	0.67	0.60	0.60	0.64	0.67	Curve
% New Asphalt Binder	100.0	100.0	100.0	100.0	100.0	13.8
Asphalt Binder Sp.Gr. @ 25c	1.036	1.036	1.036	1.036	1.036	Mix Gmm Check
% Water Abs	1.30	1.30	1.30	1.30	1.30	Excellent
S.A. m^2 / Kg.	4.41	4.41	4.41	4.41	4.41	Pb Range Check
% + 4 Type 4 Agg. Or Better	100.0	100.0	100.0	100.0	100.0	1.50
% + 4 Type 2 or 3 Agg.	25.4	25.4	25.4	25.4	25.4	Specification Check
Angularity-method A	45	45	45	45	45	Comply
% Flat & Elongated	0.0	0.0	0.0	0.0	0.0	TSR Check
Sand Equivalent	82	82	82	82	82	82.0

D

Disposition : An asphalt content of 4.9% is recommended to start this project.
Data shown in 4.87% column is interpolated from test data.

Comments :

Copies to : Quality Construction Cent. Lab RCE Dist 3

Mix Designer & Cert.# : Jon Rayson 12345 Signed :

4

HMA Mix Design

HMA MIX DESIGN

Refer to:

A JMF aggregate proportions, sources

B JMF target and design gradation with tolerances.

C Source and grade of the asphalt binder used in the job mix formula.

D The target asphalt binder content recommended to start mixture production. Expressed as a percent of asphalt binder, based on the total mass of the mixture. Established during the mixture design process.

Agreement Between the Contractor and the Producer Form 955

October 19, 2004
Supersedes October 26, 1999

Matls. IM 508

Form 955 ver. 6.0r

Iowa Department of Transportation
Highway Division-Office of Materials
Proportion & Production Limits For Aggregates

County : Monona
Project No.: IM-29-5(89)106--13-67
Date: 03/12/04
Project Location: Southbound from MP 105.61 to 112.71
Mix Design No.: ABD4-001
Contract Mix Tonnage: 500,000
Course: Surface
Mix Size (in.): 3/4
Contractor: Quality Construction
Mix Type: HMA 30M
Design Life ESAL's: 15,000,000

Material	Ident #	% in Mix	Producer & Location	Type (A or B)	Friction Type	Beds	Gsb	%Abs
3/4 Cr. Lmst.	A19512	25.0%	Quality Aggregate	A	4	10-12	2.643	1.75
3/4 Clean Lmst.	A19513	15.0%	Quality Aggregate	A	4	14-21	2.624	1.21
3/8 Qtz. Chip	A19515	20.0%	Quality Aggregate	A	2	2-3	2.628	0.34
Man. Sand	A19517	25.0%	Quality Aggregate	A	4	5-12	2.662	2.09
Natural Sand	A19518	15.0%	Quality Aggregate	A	4		2.636	0.60

Type and Source of Asphalt Binder: PG 64-28 Quality Binder

Individual Aggregates Sieve Analysis - % Passing (Target)

Material	1"	3/4"	1/2"	3/8"	#4	#8	#16	#30	#50	#100	#200
3/4 Cr. Lmst.	100	100	89	75	41	26	20	17	14	12	9.9
3/4 Clean Lmst.	100	100	25	5.2	2.6	2.4	2.3	2.2	2.1	2.0	1.7
3/8 Qtz. Chip	100	100	100	100	47	5.7	2.5	1.7	1.1	0.7	0.4
Man. Sand	100	100	100	100	95	63	37	21	11	6.8	4.6
Natural Sand	100	100	100	100	96	85	71	48	15	1.6	0.6

Preliminary Job Mix Formula Target Gradation

Upper Tolerance	100	100	93	87	65	42		21			6
Comb Grading	100	100	86	80	58	37	26	17	9.0	5.4	4.1
Lower Tolerance	100	93	79	73	51	32		13			2
S.A. sq. m/kg	Total	4.41		+0.41	0.24	0.30	0.42	0.50	0.55	0.66	1.33

Production Limits for Aggregates Approved by the Contractor & Producer.

Sieve Size in.	25.0% of mix 3/4 Cr. Lmst.		15.0% of mix 3/4 Clean Lmst.		20.0% of mix 3/8 Qtz. Chip		25.0% of mix Man. Sand		15.0% of mix Natural Sand		
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	
1"	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
3/4"	98.0	100.0	98.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
1/2"	82.0	96.0	18.0	32.0	100.0	100.0	100.0	100.0	100.0	100.0	
3/8"	68.0	82.0	0.0	12.2	98.0	100.0	98.0	100.0	98.0	100.0	
#4	34.0	48.0	0.0	9.6	40.0	54.0	88.0	100.0	89.0	100.0	
#8	21.0	31.0	0.0	7.4	0.7	10.7	58.0	68.0	80.0	90.0	
#30	13.0	21.0	0.0	6.2	0.0	5.7	17.0	25.0	44.0	52.0	
#200	7.9	11.9	0.0	3.7	0.0	2.4	2.6	6.6	0.0	2.6	

Comments:

Copies to: Quality Construction Cent. Lab RCE Dist 3

The above target gradations and production limits have been discussed with and agreed to by an authorized representative of the aggregate producer.

Signed: ______________________ Producer

Signed: ______________________ Contractor

3-53

Calibration (Drum Mix Plant)

CALIBRATION OF PLANT EQUIPMENT (DRUM MIX PLANT)

County: Tama
Project: ER30-6(44)--26-86
Date: 8-4-88
P.oj. Eng.: Tom Reis

Contractor: Cessford Construction Plant Location: Montour Quarry
Plant Type and Name: Cedar Rapids Drum Mix Pollution Control: Baghouse
Mix Type: A Surface Class: ______ Mix Size: 3/4"
Asphalt Type and Grade: AC-10 Temperature °F: ______ A.C. #/Gal.: 8.55

WEIGHT BELT			
Span	2541	2578	2578
Fine Zero	5524	5524	5524
Total weight aggregate lbs.	17,640	17,460	17,500
Truck total weight aggregate lbs.	17,900	17,440	17,490
Difference	-260	+20	+10
% Error	1.45	0.10	0.06

A.C. PUMP		
Meter Er. Gals.	299	300
Corrected Gals.		
Metered lbs.	2556	2565
Truck lbs.	2560	2568
Difference	-4	-3
% Error	0.16	0.12

WEIGHT SILO		
Total weight lbs.	28160	28500
Truck lbs.	28180	28510
Difference	-20	-10
% Error	0.07	0.04

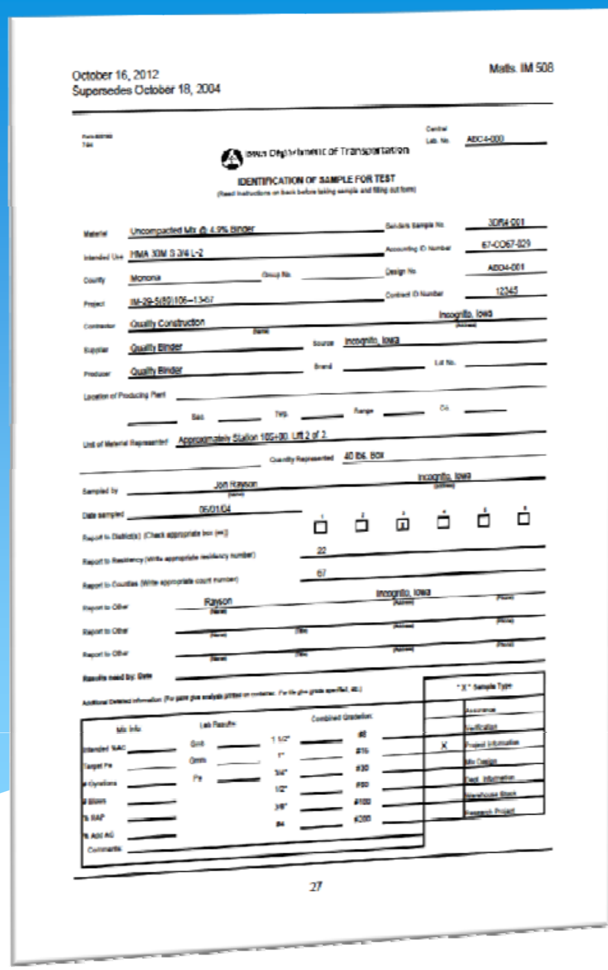
Date scale was certified: 8-4-88
Sensitivity check on weights is was o.k.

The above data is furnished as set forth in the Standard Specifications for plant operations, for informational purposes only. The Contracting Authority makes no representations as to accuracy, either expressed or implied, which are to be construed to relieve the Contractor from the responsibility to comply with the specifications.

Calibrated by: Ted Huisman Witnessed by: Mark Trueblood
Contractor: Cessford Construction Title: Asphalt Tech-District Materials

Distribution:
White Copy - Plant Inspector
Canary Copy - Contractor
Pink Copy - District Materials Engineer
Goldenrod Copy - Project Engineer

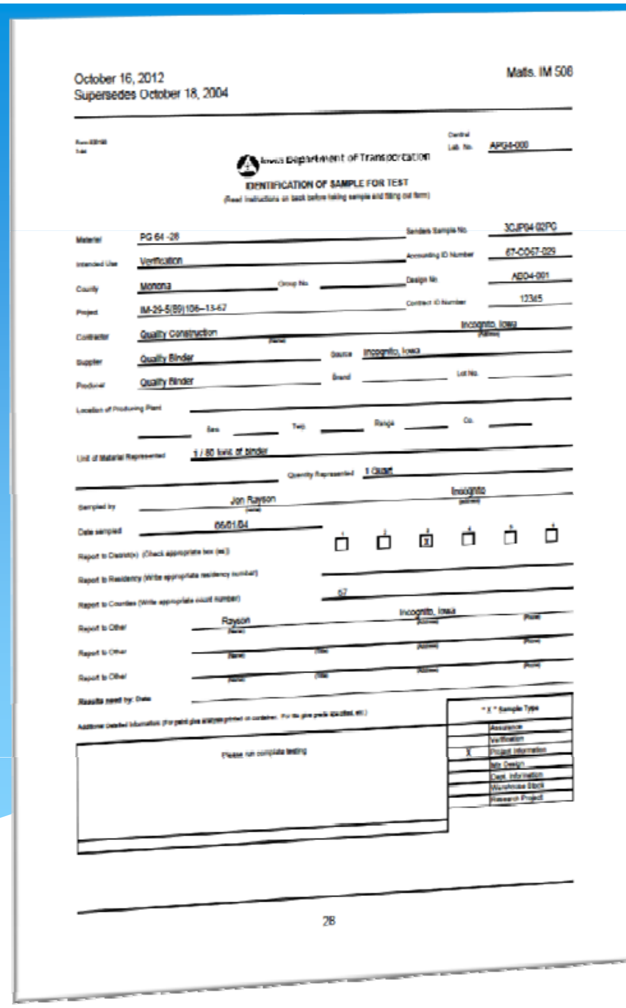
3-63


October 16, 2012
Supersedes October 18, 2004
Matls. IM 508
Iowa Department of Transportation
IDENTIFICATION OF SAMPLE FOR TEST
27

Identification of Sample for Test

Form 820193

All uncompacted mix samples that are directed and witnessed by the Contracting Authority will be documented on this form. The completed form shall accompany the split sample, which is sent to the District Materials Laboratory for testing. Be thorough when completing your 193's.


October 16, 2012
Supersedes October 18, 2004

Matls. IM 508

IDENTIFICATION OF SAMPLE FOR TEST

PG 64 -28

Verification

Monona

Quality Construction

Quality Binder

Quality Binder

Jon Rayson

Incognito, Iowa

Please run complete testing

28

Identification of Sample for Test

Form 820193

The Binder and Tack samples shall be witnessed and secured, along with the proper identification for the District Materials Laboratory.

Binder and Tack samples are not split samples.

Make sure to identify the Grade of Binder and type of Tack.

OVERVIEW IM 511
& CHANGES

I.M. 511
Control of Asphalt Mixtures

- This I.M. describes Quality Control/Quality Assurance (QC/QA) procedures for monitoring and controlling plant-produced mixtures on Quality Management of Asphalt (QMA) projects.

Sampling & Testing

- Only the information obtained from random samples as directed and witnessed by the Engineer and validated by comparison to one or more of the paired samples tested by the Contracting Authority will be used for specification.

Validation

- Validation is defined as the ability of two labs to achieve similar (statistically equivalent) test values on split or paired samples.

I.M. 216 – Comparison Report & Tolerances

Gradation (Ignition Oven vs. Cold Feed)

Uncompacted Hot Mix: Gmb & Gmm

I.M. 216 – Comparison Report & Tolerances

Gradation (Ignition Oven vs. Cold Feed)

Rev 05/08 | **Iowa Department Of Transportation** | Form 201 Modified

Cold-Feed & Ignition Oven Gradation & I.M. 216 Comparison Report

Project No.: ESFM-CO18(54)--5S-18

Contract ID: 18-CO18-054 | Intended Use: 1M Surface 1/2"

County: Cherokee

Contractor/Producer: Asphalt Paving, Inc.

			Good	Fair	Poor
Mix Design No.:	ABD9-3022				
Mix Change (Y/N):	N	Care of Equipment:	x		
Date of Change:		Sampling Procedure:	x		
Total, % Asphalt (Pb):	5.69	Splitting Procedure:	x		
Effective % Asphalt (Pbe):	5.28	Sieving to Completion:	x		
Proper Equipment:	Yes	Computations:	x		
Applicable Specs.:	Yes	Reporting:	x		

Ignition Oven Tested By: I.D.O.T. Amee Lee | Cert. No.: NW 104 | Date: 1/7/11

Cold-Feed Tested By: Contractor Joe Green | Cert. No.: NW 000 | Date: 1/7/11

			Sieve Sizes - Percent Passing											
			1 1/2"	1"	3/4"	1/2"	3/8"	#4	#8	#16	#30	#50	#100	#200
		Limits	100	100	100	100	97	80	60			29		6.9
						88	83	66	50			21		2.9
Sample ID	IG062409C	Ign. Oven	100.0	100.0	100.0	95.0	92.0	73.0	51.0	38.0	23.0	11.0	5.4	3.3
	Compliance (C or N)		**C**	**C**	**C**	**C**	**C**	**C**	**C**			**C**		**C**
Sample ID	CF062409A	Cold-Feed	100.0	100.0	100.0	96.0	91.0	72.0	52.0	39.0	25.0	13.0	6.5	4.3
	Compliance (C or N)		**C**	**C**	**C**	**C**	**C**	**C**	**C**			**C**		**C**
	Correction Factor		0.0	0.0	-1.0	1.0	-1.0	-1.0	1.0	1.0	2.0	2.0	1.1	1.0
	Validation		**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**

Sieves	Ign. Oven % Retained	Cold-Feed % Retained	Diff.	Tol. %	Comply (Y/N)
1 1/2 - 1	0.0	0.0	0.0	5	Y
1 - 3/4	1.0	0.0	0.0	5	Y
3/4 - 1/2	3.0	4.0	1.0	5	Y
1/2 - 3/8	5.0	5.0	0.0	5	Y
3/8 - 4	19.0	19.0	0.0	5	Y
4 - 8	20.0	20.0	0.0	5	Y
8 - 16	13.0	13.0	0.0	5	Y
16 - 30	14.0	14.0	0.0	5	Y
30 - 50	12.0	12.0	0.0	5	Y
50 - 100	6.5	6.5	0.0	3	Y
100 - 200	2.2	2.2	0.0	2	Y
200	4.3	4.3	0.0	3	Y

Corrected Ign. Oven SA:	5.5	Film Thickness:	9.6
Cold-Feed Surface Area:	5.5	Film Thickness:	9.6
Correction Factor:	0.66		

Sieve Fraction Between Consecutive Sieves, %			Tolerance, %
0.0	To	3.0	2
3.1	To	10.0	3
10.1	To	20.0	5
20.1	To	30.0	6
30.1	To	40.0	7
40.1	To	50.0	9
+#4 sieves minimum tolerance =			5

Remarks: ____________________

Distribution________ Central Materials________ Dist Materials________ Contr./Producer________ Proj. Engineer________ Technician________

I.M. 216 Tolerances

October 19, 2010
Supersedes October 20, 2009

Matls. IM 216

TEST NAME	TEST METHOD	TOLERANCE
Wet Density by Nuclear Gauge, Soils & Bases	IM 334	2.0 lb./ft³ (32 kg/m³)
G_{mm} Maximum Specific Gravity	IM 350	0.010
G_{mb} Density of HMA Concrete, by Displacement	IM 321	0.020
G*/Sin Delta	T315	10% of mean
% Binder, Ignition Oven	IM 338	0.3%
G_{sa} Apparent Specific Gravity	IM 380	0.010
G_{sb} Bulk Specific Gravity	IM 380	0.028
Percent Absorption	IM 380	0.37%
Fine Aggregate Angularity	T304	2.0%
Sand Equivalency	T176	10 % of mean

Dispute Resolution:

when validation is not achieved or maintained

- Investigate the discrepancy
  - Retesting
  - Review sampling & testing procedures
  - Extra samples taken: third laboratory involved

The District Materials Engineer will establish a Correction factor.

Reporting

- For each production sample of loose asphalt mixture the Contractor reports & plots (per QMA Specification):
- Gmb (Bulk Density)
- Gmm(Maximum Density)
- Pa (Air Voids)
- Binder Content
- Gradation

Daily HMA Plant Report Form #800241

- Summarizes all test data results & Q.I.

- This report shall be provided to the DME and the Project Engineer within 4 hours of beginning operations on the next working day. Electronic email as the method is preferred unless other arrangements are necessary.

At the completion of the project a CD with all copies of the daily reports and plant book shall be given to the DME & Project Engineer.

The Table of Responsibilities I.M. 511 Appendix A

- Two main categories:
  - Quality Action
  - Type of Project (two sub-categories)
    - Certified Plant Inspection (CPI)
    - Quality Management Asphalt (QMA)

  Quality Action is sub-divided into types of work:

Quality Action:

Sub-divided into types of work:

- General
- Asphalt Binder
- Aggregate
- Loose Hot Mix
- Compacted Hot Mix
- Revisions

The table represents how the work should progress during a Hot Mix Asphalt paving

Quality Action identifies the group responsible for the work performed

October 17, 2006
Supersedes October 2, 2001

Matls. IM 511
Appendix A

*****GENERAL REWRITE – PLEASE READ CAREFULLY.*****

TABLE OF RESPONSIBILITY

QUALITY ACTION	CPI & QMA	SMALL QTY.
General		
Use of Qualified Labs & Certified Technicians	CONTR/RCE	CONTR
Use of Certified Labs & Qualified Technicians	DME/CTRL	DME/CTRL
Preparation of the Job Mix Formula (JMF)	CONTR[2]	CONTR[2]
Approval of the JMF	DME	DME
Calibration of the Plant	CONTR	CONTR
Monitoring of Plant Operations	DME/RCE[1]	DME/RCE[1]
Inspection of Plant Operations	CONTR[1]	CONTR[1]
Asphalt Binder		
Direct & Witness Verification Sample of Asphalt Binder	RCE/DME[3]	NA
Sample Asphalt Binder	CONTR[3]	NA
Secure Verification Sample of Asphalt Binder	RCE/DME	NA
Transport Verification Sample of Asphalt Binder	CONTR/RCE	NA
Run & Report Verification Sample of Asphalt Binder	DME/CTRL	NA
Aggregate		
Direct & Witness Verification Sample of Combined Aggregate	RCE[4]	NA
Sample Combined Aggregate	CONTR[4]	CONTR[4]
Direct & Witness Splitting of Combined Aggregate Sample	RCE[5]	NA
Secure Verification Sample of Combined Aggregate	RCE	NA
Transport Verification Sample of Combined Aggregate	CONTR/RCE	NA
Run & Report QC Tests on Combined Aggregate Gradation	CONTR[5]	CONTR[5]
Run & Report Verification Tests on Combined Aggregate Gradation	DME/RCE[5]	NA
Report Validation per IM 216 on Combined Aggregate Gradation	DME/RCE	NA
Obtain & Transport Verification Samples of Coarse Aggregate Quality	DME[4]	NA
Run & Report Verification Tests on Coarse Aggregate Quality	CTRL	NA
Loose Hot Mix		
Determine Loose Hot Mix Paired Sample Frequency/Location	RCE[3]	CONTR
Direct & Witness Verification Sample of Loose Hot Mix	RCE[3]	NA
Sample Loose Hot Mix Paired Samples	CONTR[3]	CONTR[3]
Secure Verification Sample of Loose Hot Mix	RCE	NA
Transport Verification Sample of Loose Hot Mix	CONTR/RCE	NA
Run & Report QC Tests on Loose Hot Mix Samples	CONTR[1]	CONTR[1]
Run & Report Verification Tests on Loose Hot Mix Samples	DME[1]	NA
Report Validation of Hot Mix Tests	CONTR[1]	NA
Evaluate Test Results/Take Action when Validation Fails	DME	NA
Compacted Hot Mix		
Determine Density Coring Frequency/Location	RCE[3]	RCE[3]
Direct & Witness Coring & Transport to QC Lab	RCE[3]	RCE[3]
Obtain Core Samples & Prepare Samples at the QC Lab	CONTR	CONTR
Run Density Testing on Cores	RCE[3]	RCE[3]
Record Density Testing Measurements on Cores	RCE[3]	RCE[3]
Report Density Testing Results on Cores	CONTR[1]	CONTR[1]
Revisions		
Adjust Production to Maintain JMF Targets	CONTR	CONTR
Report Plant Adjustments	CONTR[1]	CONTR[1]
Approve Revisions to JMF Targets	DME	DME
Shut Down Production when Required	CONTR	CONTR

NOTES:
(1) Must be done by Certified Level I HMA Technician
(2) Must be done by Certified Level II HMA Technician
(3) Must be done by Certified HMA Sampler
(4) Must be done by Certified Level I Aggr. Technician
(5) Must be done by Certified Level II Aggr. Technician

ABBREVIATIONS:
CPI = Certified Plant Inspection
QMA = Quality Mgmt. of Asphalt
RCE = Project Engineer
CONTR = Contractor
DME = District Materials
CTRL = Central Materials

Contractor's Quality Control and Testing Plan for HMA Production

This form will be completed by the Contractor at the time of the Preconstruction Conference and approved by the District Materials Engineer.

I.M. 511 Appendix D

October 21, 2008
New Issue

Matls. IM 511
Appendix D

****THIS IS A NEW APPENDIX. – PLEASE READ CAREFULLY.****

Contractor's Quality Control and Testing Plan for HMA Production

Project Number: ____________

Contractor: ____________

Anticipated Daily Production Surface (Tons): ____________

Anticipated Daily Production Intermediate (Tons): ____________

Anticipated Daily Production Base (Tons): ____________

Uncompacted Mix Sampling Frequency: Standard [ ] Modified [ ]

Proposed Modified Sampling Frequency: ____________

Uncompacted Mix Sampling Timing: Standard [ ] Modified [ ]

Proposed Modified Sampling Timing: ____________

Gradation Control By: Cold-Feed [ ] Ignition Oven [ ]

Cold-Feed Sampling Frequency: 1/day [ ] 2/day [ ]

Ignition Oven Testing Frequency: ____________

Surface Test Strip Size (Tons): ____________ (Maximum 1/2 Days Production) (Required on Primary and Interstate)

Intermediate Test Strip Size (Tons): ____________ (Maximum 1/2 Days Production) (Required on Interstate)

Base Test Strip Size (Tons): ____________ (Maximum 1/2 Days Production) (Optional)

Other Proposed Sampling and Testing Modifications: ____________

Contractor's Contact for QC/QA Decisions: ____________ Cell No.: ____________

QC Laboratory Identification Number: ____________ QC Laboratory Qualification Date: ____________

HMA Level 1 Certified Technician: ____________ Cert. No.: ____________

HMA Level 1 Certified Technician: ____________ Cert. No.: ____________

HMA Sampler Certified Technician: ____________ Cert. No.: ____________

Comments: ____________

Submitted by:
Contractor: ____________

Approved by:
DME: ____________

April 16, 2013
Supersedes October 16, 2012

****THIS IS A NEW IM. – PLEASE READ CAREFULLY.****

MOISTURE SENSITIVITY TESTING OF ASPHALT MIXTURES

SCOPE

This test method identifies the Iowa DOT modifications to AASHTO T324, Hamburg Wheel-Track Testing of Compacted Hot-Mix Asphalt (HMA). Moisture susceptibility of asphalt paving mixtures is based on the stripping inflection point (SIP) calculated from test measurements.

REFERENCED DOCUMENTS:

AASHTO R 30, Standard Practice for Mixture Conditioning of Hot-Mix Asphalt (HMA)
IM 322, Sampling Uncompacted Hot Mix Asphalt
IM 350, Determining Maximum Specific Gravity of Hot Mix Asphalt (HMA) Mixtures
IM 325G, Method of Test for Determining the Density of Hot Mix Asphalt (HMA) Using the Superpave Gyratory Compactor (SGC).
AASHTO T 324, Hamburg Wheel-Track Testing of Compacted Hot-Mix Asphalt (HMA)

APPARATUS

See AASHTO T 324, Hamburg Wheel-Track Testing of Compacted Hot-Mix Asphalt (HMA)

SPECIMEN PREPARATION

For plant produced material, collect a 70 lb sample per IM 322. Prepare two gyratory test specimens per IM 325G for each test wheel conforming to the mold geometrics. Compact specimens to 7% (± 1%) air voids (93% of G_{mm} per IM 350). For testing in the Mix Design phase, age the specimens 2 hours at the proposed field compaction temperature.

PROCEDURE

1. Place molds containing the specimens into the mounting trays, compacted side up.

2. The test temperature shall be 50°C. Condition specimens for 30 minutes after achieving test temperature. At no time should specimens be submerged longer than 35 minutes prior to test initiation.

3. Lower wheel onto specimens

4. Set the wheel-tracker to shut off after 20,000 passes or when the maximum LVDT displacement is 20 mm.

5. Perform the HWT test as per equipment manufacturer's instructions.

STRIPPING INFLECTION POINT

Use the most current version of the Iowa DOT Hamburg Software to determine the SIP. For each sensor, the deformation curve is characterized by a 6^{th} degree polynomial determined through least-squares multiple regression. If the curve has an R^2 greater than or equal to 98.0%, the creep and stripping slopes are calculated. If not, the sensor is considered invalid and is not used in the analysis.

The SIP, creep slope, and stripping slope are calculated for each valid sensor for each wheel. The final SIP and slopes are the average of both wheels provided both sides of the device contain the same mix. If the ratio between the average stripping slope and the average creep slope is less than 2.0, the SIP is invalid and the mix is considered passing.

Details:
The creep slope represents the rate of rutting in the linear region of the deformation curve prior to the onset of tertiary flow. The stripping slope is the rate of rutting in the linear region of the post tertiary deformation curve to the end of the test. The stripping inflection point (SIP) is the point of intersection of these two slopes.

Stripping Slope:
The stripping slope is calculated prior to the creep slope. First, the maximum rutting slope (absolute value) near the end of the test is found. This is accomplished by using Solver to find the pass number nearest the end of the test (strip pass) at which the first derivative of the deformation curve is smallest (rutting is a negative value). The slope of the curve is then evaluated at this pass number to give the stripping slope. The stripping slope intercept is then found using point slope form. Note: the first derivative is synonymous with slope.

Creep Slope:
To calculate the creep slope, the pass at which the absolute value of the rutting slope is the smallest prior to the strip pass is first found. This is accomplished first using Solver to find the pass (creep pass) at which the second derivative is zero (prior to the strip pass). The first derivative of the deformation curve is then evaluated at the creep pass, resulting in the creep slope.

SIP:
The intersection of the creep slope and the stripping slope is found mathematically setting the equations for both lines equal and solving for the pass number.

OPTIMIZING ANTI-STRIP ADDITIVES
During the mixture design phase, if the contractor's SIP results do not meet the minimum requirements of 2303.02, E, 2, d, the Contractor shall select an anti-strip additive for use in the mix. The anti-strip additive shall be evaluated and optimized as indicated below. The contractor will be paid at the specified rate for incorporating the anti-strip additive into the mixture provided it is effective in achieving the minimum requirements. The Engineer will obtain samples of the plant produced mixture for moisture sensitivity testing in the Central Laboratory.

To optimize an anti-strip additive, the contractor shall test the mixture at a minimum of three different dosages of the anti-strip additive to determine the effectiveness and optimum rate of addition to the mix. The dosages tested shall cover the range of dosages recommended by the supplier of the anti-strip additive or, in the case of hydrated lime, at dosages agreed to by the District Materials Engineer (DME). The Contractor shall include the data from the moisture susceptibility testing in the electronic file (SHADES) and submit the file to the DME. The DME will evaluate the data and select an optimum dosage of anti-strip additive based on effectiveness and economic evaluation.

HOT MIX ASPHALT

Section 2303 & 2213

MATERIAL OR CONSTRUCTION ITEM	TESTS	METHOD OF ACCEPTANCE & RELATED IMs	QUALITY CONTROL					INDEPENDENT ASSURANCE, & VERIFICATION S&T						REMARKS
			SAMPLE BY	FREQ.	SAMPLE SIZE	TEST BY	REPORT	S&T TYPE	SAMPLE BY	FREQ.	SAMPLE SIZE	TEST BY	REPORT	
SOURCE INSPECTION														
Aggregates-Coarse (4127)		AS 209												
Aggregates-Fine (4127)		AS 209												
Hydrated Lime (4127)		AS 491.04												
Asphalt Binder		AS 437												
Emulsions & Cutbacks		AS 437												
Release Agent		AS 491.15												
Recycled Asphalt Shingles		AS 506												
PLANT INSPECTION														
Aggregates (2303)	Quality							V	DME	1/20,000 Ton	50 lb.	CTRL		
Combined Aggregate (4127)	Gradation		RCE/ CONTR	1/lot	IM 301	CONTR		V IA	RCE/ CONTR	Sample 1/day, Test 1st day + 20% Systems Approach*	IM 301	DME/ RCE	IM 216 IM 216	
	Moisture		CONTR	1 / half day	1000 gm	CONTR								Dryer Drum Plants Only

AS-Approved Source
ASD-Approved Shop Drawing
S&T-Sampling & Testing

Cert A-Type A Certification
Cert C-Type C Certification
Cert D-Type D Certification

RCE-Resident Construction Engineer/Project Engineer
DME-District Materials Engineer
CTRL-Central Materials Office
CONTR-Contractor

IA-Independent Assurance
V-Verification

*A project approach may be applied at the discretion of the DME at the frequency 1/project.

NOTE: RCE/CONTR indicates that the Contractor shall assist in the sampling at the direction of and witnessed by the Project Engineer.

HOT MIX ASPHALT
Section 2303 & 2213

MATERIAL OR CONSTRUCTION ITEM	TESTS	METHOD OF ACCEPTANCE & RELATED IMs	QUALITY CONTROL					INDEPENDENT ASSURANCE, & VERIFICATION S&T							REMARKS
			SAMPLE BY	FREQ.	SAMPLE SIZE	TEST BY	REPORT	S&T TYPE	SAMPLE BY	FREQ.	SAMPLE SIZE	TEST BY	REPORT	
PLANT INSPECTION														
Mineral Filler								V	DME	1/project	11 lb	DME	821278	
Asphalt Binder	DSR Quality	AS Cert D						V V IA	RCE/ CONTR DME	Sample 1/day Test 1st 1/week 1/20,000 T of Mix Systems Approach	4 oz tin 1 qt	DME CTRL		Log all shipments
Cutback		AS 329												Log all shipments
Emulsion	Residue	AS 360						V	RCE	1/project	1 qt	DME		Plastic bottle required
GRADE INSPECTION														
Uncompacted Mixture:	Lab Density & Lab Voids	321, 350 325G	RCE/ CONTR	As per 2303	40 lb	CONTR		V IA	RCE/ CONTR	As per 2303 Test 1/day Systems Approach	40 lb	DME		
	Moisture Sensitivity	AS 319 ~~507~~ Article 2303.02, Section E,2 ~~IM 510 App C~~						V	RCE/ CONTR	Test 1st Sample at 500 tons then sample 1/10,000 tons per 2303 until 1st sample accepted (test as needed)	70 lb	CTRL		
Compacted Mixture	Mat Density, Thickness & Voids	320, 321 337						V IA	RCE/ CONTR DME	Lot 1 lot/project*	Min 8/lot	RCE DME		
	Joint Density	Article 2303.03, Section D, 4, b						V	RCE/ CONTR	Each Joint = 1 Lot	4/lot	RCE		6-inch core centered on seam
	Smoothness	341	CONTR	100%	100%	CONTR		V	DME	10%		DME		

AS-Approved Source
ASD-Approved Shop Drawing
S&T-Sampling & Testing

Cert A-Type A Certification
Cert C-Type C Certification
Cert D-Type D Certification

RCE-Resident Construction Engineer/Project Engineer
DME-District Materials Engineer
CTRL-Central Materials Office
CONTR-Contractor

IA-Independent Assurance
V-Verification

* A system approach may be applied at the discretion of the DME.

NOTE: A Verification sample for asphalt binder quality and aggregate quality not required under 2000 tons of mix.

NOTE: RCE/CONTR indicates that the Contractor shall assist in the sampling at the direction of and witnessed by the Project Engineer.

IM 209

APPROVED PRODUCER PROGRAM AND CERTIFIED AGGREGATES

APPROVED PRODUCER PROGRAM

In order to furnish certified aggregates to projects, an aggregate producer shall be on the approved aggregate producer listing (Appendix B, attached). This will also apply to recycled product yards and/or processors. The specific requirements, including the details of the required quality control program are in Appendix A (attached).

Specification limits for aggregates being produced are found in Appendix C and D. For complete details on aggregate quality and gradation requirements, refer to the appropriate referenced specification.

Non-compliance to the approved Producer Quality Control Program shall constitute grounds for the source and/or producer to be placed on conditional status by the District Materials Engineer. Continued non-compliance will be considered sufficient grounds to remove the producer from the Approved Producer List.

Appendix E contains the "Notification of Violations of the Approved Producer's Quality Control Program". This is a written notice from the District Materials Coordinator or District Materials Engineer to a Producer identifying violation(s) of the Producer's Quality Control Program or requirements of the Approved Producer Program. A written response is required from the Producer describing how the violation occurred, how the violation will be rectified, and what will be done so the violation will not occur or continue to occur in the future.

An Aggregate Review Board will meet, as needed, for disciplinary actions and appeals involving Approved Producers.

The Aggregate Review Board shall consist of:

- The State Materials Engineer
- The Chief Materials Geologist

CERTIFIED AGGREGATES – SAMPLING AND TESTING

The Aggregate Producer shall be responsible for source product quality control. Aggregate quality will be determined by testing samples secured by District Materials personnel. This will not relieve the producer or supplier of their responsibility for quality of the material. Producers must meet the responsibilities outlined in *Guidelines for Aggregate Producer Quality Control Program,* IM 209 Appendix A.

Not less than 24 hours before start up, or as soon as possible for a production change, the appropriate District Materials Engineer shall be notified. The notification shall include the estimated daily production and total production, the intended use (project or warehouse stock), production ledge(s) if applicable, and responsible person(s). Failure to notify may result in additional quality sampling and testing, or rejection of the material.

Aggregates to be used in highway construction projects shall be subject to sampling and testing, including Producer Quality Control (QC) sampling and testing. Sampling and testing shall be performed during production in accordance with the minimum frequencies listed in the table below.

TABLE 1. SOURCE SAMPLING AND TESTING REQUIREMENTS

Sample Type	Producer Quality Control Testing Frequency	Iowa DOT Verification Testing Frequency
Proportioned Aggregates		
Gradation	1/1500 T (1) minimum	1/18,000 T (2)
Quality	1/12,000 T or 1/month, whichever is more frequent (3)	1/12,000 T or 1/month, whichever is less frequent (2)
Non-Proportioned Aggregates		
Gradation	1/3000 T (1) minimum	1/18000 T (2)
Quality	1/12,000 T or 1/month, whichever is more frequent (3)	1/12,000 T or 1/month, whichever is less frequent (2)

Notes:
1 Additional QC testing may be required at the time material is shipped to a project, for a stockpiled material carried over a winter season or if there is evidence of segregation, contamination, or degradation.
2 May be adjusted by the DME for source specific needs.
3 When required by the DME for sources where historic quality test results have approached or exceeded the specification limits (IM 307, 344, and 368).

A. Producer Quality Control Sampling & Testing

Producer QC sampling and testing personnel, laboratories, and equipment shall be qualified in accordance with the Iowa DOT Technical Training & Certification Program (IM 213) and the Materials Laboratory Qualification Program (IM 208). If Producer gradation test results are used as part of an acceptance decision, they will be evaluated under the Independent Assurance Program.

It is recommended that a Producer Quality Control Program include quality control testing to assist with ledge control and pit quality. Such tests may include: specific gravity (IM 307), clay lumps and friable material (IM 368), or shale in fine aggregate (IM 344). If historic data from a source indicate that quality test results approach or exceed specification limits the Engineer may require specific data be provided by the aggregate producer or supplier to the Iowa DOT (obtained by qualified persons and procedures). These data may include those tests listed above. See Table 1 for frequencies.

B. Iowa DOT Verification Sampling & Testing

The District Materials Office will be responsible for monitoring the Producers Quality Control Program. Verification of quality and gradation is through independent sampling and testing. Verification sampling and testing is done by Agency personnel. Agency sampling and testing personnel, laboratories, and equipment will be qualified in accordance with the Iowa DOT Technical Training & Certification Program (IM 213) and the Materials Laboratory Qualification Program (IM 208).

When requested by the Agency, Producer or Contractor personnel shall assist with the sampling as directed and witnessed by the certified Agency personnel. The sample location and time will be randomly selected by the Agency (except when noted elsewhere) and will only be given to the Producer immediately prior to sampling. To maintain the integrity of the sample, it will be transported by Agency personnel or secured by a tamper proof method and transported by the Producer. The Agency may spilt the verification sample and give a portion to the Producer.

Verification gradation test results, when non-complying, will normally be provided to the Producer within 3 working days of sampling.

At no time will the District Materials Office representative issue directions to the producer. However, the representative will have authority and responsibility to question and where necessary reject any operation, which is not in accordance with the Specifications, Special Provisions, and Instructional Memorandums.

C. Validation of Test Results

The verification gradation test results will be compared to the QC test results to validate the QC results for non-proportioned aggregate. Validation is based on the verification test results being within the specification limits. When the QC test results cannot be validated, the dispute resolution process will be used. Material shall not be shipped from the stockpile until the dispute is resolved. **NOTE:** Verification test results may be used solely for acceptance. When verification test results are used solely for acceptance, the acceptance criteria is Article 4109.

D. Dispute Resolution System

Validation disputes arising between the Contracting Agency and the Producer or Contractor will be resolved in a reliable, unbiased manner usually within two weeks of notification of a dispute. If necessary, an evaluation will be performed by the Iowa DOT Central Materials Laboratory. Resolution decisions by the Iowa DOT Central Materials Laboratory will be final.

Unless specified elsewhere, the District Materials Engineer will select some or all of the following steps for the dispute resolution:

1. Perform a comparison between the verification result and QC result(s) for the same time period (If the QC sample is from a split with the verification sample, also compare the previous independently taken QC result). Use the tolerances in IM 216. If the results are within the tolerance, validation is achieved.
2. Check all numbers and calculations.
3. Isolate material in dispute and begin a new stockpile. Resample stockpile material in dispute.
4. Perform tests on split obtained by Agency personnel.
5. Review past proficiency and validation data.
6. Review sampling and testing procedures.
7. Check equipment operation, calibrations and tolerances.
8. In the event of multiple validation failures for a source, the DME may use F-test and t-test statistical methods to compare the set of QC results with the set of verification results. A 0.05 level of significance will be used and a set of at least 5 verification test results.
9. Involve the Central Materials Laboratory.

If the discrepancy cannot be resolved using the steps listed above then the Agency test results will be used for the acceptance decision for that lot.

E. Small Quantities

Verification sampling and testing may be waived by the DME for product quantities of less than 2000 tons. For quantities of less than 200 tons of non-critical aggregate, the DME may waive QC testing and approve the stockpile based on a visual inspection by the DME or the Engineer.

CERTIFIED AGGREGATES – DOCUMENTATION

A. Producer Test Documentation

All producer test results performed on certified aggregates, whether compliant or non-compliant, shall be reported weekly or as designated to the District Materials Engineer on Form #821278. These reports shall indicate whether the aggregate is being produced for direct project delivery, stockpiling for a specific project, or for advance warehouse stock.

Selected production limits shall be included on Form #821278.

Production limits for aggregate produced for use in HMA or PCC mix designs are generated by the contractor and supplied to the aggregate producer on Forms #955 and #955QMC respectively.

B. Certified Aggregate Delivery Documentation

Documentation may be accomplished by numbered truck ticket, transfer list or shipment statement (such as Form #821278), or by a bill of lading (for rail or barge shipments). The certified documentation shall be furnished to project inspection personnel or receiving contractor before material is incorporated.

- For aggregates as bid items measured by weight (mass), the certified truck tickets shall be numbered and include signatures or initials in accordance with Article 2001.07.
- A "secure electronic signature" as defined by IM 209 Appendix G may be acceptable for certification of truck tickets in lieu of an original signature.
- In the case of shipment by rail or barge, the documentation shall be sent to the project engineer and receiving contractor or ready mix operator no later than the same day as shipment source departure. The documentation shall include the rail car or barge number(s).
- Documentation not having an exact weight (mass) shall include an estimated quantity (i.e. transfer listings or Form #821278, etc.).
- If the Producer/Supplier QC test results are used in the acceptance decision for non-proportioned aggregates, the Producer shall supply a signed summary documentation to the Project Engineer, including: the type of material and source, the total quantity, project number, and gradation results.
- When Agency test results are used for the acceptance decision of non-proportioned aggregate, the Producer/Supplier shall provide the Materials Engineer the total tons delivered to the project, the type of material and source, project number, and gradation results. District Materials will provide test reports to the project.

The following certification statement is required to be on the document used to certify the material being delivered (i.e. truck ticket, Form #821278, etc.): "**This is to certify the material herein described meets applicable contract specifications.**" **<u>NOTE</u>:** This certification statement shall be signed or initialed by an authorized representative of the aggregate supplier.

To ensure proper identification of delivered aggregates, the following additional information is required on the certification document:

Proportioned Aggregate
When the aggregate represented is for use in HMA or PCC mixtures, the project number is preferred when practical, as in the case when shipping to a single project paving plant site, and not required when impractical, as in the case when shipping into warehouse stock at a ready mix plant or when shipping to a plant supplying material to multiple projects.

<u>PCC Aggregate:</u> Gradation number, quantity, source name and T203 A-number, production beds (for quarried stones) and the delivery date. **<u>NOTE</u>:** For aggregate being delivered for use in a Concrete Design Mixture (CDM), the product size is required in lieu of the Iowa DOT gradation number.

HMA Aggregate: Product size, quantity, source name and T203 A-number, production beds (for quarried stones), and delivery date.

Non-proportioned Aggregate
Iowa DOT gradation number, project number, quantity, source name and T203 A-number and the delivery date. **NOTE:** Documentation for revetment stones shall include production beds.

REHANDLING OF CERTIFIED AGGREGATES

When certified aggregates are rehandled the District Materials Engineer shall be notified and afforded the opportunity to monitor the re-handling procedure.

For the purpose of this IM, re-handling is meant to include the physical unloading and reloading of aggregate at a temporary storage site before the aggregate is delivered to its final destination. Rehandled certified aggregates may be required to be re-tested, with or without re-weighing and recertified on a numbered shipment ticket with proper identification and certification statement.

ACCEPTANCE

At the Contractor's and Producer's own risk, aggregates may be certified for project use before quality sample test results are reported based on the following:

- Complying Quality Control and Verification gradations
- Documentation of consistent previous compliance to specified quality requirements from the source or ledge.

A. Proportioned Aggregate

In the case of HMA or PCC proportioned aggregates, acceptance tests will be performed on verification samples obtained at the proportioning plant.

Certified proportioned aggregate may be incorporated into a project on the basis of the certified truck ticket, certified bill of lading, shipment listing, certified transfer listing or Certified Gradation Test Report (Form #821278).

A file of certified shipment or transfer documents for the HMA or PCC proportioned aggregate will be maintained by the contractor or ready mix operator and made available for inspection at each plant or project site during the project period. Project inspection personnel shall verify that all material incorporated in the project is properly certified and document this verification and quantity on each of the appropriate daily or periodic construction reports. No other project documentation for the incorporated aggregate is required.

B. Non-Proportioned Aggregate

Acceptance of non-proportioned aggregates will be based on proper certification, visual examination by the contracting authority to ensure against obvious contamination or segregation, Producer quality control test results, and Agency verification test results.

Minor quantities of non-critical aggregates may be visually inspected by the contracting authority and recorded in the project field book. Quantities less than 200 Mg (ton) are considered minor. An example of a non-critical aggregate is a non-proportioned aggregate such as granular backfill material for bridge abutments.

C. Independent Assurance Program (IAP)

If Producer QC test results are used in the acceptance decision for non-proportioned aggregate, each certified technician who performs the QC sampling or testing and their test equipment will be independently checked by Iowa DOT certified technicians (IAP personnel) as per Materials IM 205 at least once per year. IAP personnel must not be involved in gradation verification testing for the aggregate source being tested.

IAP personnel will witness the Producer technician taking a random sample and splitting that sample. The splits of the sample will be tested by the Producer's technician and by the Iowa DOT District Laboratory. District Laboratory IAP testing equipment must not be the same equipment that is used for gradation verification for that source.

The results will be compared using IM 216. If acceptable correlation is not found, IAP personnel will contact the Producer's technician and review the results for the following:

1. Check for recording, weighing, or calculating errors.
2. Check to see that the balance is working correctly.
3. Check the sieves for damage or out of tolerance openings.
4. Check for overloading of sieves.
5. Check for incomplete sieving.
6. Resolve any problems, repeat the sampling, splitting, and observe the testing of a new sample.

The IAP results are not to be used in the acceptance decision for the material. Any non-complying IAP results should result in a visit by the Iowa DOT inspector responsible for verification testing at that location.

This method of IAP is called a System Approach and requires the Iowa DOT to report a summary of the results annually to the FHWA. Document when the Producer's Technician was visited, which Producer's laboratory was used, the results, and any follow-up if required. This documentation should be retained in the event of an FHWA audit.

GUIDELINES FOR AGGREGATE PRODUCER QUALITY CONTROL PROGRAM

GENERAL

This appendix contains the minimum requirements for the producer Quality Control Program in order to become an approved aggregate producer.

Producers must submit a written application to their District Materials Engineer (DME) for review and approval.

Quality Control Programs for recyclers will describe procedures for receiving, sorting and managing stockpiles of reclaimed materials intended to be processed into certified aggregates.

NOTE: Producers with operations in more than one District shall apply to the District Materials Engineer in the district where the most certified material production exists or is anticipated. The application is attached to this Appendix or is available on-line through the Iowa DOT web page. This application is also available from the DME Offices and the Iowa Limestone Producers Association (ILPA) office.

DEFINITIONS

The following definitions apply to the Quality Control Program guidelines:

Source - Any location aggregate is produced at or shipped from on a certified basis (e.g., quarries, pits, project sites, recycle yards, terminal locations, portable production operation, etc.).

Conditional Status - This is a written notice from the District Materials Engineer to a producer that certified aggregates will no longer be accepted from a particular source. Application of Conditional Status may vary depending upon situation or specific circumstances. The Conditional Status may apply only to a production operation and aggregate produced by that operation. In other situations, when the deficiency is more widespread, the Conditional Status may apply to an entire company or division within a company until the problem is resolved. In the case of portable production operations, Conditional Status shall apply to the specific production operation regardless of source location, and shipment of aggregate previously produced by the affected production operation may be placed on Conditional Status when warranted.

GUIDELINES FOR AGGREGATE PRODUCER QUALITY CONTROL PROGRAM

1. Aggregate Certification

   The producer has the overall responsibility of certifying that material being placed in the certified stockpile is produced under and conforms to the Aggregate Certification Program, and the producer Quality Control (QC) Program. The Iowa DOT, through its monitoring activities (sampling/testing, visual observation, etc.), will verify the continued compliance to the program.

2. Knowledge of Current Specifications

   The producer Quality Control representative(s) must maintain up-to-date knowledge of the specifications that apply to aggregate products currently being produced at the source. The producer representative shall have available, at the testing lab, a copy of the current Standard Specifications, all applicable Supplemental Specifications and all applicable Instructional Memorandums (IMs) for aggregate inspection, as well as a current geological section, if applicable. The producer will be aware of any Special Provisions, which change current aggregate specifications. This applies to both quality and gradation requirements. The producer shall be responsible for providing these up-to-date publications to their QC representative.

3. Plant Production Log

   The producer is required to maintain a plant production log when producing under the program. This production log shall detail, on a daily basis, samples taken, pass/fail results, corrective actions, plant/ledge changes, etc. The log must be kept at a designated location and be readily available to the Iowa DOT representative for review.

4. Visual Inspection

   The producer is responsible for visually inspecting the aggregate source process on a frequent basis. Visual inspection can be defined as observing the processing or production area, as well as the condition of the aggregate in the flow stream or stockpiles. This visual inspection does not take away from actual testing, but enhances the inspection to ensure quality aggregates. It is the responsibility of the producer Quality Control representative to observe the overall operation to detect segregation, degradation, and contamination that are detrimental to the quality of the product.

5. Quality Requirements

   Any certified stockpile must meet the designated quality before shipment. The producer is responsible for supplying material meeting all quality requirements. Intentional shipment of untested or out of specification material will constitute grounds for immediate rejection of material and placement of the source and/or the producer on conditional status. The producer Quality Control representative will obtain and maintain quality information on specific ledges, production methods, and certified stockpiles for each source.

6. Production Notification

   Twenty-four hours before startup or as soon as possible for production change, the appropriate Area Materials Coordinator (AMC) or District Materials Engineer (DME) shall be notified. Failure to notify may result in material rejection or resampling of the stockpile. Notification shall include the estimated intended tonnage to be produced, estimated daily production rate, intended use (e.g., project information or warehouse stock), and if applicable, production ledges, and responsible person(s).

7. Production

   A. The producer shall establish gradation production limits for each material to be certified to help ensure a product that is uniformly graded and meets specifications at the time of use.
      1. Gradation production limits shall apply to individual products within each source and be maintained for each stockpile.

      2. Gradation production limits are subject to review, only, by the AMC or DME.

      3. Repeated non-adherence to the producer established gradation production limits require stockpile sampling and testing by the producer.

   B. Testing and Reporting

      1. Minimum test frequencies as per IM 209, Appendix C

      2. Test results will be known before delivery when the product is being shipped to a project.

      3. All test results will be available at a designated location within 24 hours of sampling when the material is being placed into a certified stockpile.

      4. Report gradation test results to DME and contractor, when applicable, on Form #821278.

   C. Maintaining Ongoing Quality Control Procedures

      1. Proper ledge control and/or control of stockpiles of reclaimed PCC and HMA intended for recycling into certified aggregates.

      2. Equipment (production and testing)

      3. Stockpiling procedures

      4. Proper stockpile identification (signing, stockpile maps, etc., as required).

8. Delivery

   A. Stockpile identification to ensure delivery from proper stockpiles
   B. Visual inspection for contamination, segregation, etc.
   C. Stockpile gradation resampling may be required.
   D. Proper identification and certification of delivered aggregate as per IM 209
   E. Maintain ongoing QC procedures.
   F. Report tonnage to the AMC when requested.

9. Quality Control Structure

   In order to ensure quality as a priority, the producer Quality Control personnel will have a line of communication directly to their management, as well as their production operation.

AGGREGATE PRODUCER APPROVAL APPLICATION

Company Name ______________________________
Address ______________________________
(IF MORE THAN ONE; i.e., Regional Offices, etc., PLEASE ATTACH LIST AND AREA COVERED.)

1. Are copies of current applicable specifications, aggregate testing IMs and source information data such as geologic sections available at the respective sources or testing facilities? (Yes or No) If No, explain.
 ____
2. Is a plant production log maintained on a daily basis and available for inspection? (Yes or No) If No, explain. ______________________________
3. Who (position) is responsible for production notification to the Area Materials Coordinator?
 ____
4. Which company representative (position) is normally responsible for daily overall Quality Control processes at the source? ______________________________
5. Describe the certified stockpile identification system in place at each source (Map, signing, etc.) __________
6. Please attach a detailed summary of your Quality Control Program. (**NOTE:** Please refer to Guidelines for Required Aggregate Producer Quality Control Program.)
7. Please attach a flow chart of your current Quality Control structure (Include names, addresses, phone numbers of appropriate management personnel, chain of command, etc., for problem resolution).

Indicate the District(s) for which you have operations to produce State of Iowa Certified material.

1 2 3 4 5 6

AUTHORIZED SIGNATURE ______________________ DATE ______________

DME RECOMMENDATIONS ______________________________
____

DME SIGNATURE ______________________ DATE ______________
APPROVAL (YES or NO) REMARKS ______________________________
____

MATLS. ENGINEER SIGNATURE ______________________ DATE ______________

APPROVED AGGREGATE PRODUCERS

This appendix lists the approved aggregate Producers.

PRODUCER

A-Line Crushing Service
Cedar Falls, IA

Acme Fuel & Materials Company
Muscatine, IA

Aggregate Industries
Eagan, MN

Aggregate Materials Company
Dubuque, IA

Aggregates, Inc.
Cedar Rapids, IA

Anderson Sand & Gravel Company
De Witt, IA

Arcadia Limestone Company
Arcadia, IA

Bard Concrete
Dyersville, IA

BMC Aggregates L.C.
Waterloo, IA

Bedrock Gravel Company
Schleswig, IA

Bellco of Nebraska, Inc.
Council Bluffs, IA

Bellevue Sand & Gravel Company
Bellevue, IA

Benton's Sand & Gravel
Cedar Falls, IA

Big Stones Quarry, Inc.
Peru, IA

PRODUCER

Blazek Corporation
Lawler, IA

Boon Construction Company for Crosby Pit
Neillsville, WI

Boyer Sand & Rock, Inc.
Hawarden, IA

Bridgeport Materials
Sergeant Bluff, IA

Brockman Mgt., LLC, dba Brockman Sand Co.
Ft. Madison, IA

Bruening Rock Products, Inc./Skyline Const., Inc.
Decorah, IA

Builders Sand & Cement Company
Davenport, IA

C.J. Moyna & Sons, Inc.
Elkader, IA

Carnarvon Sand & Gravel
Denison, IA

Cemstone Products Company
Mendota Heights, MN

Central Stone Company #1
Hannibal, MO

Cessford Construction Company
Burlington, IA

Cessford Construction Company
Le Grand, IA

Cohrs Construction, Inc.
Spirit Lake, IA

Concrete, Inc.
Gifford, IA

PRODUCER

Concrete Materials
Sioux Falls, SD

Conreco, Inc.
Omaha, NE

Coots Materials Company
Vinton, IA

Corell Recycling - A Div. of Corell Contractor, Inc.
Des Moines, IA

County Materials Corp.
Marathon, WI

Crawford Quarry Company
Cedar Rapids, IA

Croell Redi Mix
New Hampton, IA

Crushed Aggregate Products
Red Oak, IA

Dave's Sand & Gravel, Inc.
Everly, IA

DeLong Recycling, Inc.
Washington, IA

Des Moines Asphalt and Paving
Johnston, IA

Douds Stone, Inc.
Ottumwa, IA

Duininck Bros., Inc.
Prinsburg, MN

Falk, L. R. Construction Company
St. Ansgar, IA

Falkstone LLC
St Ansgar, IA

PRODUCER

Flewelling Sand & Gravel
Moville, IA

Floyd River Materials
Sioux City, IA

Ft. Calhoun Stone Company
Blair, NE

Fort Dodge Asphalt Company
Fort Dodge, IA

Geo Tech Materials
Douds, IA

Gehrke Quarries, Inc.
Gifford, IA

Gray Quarry, Inc.
Hamilton, IL

Great River Materials, LLC
Burlington, IA

Greene Limestone Company
Charles City, IA

Grimes Asphalt & Paving
Grimes, IA

Hahn Ready Mix
Muscatine, IA

Hallett Materials
Des Moines, IA

"Hank" Stalp Gravel Company
West Point, NE

Heartland Asphalt, Inc.
Mason City, IA

Heimes Excavating & Utilities Co.
Omaha, NE

PRODUCER

Higman Sand & Gravel
Akron, IA

Horsfield Materials, Inc.
Epworth, IA

Ideal Sand Co. aka Ideal Ready Mix Co., Inc.
West Burlington, IA

Iowa Drainage, Inc.
Sheffield, IA

Knife River Midwest LLC
Stratford, IA

Kuhlman Construction Company
Colesburg, IA

L.G. Everist, Inc.
Sioux Falls, SD

L & M Sand & Gravel, Inc.
LeMars, IA

L & W Quarries
Centerville, IA

LaHARV Construction Company, Inc.
Forest City, IA

Lessard Contracting, Inc.
Sergeant Bluff, IA

Linwood Mining & Minerals Corporation
Davenport, IA

Lounsbury
West Des Moines, IA

Lundell Construction Co., Inc.
Storm Lake, IA

Lyman-Richey Sand & Gravel Company
Omaha, NE

PRODUCER

Mallard Sand & Gravel Company
Valley, NE

Manatt's, Inc.
Brooklyn, IA

Manatt's Sand & Gravel, Inc.
Tama, IA

Marengo Ready Mix, Inc.
Marengo, IA

Martin Commercial Excavating
Davenport, IA

Martin Marietta Aggregates
Des Moines, IA

MatX, Inc.
Colorado Springs, CO

McAlister Aggregates, LLC
Bayard, IA

Meller Excavating & Asphalt, Inc.
Fort Madison, IA

Mielke's Quarry
McGregor, IA

Milestone Materials, Di. of Mathy Const. Company
Onalaska, WI

Mobile Crushing & Recycling, Inc.
Otho, IA

Mohr Sand, Gravel & Construction, LLC
Lohrville, IA

Myrl & Roy's Paving, Inc.
Sioux Falls, SD

Nelstar
Meriden, IA

PRODUCER

New Ulm Quartzite Quarries, Inc.
New Ulm, MN

Norris Aggregates Company
Cameron, MO

North Iowa Sand & Gravel, Inc.
Mason City, IA

Northwest Materials
Fort Dodge, IA

NorthWest Ready-Mix Concrete, Inc.
Ocheyedan, IA

NUAggregates
Akron, IA

Ortonville Stone Company
Ortonville, MN

PBI Construction
Marcus, IA

Patrick M. Pinney Contractors, Inc.
Sioux City, IA

Paul Niemann Construction Company
Sumner, IA

Pella Construction Company Ltd.
Pella, IA

Persinger Sand & Gravel
Smithland, IA

Peru Quarry
Winterset, IA

Peterson Contractors, Inc.
Reinbeck, IA

PRODUCER

Pettengill Concrete & Gravel
Rock Rapids, IA

Pierce Sand
Stanberry, MO

Prairie Sand & Gravel
Prairie Du Chien, WI

Preston Ready Mix Corporation
Preston, IA

Quality Concrete Company
Clinton, IA

Randall Transit Mix Company
Northwood, IA

Recycled Aggregate Products Company
Sioux City, IA

Red Rock Quarry
Sanborn, MN

Reding’s Gravel & Excavating Co.
Algona, IA

Reilly Construction Company, Inc.
Ossian, IA

Riehm Construction Company, Inc.
Waukon, IA

River Bend Enterprises
Nashua, IA

River City Stone - Di. of Mathy Construction Company
Keiler, WI

Riverstone Group, Inc.
Moline, IL

River Products Company, Inc., The
Iowa City, IA

PRODUCER

Rock Hard Concrete Recycling Inc
West Branch, IA

Rocky Mountain Enterprises, Inc.
Athens, WI

S & A Construction, LTD
Allendale, MO

S & G Materials
Iowa City, IA

Savanna Quarry, Inc.
Savanna, IL

Schildberg Construction Company, Inc.
Greenfield, IA

Schmillen Construction, Inc.
Marcus, IA

Shipley Contracting
Fort Madison, IA

Sieh Sand and Gravel
Spencer, IA

Southern Minnesota Construction Company, Inc.
Fairmont, MN

Spencer Quarries
Spencer, SD

Stensland Gravel Company
Larchwood, IA

Sterzinger Crushing, Inc.
Taunton, MN

Stoner Sand
Ridgeway, MO

Stratford Gravel, Inc.
Dayton, IA

PRODUCER

Strong Rock & Gravel
Lansing, IA

Swan Rock & Sand Products, LLC
Eddyville, IA

Tiefenthaler Ag-Lime Inc.
Breda, IA

Tri City Blacktop
Rock Island, IL

Tri Star Quarries
Plano, IA

Tube City IMS Corp.
Wilton, IA

Ulland Brothers, Inc.
Albert Lea, MN

United Contractors, Inc.
Grimes, IA

Valley Sand & Gravel Co.
Rock Valley, IA

Weatherton Contracting Co., Inc.
Beresford, SD

Weber Stone Company, Inc.
Anamosa, IA

Welden Aggregates, Inc.
Iowa Falls, IA

Wendling Quarries, Inc.
De Witt, IA

West Des Moines Sand
Des Moines, IA

Western Engineering Company
Harlan, IA

PRODUCER

Wiltgen Construction Company
Calmar, IA

Winn Corporation Sand & Gravel
Ollie, IA

Wright Materials Company
Belmond, IA

Zupke Sand & Gravel
Randalia, IA

TEST LIMITS	Spec #	F & T A	F & T C	LA Abrasion	Absorption	Chert	Shale	Clay Lumps	Plastic Index	Mortar Strength	Al_2O_3 Limit	Pore Index	Gradation Number
Fine Aggregate for PCC													
PCC	4110						2			6000psi			1
		Note: Maximum 40% between sieves											
		Note: The Engineer may require mortar strength testing for sources where quality changes.											
		Note: Shale + Coal not to exceed 2% max.											
PCC, Class L	4111	Note: Only from approved PCC sources.					2			5200psi			1
		Note: Maximum 45% between sieves.											
		Note: Shale + Coal not to exceed 2%max.											
Coarse Aggregate for PCC													
Crushed Stone	4115												
-Structural		6		50		2	1	0.5			0.5		3-5
-Nonstructural		6		50		3	1	0.5			0.5		3-5
		Note: See 4115.02 for maximum allowable objectionable materials.											
Gravel	4115												
-Structural		6		35		2	1	0.5					3-5
-Nonstructural		6		35		3	1	0.5					3-5
		Note: See 4115.02 for maximum allowable objectionable materials.											
Bridge Deck *-Surfacing, Repair & Overlay*	4115	6		40	2.5	0.5					0.4		6
		Note: Unsound Chert+Shale+Coal+Iron not to exceed 1%.											
		Note: Unsound Chert particles are defined in 4115.02.											
Class V Aggregate	4117	6		40			2 (+#16)			1.5			7
		Note: Coarse Aggregates as in 4115 (except abrasion) and Fine Aggregates as in 4110.											
Combination of Materials With Cl. V		Note: See 4117 for cement requirements.											
Coarse Limestone		Note: Acquire limestone from sources meeting the specified coarse aggregate durability class for PCC.											
Limestone Screenings		Note: Must meet the requirements of 4115 and be only from sources acceptable as coarse aggregate.											8

AGGREGATE SPECIFICATION LIMITS & SAMPLING AND TESTING GUIDE

(See Specifications for Complete Details.)

TEST LIMITS	Spec #	F & T A	F & T C	LA Abrasion	Absorption	Chert	Shale	Clay Lumps	Plastic Index	Mortar Strength	Al_2O_3 Limit	Pore Index	Gradation Number
Granular Surfacing													
Aggregate for Granular Shoulders	4120.02	Note: Requirements are equivalent to 4120.04, 4120.05 or 4120.06.											Per 4120.02
Class C Gravel	4120.03		15				10						10
		Note: Percent of Clay Lumps + percent passing #200 sieve not to exceed 15%.											
		Note: Percent of Clay Lumps + percent of (+4) shale + percent passing #200 not to exceed 20%.											
Class A Crushed Stone	4120.04		15	45				4					11
		Note: For shoulders only; material with Al_2O_3 not exceeding 0.7 or A-freeze not exceeding 10 may have an abrasion maximum of 55.											
Class B Crushed Stone	4120.05		20	55				4					11
		Note: "C" Freeze + Abrasion not to exceed 65%											
Class D Crushed Stone	4120.06												
		Note: "C" Freeze, Abrasion, and Gradation to be specified by Contract Documents.											
Paved Shoulders	4120.07		15	45				4					11
Fillets		Note: Material with Al_2O_3 not exceeding 0.7 or A-freeze not exceeding 10 may have an abrasion maximum of 55.											
Granular Subbase													
	4121	25		50							1.5		12a(Cr. St.) 12b(Grav.)
		Note: Combinations of crushed PCC, sand, crushed gravel, or crushed stone may be used. Specification limits are for crushed stone or crushed gravel.											
Crushed Stone-Base													
Macadam Stone	4122		10	50									13(Visual) Per 4122.02
		Note: Choke stone see 4122.03 for details; when produced from Macadam has certified inspection of 1/3000 ton.											

TEST LIMITS	Spec #	F & T A	F & T C	LA Abrasion	Absorption	Chert	Shale	Clay Lumps	Plastic Index	Mortar Strength	Al_2O_3 Limit	Pore Index	Gradation Number
Modified Subbase													
	4123		15	45					7(Gravel)		4.7(-#40)		14
		Note: Material with Al_2O_3 not exceeding 0.7 (+4) or A-freeze not exceeding 10 may have an abrasion maximum of 55.											
		Note: If gravel only, 75% of +3/8" must be crushed with a minimum of one fractured face.											
		Note: Reclaimed pavements meeting Materials IM 209 may be used.											
Aggregate for Slurry Mixture													
	4124.03	10		40			5				0.7		22 or 23
		Note: Friction Type 4 or better, sand equivalent of not less than 45, and organic materials maximum 0.01%.											
Aggregate for Bituminous Sealcoat													
	4125.03		10	40			5						1, 19-21
		Note: Friction Type 4 or better, shale on sand cover aggregate shall not exceed 2% maximum.											
Coarse Aggregate for HMA													
Type A	4127.02	10		45	6.0			0.5			0.7		Per Form 955
		Note: Organic materials maximum 0.01%.											
Type B													
Primary	4127.02	25	10	45	6.0						1.5		Per Form 955
Non-Primary	4127.02	45	10	45	6.0						2.5		Per Form 955
		Note: Organic materials maximum 0.01%.											
Fine Aggregate for HMA													
	4127.03												Per Form 955
		Note: Natural sand shall have no more than 50% retained between two consecutive sieves below the #4 sieve.											
		Note: Organic materials maximum 0.01%.											
		Note: Crushed gravel or stone processed from coarse aggregate meeting requirements of 4127.02.											
Combination of Materials													
Type A	4127.04	Note: The fine portion of combined materials shall not exceed 2% shale retained on the #16 sieve.											Per Form 955
Type B		Note: The fine portion of combined materials shall not exceed 5% shale retained on the #16 sieve.											

TEST LIMITS	Spec #	F & T A	F & T C	LA Abrasion	Absorption	Chert	Shale	Clay Lumps	Plastic Index	Mortar Strength	Al_2O_3 Limit	Pore Index	Gradation Number
Revetment Stone		Note: Rocks that split into layers less than 4" thick shall not be used.											
Class A	4130.01	10*	5**	50	(*Primary/**Non-primary)						0.7	25	Visual
Class B	4130.01	10*	5**	50							0.7	25	Visual
Class D	4130.01		10	50									Visual
Class E	4130.01	10		50							0.7	25	Visual
		Note: See Specification 4130.01 for bedding plane/concrete slab thickness requirements.											
Erosion Stone	4130.05		15	50				5	Note: See 4130.04 for gradation requirements.				Visual
Gabion Stone	4130.08	10		50							0.7		Visual
		Note: See 4130.07 for gradation requirements.											
Porous Backfill													
	4131	10		45			5(+4)				0.7		29
		Note: Material shall be free of visible clay and objectionable clay coating.											
Special Backfill													
	4132.01												30,31
Crushed Stone/PCC/CCP/Reclaimed HMA; Mixtures of Gravel, Sand and Soil or Uniformly blended combinations of the above.													
Gravel	4132.03								10				31
		Note: Organic material of no more than 1% on fraction passing the #40 sieve.											
Granular Backfill													
	4133		20	55				4					32*,**
		Note: "C" Freeze + Abrasion not to exceed 65%. *See 4133.04 for gradation when backfill is under flowable mortar. **See 4133.05 for gradation when used as floodable backfill.											
Recycled PCC		Note: Recycled PCC must meet gradation and sampling frequency of the intended product; and meet the requirements of IM 210.											
Recycled Composite Pavement		Note: Recycled composite pavement must meet gradation and sampling frequency of the intended product; and meet the requirements of IM 210.											

AGGREGATE GRADATION TABLE – ENGLISH

Grad. No.	Section No.	Std. Sieve Size / Intended Use	1½”	1”	3/4”	1/2”	3/8”	#4	#8	#30	#50	#100	#200	*Notes
			Percent Passing											
1	4110,4125, 4133	PCC FA Cover Agg.					100	90-100	70-100	10-60			0-1.5	1
3	4115 (57, 2-8)	PCC CA	100	95-100		25-60		0-10	0-5				0-1.5	2,11
4	4115 (2-8)	PCC CA	100	50-100	30-100	20-75	5-55	0-10	0-5				0-1.5	11
5	4115 (67, 2-8)	PCC CA		100	90-100		20-55	0-10	0-5				0-1.5	11
6	4115.05 (Repair & Overlay)	PCC CA			100	97-100	40-90	0-30					0-1.5	11
7	4117 (Class V)	PCC FA & CA	100					80-92	60-75	20-40				
8	4117.03 (Class V)	Fine Limestone					100	90-100					0-30	
10	4120.02, 4120.03 (C Gravel)	Granular Surface			100			50-80	25-60					3, 12
11	4120.02, 4120.04, 4120.05, 4120.07 (A, B, Cr. St.)	Granular Surface & Shoulder		100	95-100	70-90		30-55	15-40				6-16	4, 5, 12
12a	4121 (Cr. St.)	Granular Subbase	100			40-80			5-25				0-6	6, 12
12b	4121 (Cr. Gravel)	Granular Subbase	100			50-80			10-30		5-15		3-7	7, 12
13	4122.02 (Cr. St.)	Macadam St. Base	3” nominal maximum size – screened over 3/4” or 1” screen											12
14	4123	Modified Subbase	100		70-90				10-40				3-10	5, 7, 12
19	4125 (1/2” Cr. Gr. or Cr. St.)	Cover Aggregate			100	97-100	40-90	0-30	0-15				0-2	12
20	4125 (1/2” Scr. Gr.)	Cover Aggregate			100	95-100	40-80	0-15	0-7				0-1.5	12
21	4125 (3/8”)	Cover Aggregate				100	90-100	10-55	0-20	0-7			0-1.5	12
22	4124.02	Fine Slurry Mixture					100	85-100	40-95	20-60	14-35	10-25	5-25	10, 12
23	4124.02 (Cr. St.)	Coarse Slurry Mixture					100	70-90	40-70	19-42			5-15	12
29	4131	Porous Backfill			100	95-100	50-100	0-50	0-8					12
30	4132.02 (Cr. St.)	Special Backfill	100						10-40				0-10	5, 12
31	4132.03 (Gravel)	Special Backfill		100	90-100	75-100			30-55				3-7	12
32	4133 (Sand/Gr./Cr. St.)	Granular Backfill	100% passing the 3” screen						10-100				0-10	8, 12
35	4133.05 (Natural Sand/Gr.)	Floodable Backfill	100						20-90				0-4	12
36	4133.05 (Natural Sand)	Floodable Backfill							100				0-2	12

Notes: (Gradations Nos. 2, 9, 15, 16, 17, 18, 24, 25, 26, 27, 28, 33 and 34 have been deleted.)

*For numbered notes, see page 2.

1. For Section 4110, when the fine aggregate is sieved through the following numbered sieves - 4, 8, 16, 30, 50, and 100 - not more than 40% shall pass one sieve and be retained on the sieve with the next higher number.

2. When used in precast and prestressed concrete bridge beams, 100% shall pass the 1” sieve.

3. When compaction of material is a specification requirement, the minimum percent passing the No. 200 sieve is 6%.

4. See specifications for combination of gravel and limestone.

5. Unwashed air-dried samples of crushed composite material shall be tested for gradation compliance except that no gradation determination will be made for material passing the No. 200 sieve.

6. The gradation requirement for the No. 8 sieve shall be 5% to 20% when recycled material is supplied.

7. For Section 4121 gravel, one fractured face on 30% or more of the particles retained on the 3/8-inch sieve. For Section 4123 gravel, one fractured face on 75% or more of the particles retained on the 3/8-inch sieve.

8. Crushed stone shall have 100% passing the 1.5” sieve.

10. Gradation limitations for the 30, 50 and 100 sieves shall not apply when slurry mixture is applied by hand lutes, such as for slurry leveling.

11. Maximum of 2.5% passing the No. 200 sieve allowed for crushed limestone or dolomite when documented production is 1% or less.

12. When Producer gradation test results are used for acceptance, test results representing at least 90% of the material being produced shall be within the gradation limits and the average of all gradation results shall be within the gradations limits. Stockpiled material not meeting the criteria may, at the District Materials Engineer’s discretion, be resampled using Materials I.M. 301 procedures. One hundred percent of the stockpile quality control and verification test results shall be within the gradation limits.

HMA Gyratory gradation requirements are listed in IM 510, Appendix A.

******THIS IS A NEW APPENDIX. – PLEASE READ CAREFULLY.******

NOTIFICATION OF IM 209 VIOLATION

This appendix contains the Notification of Violations of the Approved Producer's Quality Control Program.

This is a written notice from the District Materials Coordinator or District Materials Engineer to a producer identifying violation(s) of the Producer's Quality Control Program or requirements of the Approved Producer Program (Office of Materials IM 209).

A written response is required from the Producer describing how the violation occurred, how the violation will be rectified, and what will be done so the violation will not occur or continue to occur in the future. After the written response is received, grounds for Conditional Status will be determined. Conditional Status requires that certified aggregates will no longer be accepted from a particular source. The Conditional Status may apply only to a production operation and aggregate produced by that operation. In other situations, when the deficiency is more widespread, the Conditional Status may apply to an entire company or division within a company until the problem is resolved. See Office of Materials IM 209, Appendix A for details. If the Notification of Violation is found to be in error, the Notification will be rescinded. Written responses should be sent to the District Materials Office and the Geology Section of the Central Materials Laboratory.

Producer Name____

Source (include A-number)__________________________________

Date(s) of violation____

Nature of Violation (Circle all that apply)

1. Aggregate Certification
2. Knowledge of Current Specifications
3. Plant Production Log
4. Visual Inspection
5. Quality Requirements
6. Production Notification
7. Production
8. Delivery (Unapproved Materials)
9. Quality Control Structure
10. Other

Additional details (attach a separate document if more space is needed):

IOWA DOT SIGNATURE_______________________________DATE______________

Copies to: District Materials Office
Geology Section, Central Materials Laboratory

******THIS IS A NEW APPENDIX. – PLEASE READ CAREFULLY.******

DISTRICT MATERIALS DUTIES

This appendix contains District Materials aggregate duties.

- Monitor producer/supplier compliance to the respective Approved Producer Quality Control Program.
- Confirm that material is being produced from the intended ledge.
- Confirm that unprocessed reclaimed pavement is sorted for the intended recycled product.
- Review requirements of source approvals for particular production ledges or depths and processing methods.
- Review sample locations and methods.
- Review Q/C tests:
  - test results
  - frequencies
  - reporting
- Visual inspection of stockpiles:
  - Condition of base
  - Segregation
  - Contamination
  - Degradation
  - Load-out
  - Product identification
- Production verification samples:
  - Gradation (one of the following methods)
    - Independent sample by District Materials
    - Witness Q/C technician obtain production verification sample
    - For revetment, erosion stone and macadam base, verification will be based on visual inspection
  - Quality samples will be obtained by District Materials.
  - District Materials will take possession of all production verification samples.
- District Materials will make production verification test results available to the producer.
- Non-complying production verification test results.
  - Notify the producer.
  - Investigate the stockpile, for acceptance, in accord with written evaluation method IM 301 or as directed by the District Materials Engineer.
- Review producer certification of aggregates, including compliance of certification documents in accord with IM 209.

APPLICATION FOR APPROVAL OF ELECTRONIC SIGNATURE

This appendix contains the Application for Approval of Electronic Signature for Certification of Materials and Weights.

From: ____

Name of Weighmaster / Source Name(s) / Iowa DOT District

Via: ____

Name of Company Officer / Company Name

To: District Materials Engineer, Iowa DOT
Director of Materials, Iowa DOT

Subj: Electronic Signature Authority for Certifying Truck Tickets

1. I have read Federal Code 1020 and Iowa Code 714.8 (following this document) and am aware of the potential penalties for fraud and knowingly tendering a false certification. I will not knowingly cause or create a false document nor allow others access to my password that would allow them to certify materials. I am also aware of the provisions authorizing secure electronic signature per IM.209 Appendix G.
2. My Secure Electronic Signature Authority is granted to me by the Iowa DOT Director of Materials and represents the authorization by the company officer to certify materials for the company for whom I am employed. Should either of us terminate employment this signature authority shall be revoked. This certificate is valid for five years from the date signed by the Iowa DOT Director of Materials. This authority can be renewed by review of the Federal and Iowa Codes and resubmission to the Director of Materials. Violations of these Codes shall be cause for revocation of this authority.

Signature and Date of Weighmaster acknowledging review of Codes.

SIGNATURE____ DATE__________________

Attach a Sample of Secure Electronic Signature

Authorization to Certify on behalf of the Company: Signature and Date of Company Officer, Title, Date.

SIGNATURE______________________________ TITLE________________ DATE__________

Signature and Date of Iowa DOT District Materials Engineer

IOWA DOT SIGNATURE____________________________________DATE__________________

Signature and Date of Electronic Signature Authorization: Iowa DOT Director of Materials

IOWA DOT SIGNATURE____________________________________DATE__________________
Expires Five years from Date of Director of Materials Signature

Copies to: District Materials Office
Geology Section, Central Materials Laboratory

Iowa DOT requirements are based on Iowa Code Section 554(C) Superseded by 554(D) Secure Electronic Signature.

1. Subject to the provisions of section 554C.303 and 554(D), if, by the application of a qualified security procedure, it can be authenticated that an electronic signature is the signature of a specific person, the electronic signature shall be considered to be a secure electronic signature at the time of verification.
2. A qualified security procedure for purposes of this section is a security procedure for identifying a party that meets the following:
   A. Authorized by, and implemented in accordance with the requirements of IM 209 Appendix G.
   B. Previously agreed to by the parties to an agreement and implemented in accordance with the terms of the agreement.
   C. Authorized by the responsible Company Officer to act on behalf of the Company and being capable of creating a secure electronic signature that meets all of the following conditions:
      (1) Is unique to the signer within the context in which it is used.
      (2) Can be used to promptly, objectively, and automatically identify the person signing the electronic record.
      (3) Is password protected and assignable to only that person with the authority given by the Company Officer.
      (4) Was reliably created by such identified person.
      (5) Is linked to the electronic record to which it relates in a manner which ensures that if the record or signature is changed the electronic signature is invalidated, provided that the security procedure is implemented in a manner required by the certification.
      (6) Acceptable security systems shall meet the provisions of NTEP or NIST Handbook 44.

Crimes and Criminal Procedure 18 USC Section 1020

1020. Highway projects
Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the costs thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction of any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report, or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to a material fact in any statement, certificate, or report submitted pursuant to the provisions of the Federal-Aid Road Act approved July 11, 1916 (39 Stat. 355), as amended and supplemented, Shall be fined under this title or imprisoned not more than five years, or both.

Iowa Code Section 714.8 Fraudulent practices defined.

A person who does any of the following acts is guilty of a fraudulent practice:

1. Makes, tenders, or keeps for sale any warehouse receipt, bill of lading, or any other instrument purporting to represent any right to goods, with knowledge that the goods represented by such instrument do not exist.
2. Knowingly attaches or alters any label to any goods offered or kept for sale so as to materially misrepresent the quality or quantity of such goods, or the maker or source of such goods.
3. Knowingly executes or tenders a false certification under penalty of perjury, false affidavit, or false certificate, if the certification, affidavit, or certificate is required by law or given in support of a claim for compensation, indemnification, restitution, or other payment.
4. Makes any entry in or alteration of any public records, or any records of any corporation, partnership, or other business enterprise or nonprofit enterprise, knowing the same to be false.
5. Removes, alters or defaces any serial or other identification number, or any owners' identification mark, from any property not the person's own.
6. For the purpose of soliciting assistance, contributions, or other thing of value, falsely represent oneself to be a veteran of the armed forces of the United States, or a member of any fraternal, religious, charitable, or veteran's organization, or any pretended organization of a similar nature, or to be acting on behalf of such person or organization.
7. Manufactures, sells, or keeps for sale any token or device suitable for the operation of a coin-operated device or vending machine, with the intent that such token or device may be so used, or with the representation that they can be so used; provided, that the owner or operator of any coin-operated device or vending machine may sell slugs or tokens for use in the person's own devices.
8. Manufactures or possesses any false or counterfeit label, with the intent that it is placed on merchandise to falsely identify its origin or quality, or who sells any such false or counterfeit label with the representation that it may be so used.
9. Alters or renders inoperative or inaccurate any meter or measuring device used in determining the value of or compensation for the purchase, use or enjoyment of property, with the intent to defraud any person.
10. Does any act expressly declared to be a fraudulent practice by any other section of the Code.
11. Removes, defaces, covers, alters, or destroys any component part number as defined in section 321.1, vehicle identification number as defined in section 321.1, or product identification number as defined in section 321.1, for the purpose of concealing or misrepresenting the identity or year of manufacture of the component part or vehicle.
12. Knowingly transfers or assigns a legal or equitable interest in property, as defined in section 702.14, for less than fair consideration, with the intent to obtain public assistance under chapters 16, 35B, 35D, and 347B, or Title VI, subtitles 2 through 6, or accepts a transfer of or an assignment of a legal or equitable interest in property, as defined in

section 702.14, for less than fair consideration, with the intent of enabling the party transferring the property to obtain public assistance under chapters 16, 35B, 35D, and 347B, or Title VI, subtitles 2 through 6. A transfer or assignment of property for less than fair consideration within one year prior to an application for public assistance benefits shall be evidence of intent to transfer or assign the property in order to obtain public assistance for which a person is not eligible by reason of the amount of the person's assets. If a person is found guilty of a fraudulent practice in the transfer or assignment of property under this subsection the maximum sentence shall be the penalty established for a serious misdemeanor and sections 714.9, 714.10 and 714.11 shall not apply.

13. Fraudulent practices in connection with targeted small business programs.
    a. Knowingly transfers or assigns assets, ownership, or equitable interest in property of a business to a woman or minority person primarily for the purpose of obtaining benefits under targeted small business programs if the transferor would otherwise not be qualified for such programs.
    b. Solicits and is awarded a state contract on behalf of a targeted small business for the purpose of transferring the contract to another for a percentage if the person transferring or intending to transfer the work had no intention of performing the work.
    c. Knowingly falsifying information on an application for the purpose of obtaining benefits under targeted small business programs.

A violation under this subsection is grounds for decertification of the targeted small business connected with the violation. Decertification shall be in addition to any penalty otherwise authorized by this section.

14. Makes payment pursuant to an agreement with a dealer or market agency for livestock held by the dealer or market agency by use of a financial instrument which is a check, share draft, draft, or written order on any financial institution, as defined in section 203C.1, if after seven days from the date that possession of the livestock is transferred pursuant to the purchase, the financial institution refuses payment on the instrument because of insufficient funds in the maker's account.

This subsection is not applicable if the maker pays the holder of the instrument the amount due on the instrument within one business day from a receipt of notice by certified mail from the holder that payment has been refused by the financial institution.

As used in this subsection, "dealer" means a person engaged in the business of buying or selling livestock, either on the person's own account, or as an employee or agent of a vendor or purchaser. "Market agency" means a person engaged in the business of buying or selling livestock on a commission basis.

15. Obtains or attempts to obtain the transfer of possession, control, or ownership, of the property of another by deception through communications conducted primarily by telephone and involving direct or implied claims that the other person contacted has won or is about to win a prize, or involving direct or implied claims that the other person contacted may be able to recover any losses suffered by such other person in connection with a prize promotion.

16. Knowingly provides false information to the treasurer of state when claiming, pursuant to section 556.19, an interest in unclaimed property held by the state, or knowingly provides false information to a person or fails to disclose the nature, value, and location of unclaimed

property prior to entering into a contract to receive compensation to recover or assist in the recovery of property reported as unclaimed pursuant to section 556.11.

17. A packer who includes a confidentiality provision in a contract with a livestock seller in violation of section 202A.4.
18. Manufactures, creates, reproduces, alters, possesses, uses, transfers, or otherwise knowingly contributes to the production or use of a fraudulent retail sales receipt or universal price code label with intent to defraud another person engaged in the business of retailing.

For purposes of this subsection:

a. Retail sales receipt" means a document intended to evidence payment for goods or services.
b. Universal price code label" means the unique ten-digit bar code placed on the packaging of an item that may be used for purposes including but not limited to tracking inventory, maintaining price information in a computerized database, and serving as proof of purchase of a particular item.

19. A contractor who enforces a provision in a production contract that provides that information contained in the production contract is confidential as provided in section 202.3.

APPROVED OF ELECTRONIC SIGNATURES

This appendix contains the Approved Electronic Signature for Certification of Materials and Weights. All approved Electronic Signatures will expire 5 years from the date of Director of Materials Signature.

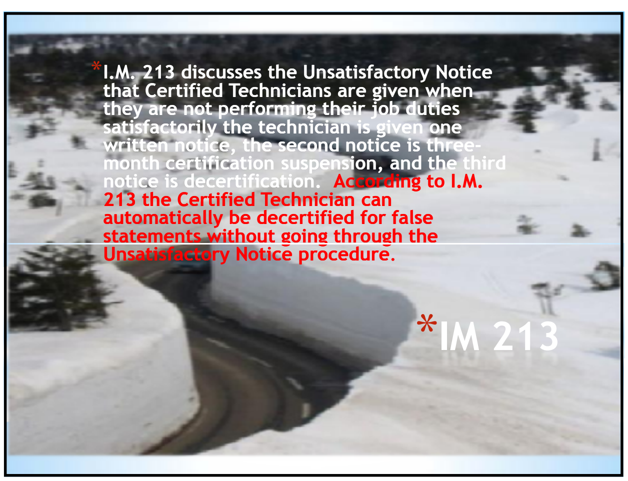
Weighmaster/Expiraton Date	Company Name	Source Name / District
Mary Worrell – 1/15/14	Martin Marietta	Ames Mine / 1
Sandra Hill – 1/15/14	Martin Marietta	Ames Mine / 1
Lori Engelby – 1/15/14	Martin Marietta	Ames Mine / 1
Nikki Hanna – 4/23/14	Martin Marietta	Fort Dodge Mine / 1
Lisa George – Bacon – 4/23/14	Martin Marietta	Fort Dodge Mine / 1
John Johnson – 7/11/14	Hallett Materials	Exira / 4
Ronda Hammes – 10/14/15	Martin Marietta	Weeping Water, Ft. Calhoun, Springfield / 4
Lisa Maher – 10/14/15	Martin Marietta	Springfield, Weeping Water, Ft. Calhoun / 4
Deb Gjerde – 10/14/15	Martin Marietta	Weeping Water, Ft. Calhoun, Springfield / 4
Theresa McMains – 10/14/15	Martin Marietta	Ft. Calhoun, Weeping Water, Springfield / 4
Julie Bauers – 10/14/15	Martin Marietta	Weeping Water, Ft. Calhoun, Springfield / 4
Robin Cass – 10/14/15	Martin Marietta	Weeping Water, Ft. Calhoun, Springfield / 4
Jennifer Stanley – 4/12/17	Martin Marietta	Raccoon River Sand / 4
Claud Harris – 4/12/17	Martin Marietta	Raccoon River Sand / 4
Jeff Werden – 4/12/17	Martin Marietta	Winterset, East Winterset / 4
Mary A. Green – 4/12/17	Martin Marietta	Earlham / 4
Danny Van Patten - 4/18/17	Martin Marietta	Sully Mine / 1
Wesley Alertsen- 4/18/17	Martin Marietta	Malcom Mine / 1
Brenda Liles – 4/18/17	Martin Marietta	Sully Mine / 1
Joel Tichy – 4/18/17	Martin Marietta	Ferguson / 1
Donna Hughes – 4/18/17	Martin Marietta	Marshalltown Sand / 1
Mark Haskell - 4/18/17	Martin Marietta	Marshalltown Sand / 1
Rex A. Gaskill - 4/18/17	Martin Marietta	Marshalltown Sand / 1
Thomas Owens Jr. - 4/18/17	Martin Marietta	Colfax Sand / 1
Viki Sauerman - 4/18/17	Martin Marietta	Saylorville Sand / 1
Craig Groover - 4/18/17	Martin Marietta	Saylorville Sand / 1

Weighmaster/Expiraton Date	Company Name	Source Name / District
Diane Thomas – 4/18/17	Martin Marietta	Durham Mine / 5
Joyce Davis - 4/18/17	Martin Marietta	Durham Mine / 5
Daryl Scott - 4/18/17	Martin Marietta	New Harvey Sand / 5
Cherene M Vote – 5/4/17	Martin Marietta	Moore / 2
Sandra Johnson – 5/4/17	Martin Marietta	Mason City / 2
Brenda L. Benjamin – 5/4/17	Martin Marietta	Moore / 2
Michell Thilges – 5/4/17	Martin Marietta	Pedersen / 2
Tonya Holmes – 5/11/17	Martin Marietta	Harris / 2
Karen Ries – 5/11/17	Martin Marietta	Mason City / 2
Doug Seela – 5/11/17	Knife River Midwest	Voss / 2
Becca Williams – 5/11/17	Knife River Midwest	Voss / 2
Aaron L. Conn – 5/11/17	Martin Marietta	New Harvey Sand / 5
Linda Jones – 5/11/17	Martin Marietta	Cedar Rapids / 6
Marjean McMahon – 5/17/17	Martin Marietta	Cedar Rapids / 6
Jeanne M Stoner – 5/17/17	Martin Marietta	Linn County Sand / 6
Tammy Draper-Hansen- 5/31/17	Martin Marietta	Alden / 1
Coby Metz – 5/31/17	Martin Marietta	Colfax Sand / 1
Jason Hinkle – 5/31/17	Martin Marietta	Fort Dodge Mine / 1
Rick A. Burchard – 5/31/17	Martin Marietta	Ferguson / 1

LEVEL I HMA
UPDATE

*2012-2013
HMA Level I Update
Specification and IM Changes

*IM 213
*Requires the HMA Level I certified technician to attend two updates during the 5 year certification period in order to apply for recertification. Failure to attend at least two updates will require the technician to attend the full school again in order to remain certified. Web updates are now being offered. Attend an update every year – they are free!



*I.M. 213 discusses the Unsatisfactory Notice that Certified Technicians are given when they are not performing their job duties satisfactorily the technician is given one written notice, the second notice is three-month certification suspension, and the third notice is decertification. According to I.M. 213 the Certified Technician can automatically be decertified for false statements without going through the Unsatisfactory Notice procedure.
*IM 213

* The Certified Technician also needs to be aware of the false statement clause that is applicable to all federal-aid projects and the fraudulent practice clause that applies to all non-federal aid projects. **Certified Technicians need to read and be aware of U.S.C. 1020 and Iowa Code 714.8 since these do apply to them.**

* FEDERAL CODE 1020 and IOWA CODE 714.8

FEDERAL AID PROJECTS

* IX. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS
* **Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law.**

* "Whoever knowingly makes any **false statement or false representation** as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 1, 1916, (39 Stat. 355), as amended and supplemented; **Shall be fined not more than $10,000 or imprisoned not more than 5 years or both"**

* NOTICE TO ALL PERSONNEL ENGAGED ON FEDERAL-AID HIGHWAY PROJECTS 18 U.S.C. 1020

- Iowa Code 714.8, subsection 3, defines fraudulent practices. "A person who does any of the following acts is guilty of a fraudulent practice. Subsection 3, Knowingly executes or tenders a false certification under penalty of perjury, false affidavit, or false certificate, if the certification, affidavit, or certificate is required by law or given in support of a claim for compensation, indemnification, restitution, or other payment." Depending on the amount of money claimed for payment, this could be a Class C or Class D felony, with potential fines and/or prison.

NON-FEDERAL AID PROJECTS

- "A contractor may be disqualified from bidder qualification if or when: The contractor has falsified documents or certifications, or has knowingly provided false information to the Department or the Contracting Authority."

Standard Specification Article 1102.03, paragraph C. section 5

- When a weigh belt is used to feed the RAM, moisture content tests must be performed on the RAM at the same frequency as the other aggregates and entered into the computer controls to correct the totalizer readings to dry weight. It is the dry weight from the totalizer printout that is used to determine the amount of RAM used and the pay quantity. The printout from the totalizer is therefore project documentation and a copy needs to be provided to the Engineer daily.

Spec 2001.22

* Special bid items have been added for incentive/disincentive on projects using PWL.
* A dollar figure will be calculated by the contracting authority based on historical data and entered in the bid item on the contract.
* Bid items for incentive/disincentive can then be adjusted on the project.

* Contract Administration

* Spec 2303 2012 Standard Specifications Including GS-12001

Warm Mix Asphalt

* Allows WMA to be used unless specifically excluded.
* WMA is excluded from mixtures placed in travel lanes of Interstate pavements.
* Mixing and compaction temperatures for WMA established by mix design between 215-280°F.

WMA continued

* Production temperature cannot be more than 10°F below JMF target temperature measured at discharge from the mixing unit.
* Moisture sensitivity testing required for traffic levels ≥10,000,000 ESALs.
* When using water injection for WMA the mix design moisture sensitivity testing can be performed on plant produced mix placed off-site at no cost to the Contracting Authority.

* Spec 2303

WMA continued

* WMA technologies must be approved by the Bituminous Engineer.
* When WMA is selected it must be used for the entire bid item unless DME allows.
  - Road surface temperature minimum lowered to 40˚F for WMA lifts.
  - Lab compaction temperature 240˚F.

*Spec 2303

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* **RAM** (RAP and/or RAS)
* No compensation is allowed for required asphalt binder grade changes.
* Up to 5% RAS may be used in all mixes.
* RAS must be certified

*Spec 2303

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* If mix is placed from a prior day's production such as overnight silo storage, uncompacted mix samples must be obtained from the area of placement that contains the prior day's production.
* This applies even if it is less than the first 100 tons **placed**, since the spec excludes only the first 100 tons **produced**.

*Spec 2303

* Liquid anti-strip dosage rates are based on a 10% improvement in TSR.
  * Payment for anti-strip also requires a 10% improvement in TSR
* Additional TSR testing may be required if aggregates are contaminated or coated.
* Additional TSR testing may be required if aggregates in the mix are not fully dried.

*Spec 2303

* Square yards bid items will be included in QMA if the calculated quantity exceeds 1000 tons.
* When mix is produced for multiple bid items in a day all mix tests that day will apply to the lab voids analysis of all the bid items placed.

*Spec 2303

* Moving AAD of lab voids used for acceptance of certain bid items instead of PWL for lab voids:
  * Base widening
  * Non-high speed ramps
  * Non-Interstate shoulders
  * Recreational trails
  * Mix not placed in travel lanes of a permanent pavement

*Spec 2303

* Moving Average Absolute Deviation from Target is the average of the last four absolute deviations from target.
* Moving AAD must be calculated after each test result is available.
* Moving AAD must be maintained ≤ 1.0

* Spec 2303

* If Moving AAD exceeds 1.0 - mandatory shutdown is required.
  * Contractor responsible to shut down
  * Contractor cannot incorporate mix not yet placed
  * Notify Engineer of corrective action before restart
* Moving AAD can only be restarted after a mandatory shutdown.
* Similar to old spec for moving average of Lab Voids

* Spec 2303

* Cores will not be obtained from runout tapers, choose a new random location.
* Field void acceptance for certain bid items and irregular areas will be based on average voids or an approved rolling pattern as determined by the Engineer.
  * Average field voids cannot exceed 8.0%
  * Average field voids pay schedule may be used.

* Spec 2303

* Definition of a lot for field voids modified to include only one bid item.
* Engineer may waive sampling for small lot quantities as before or may modify sampling and testing to include more than one day's production in the lot.
  * Mutual agreement required
  * Samples must be taken prior to trafficking

Spec 2303

* Field voids must be calculated based on all G_{mm} test results from all days production represented by the cores.
* If only one G_{mm} test is available, field voids is based on the single test.

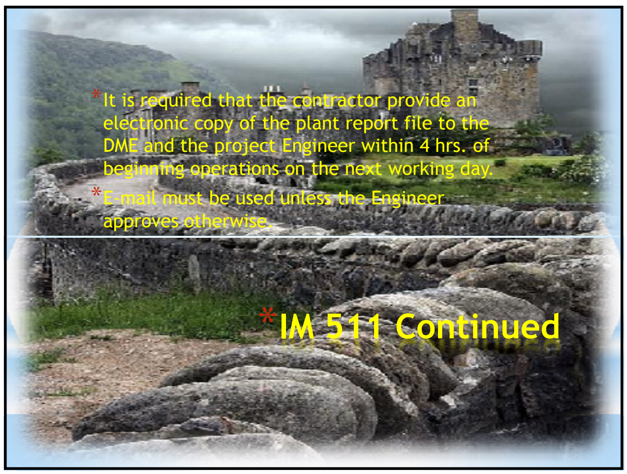
Spec 2303

* Gyratory compactors used on projects must be used in the IAP program.
  * If no IAP information on the compactor, the contractor must obtain approval of the DME
* Hot to hot correlation of tests will be used on the first day of production of each mix whenever possible.

IM 511 - Control of Asphalt Mixtures

IM 511 Continued

* Dispute resolution
  * IAP results may be considered.
  * Series of test results with correlation off more than half the allowed tolerance will no longer result in immediate use of DOT test results.
  * When DOT results are used for any tests, the maximum pay factor for the lot will be 1.000.
  * Gyratory correction factors are based on consistent differences outside of the tolerances on 2 out of 3 tests and may be applied even if validation of test results is not an issue.



IM 505 - Instructions for RAM in Asphalt Mixtures

- Quality control testing is no longer required to incorporate more than 15% Classified RAP into surface mixtures.
- Testing is optional at 1/7000 tons of mix.
- The only restriction on the use of Classified RAP is surface mixes must contain at least 70% virgin binder.

IM 437 Asphalt Binder

- Asphalt binder suppliers must now provide the required bi-weekly test results to the DOT using the Excel format
- A price adjustment schedule has been added to the Construction Manual for m-value and elastic recovery of binders.

IM 510 Method of Design of Asphalt Mixtures

- When RAS is used and the RAM contributes 15-25% of the total binder the binder grade is lowered one grade for both the high and low temperature.
- When RAS is used and the RAM contributes more than 25% of the total binder additional testing is required to select the correct grade.
- If a grade change is required, the temperature spread and elastic recovery requirements of the specified grade must be maintained.

IM 510 Continued

- WMA mix designs must include the proposed production and compaction temperatures.
- Production temperature needed to determine required binder grade changes.
- Production temperature also used for field control as per Section 2303.

Developmental Specifications DS-12030 Oct. 16, 2012

- A DS has been developed that will allow Local Agencies to opt out of paying incentive on asphalt contracts.
- Can be used only on contracts with no federal aid.
- Local Agency must reference the DS in the contract documents to remove incentive provisions in the specifications.

Developmental Specifications

When DS-12030 is applied:

- The moving AAD (absolute deviation from target) will be used in place of PWL for lab voids.
- The pay factor for field voids PWL will be capped at a maximum of 1.000 and the lower limit will be eliminated.

- "The future ain't what it used to be"

Yogi Berra

Supplemental Specifications for Flexible Paving Mixtures SS-12005

- Supplemental Specification SS-12005 has been developed for asphalt mixes and is expected to apply to all asphalt contracts beginning in January 2013.
- Major changes will affect:
  - RAP
  - Moisture sensitivity
  - Joint density

Supplemental Specifications for Flexible Paving Mixtures SS-12005

- RAP
- The Iowa DOT has purchased a XRF test device capable of evaluating the alumina content of aggregate.
- If the aggregate in a **Certified** RAP or millings from an undocumented pavement produces an alumina value meeting Type A quality per Section 4127 it may be used the same as **Classified** RAP.

Supplemental Specifications for Flexible Paving Mixtures SS-12005

- RAP
- XRF testing will be paid for by the Contractor
- Due to the extra testing, the time required to obtain the test results needed for mix design, including the binder content, may take up to two weeks.

Supplemental Specifications for Flexible Paving Mixtures SS-12005

- **Moisture Sensitivity**
- The Hamburg Wheel-Tracking Device will replace T283 type testing.
- Instead of Tensile Strength Ratio (TSR) the new test will use the Stripping Inflection Point (SIP) which is the number of wheel passes applied before the asphalt begins to strip from the aggregate.

Supplemental Specifications for Flexible Paving Mixtures SS-12005

- **Moisture Sensitivity**
- Mix designs for 30M ESALS or containing a high percentage of siliceous aggregates must be evaluated on the Hamburg.
- 10% improvement in test results using an anti-strip agent will no longer be required.
- Consultants are purchasing the equipment to provide this service.
- DOT will test plant produced samples.

Supplemental Specifications for Flexible Paving Mixtures SS-12005

- **Joint Density**
- Longitudinal joint construction will be evaluated by requiring the Contractor to cut 4 additional 6 in. cores directly over the new paving joint.
- The Engineer will select the core locations.
- For information only to help establish a reasonable specification.

Supplemental Specifications for Flexible Paving Mixtures SS-12005

- Other important changes
- Economic evaluation of mix designs that exceed the basic asphalt content by more than 0.75% must include another full mix design that does not exceed the 0.75% rule.
- Aggregate costs for both designs must also be provided for a proper comparison.

Supplemental Specifications for Flexible Paving Mixtures SS-12005

- Other important changes
- Tack coat application rates are revised:
  - New HMA Surface – 0.03-0.05 gal/yd^2
  - Milled HMA Surface – 0.05-0.07 gal/yd^2
  - PCC Surface – 0.04-0.06 gal/yd^2
- Yield checks should be documented to assure the correct rates are used.

Supplemental Specifications for Flexible Paving Mixtures SS-12005

- Other important changes
- The maximum production temperature for WMA is raised from 280°F to 330°F for mix produced after October 1st.
- The requirements for moisture sensitivity testing of WMA is raised from 10M ESALS to 30M ESALS and will match those for HMA.

Supplemental Specifications for Flexible Paving Mixtures SS-12005

- Moisture sensitivity testing of any mix design, not just WMA using water injection, may be performed on plant produced mix placed off-site at no cost to the Contracting Authority.
- Test strips for moisture sensitivity sampling are no longer required.
- The optimum dosage of anti-strip agent determined by the mix design must used throughout mix production.

Supplemental Specifications for Flexible Paving Mixtures SS-12005

- Appendix A
- Moisture Sensitivity Testing of Asphalt Mixtures
- Contains the test method for the Hamburg Wheel-Tracking Device.
- Modifications to the AASHTO T324 test method.
- Method to determine the SIP

Supplemental Specifications for Flexible Paving Mixtures SS-12005

- The changes contained in this Supplemental Specification will be included in the April 2013 General Supplemental Specification GS-12002.
- Appendix A will become an IM in April 2013

Software

- The Plant Report and Charting software is being updated to accommodate the changes discussed.
- It is essential that the letting date be entered correctly in the software to be sure the correct specs are applied.
- New software is being developed to analyze the Hamburg test data.

Iowa Department of Transportation

Technical Training and Certification Program

Course Evaluation Sheet

As part of our continuing effort to improve the program, we ask that you please carefully fill out this evaluation sheet. Your responses are very important to us. We read each comment and consider your suggestions and feedback for future classes. Please use the back of the page if additional space is needed.

Course Name
(*Example: PCC I, AGG II*): ________________

Course Instructor: ______________________

Location of course:
(*District or city*): ______________________

What type of agency do you work for:
a) DOT
b) County or City
c) Consultant
d) Contractor
e) Other

Were the instructor(s) effective in helping you learn? How could they be more helpful?

Were the instructional manuals helpful and user friendly? How could they be improved?

Is there a topic you would have liked to spend more time on? Less time on?

Do you feel prepared to work as a certified tech in this area?

What are one or two things you liked best about this class?

What are one or two things you would like to see done differently in this class?

Thank you!!!