

Quality Management Program

WisDOT/WAPA Asphalt Pavement
Project Manager Training

June 2010

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QMP Components (460.2.8)

- Contractor Quality Control (QC) plan
- Contractor Assurance (CA) plan – optional
- State Quality Verification (QV)

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Quality Control

- HTCP certified personnel for sampling and testing
- Laboratory conforming to WisDOT’s lab qualification program
- Required for contracts with 5000 tons or more of HMA
- For smaller contracts, contractor may use off site lab
- Engineer may waive testing for contracts with less than 500 tons or temporary pavement

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QC Sampling and Testing

5000 tons of HMA or more

- Random sampling (CMM 8.36)
- HMA mix from trucks at plant
- Perform tests same day as taking samples
- Retain split samples for 14 days

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QC Sampling and Testing

Total Daily Plant Production	Samples per Day
50 to 600 tons	1
601 to 1500	2
1501 to 2700	3
2701 to 4200	4
Greater than 4200	Add 1 sample for each additional 1500 tons or fraction of 1500 tons

Sample size:

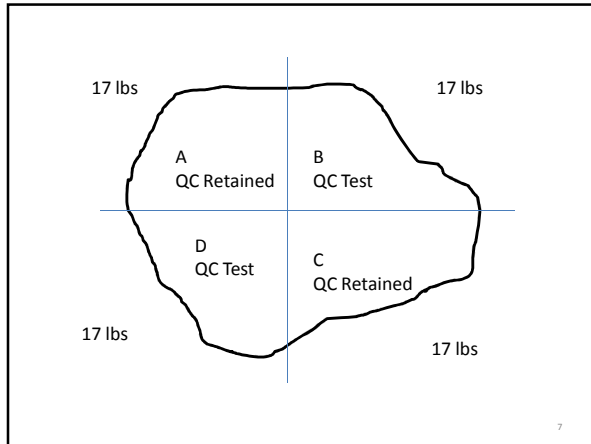
≤ 12.5 mm	70 lb
19-25 mm	100 lb
≥ 37.5 mm	160 lb

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Sample Identification

- Contractor
- QC, QC-ret, QV, QV-ret
- State project ID
- Date
- Sample number
- Type of asphaltic mixture
- State mix design ID (250-XXXX-yr)
- Percent binder
- Daily tonnage sampled
- Current bulk specific gravity of the aggregate (G_{sb})

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QC Testing

- Blended aggregate gradation and fines (P200)
- Asphalt content – by calculation, optionally by nuclear gauge reading or inventory
- Bulk specific gravity of compacted HMA
- Maximum specific gravity of HMA
- Air voids
- VMA – by calculation

Additional QC Testing

- First day of production and once for every 8 production samples
- Minimum of one test per production week
- Aggregate stockpile gradations from cold feed bins or stockpile
- RAP extractions sampled from cold feed bin or stockpile
 - May waive if stockpiles tested while built
- Field TSR tests on mixes with antistrip (not required on contracts with less than 5000 tons)

QC Documentation

- Daily records
- Running average calculation sheet – blended agg, mixture and binder content, daily
- Air void chart, daily
- Original testing records and control charts to engineer within 10 days after paving completed

QC Control Charts

- Asphalt content, %
- Bulk specific gravity
- Air voids, %
- VMA, %
- Blended aggregate gradation – percent passing 37.5, 25.0, 19.0, 12.5, 9.5, 2.36 and 0.075 mm sieves
- Plot individual results (black) and 4 point running average (red); CA data (blue); warning limits (dashed green); JMF limits (dashed red)

Control Limits

Item	JMF Limits	Warning Limits
37.5 mm	+/- 6.0	+/- 4.5
25.0 mm	+/- 6.0	+/- 4.5
19.0 mm	+/- 5.5	+/- 4.0
12.5 mm	+/- 5.5	+/- 4.0
9.5 mm	+/- 5.5	+/- 4.0
2.36 mm	+/- 5.0	+/- 4.0
0.075 mm	+/- 2.0	+/- 1.5
Asphaltic Content %	+/- 0.4	+/- 0.3
Air Voids %	+/- 1.3	+/- 1.0
VMA %	- 1.5	- 1.2

Average of last four test results.
Consider action when results approach warning limits.

Pay Adjustment

Item	Within Warning Bands	Outside JMF Limits
Gradation	90%	75%
Asphalt Content	85%	75%
Air Voids	70%	50%
VMA	90%	75%

- If running average exceeds JMF limits, stop production and make adjustments.
- If air voids running average of 4 exceeds JMF limits, remove and replace. Engineer may allow to remain in place at 50% pay.
- If 4 pt running average exceed JMF for other properties, engineer may allow to remain in place at 75% pay.

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Optional Contractor Assurance

- Contractor may provide CA data to support
 - Process control decisions
 - Troubleshooting problems
 - Limiting liability for nonconforming product
- Certified personnel and lab required
- Provide test results to engineer within 2 business days
- Sample is split of a QC sample

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CA Testing

- Bulk specific gravity of compacted mixture
- Maximum specific gravity
- Air voids
- VMA
- Stockpile gradation
- Blended aggregate gradation on plant mix
- Fine aggregate angularity

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Quality Verification (QV)

- Verification testing of independent samples
- Observing contractor sampling and testing
 - Engineer directly observes sampling and takes immediate possession
- Monitoring control charts
- Engineer may direct contractor to take additional samples at any time during production

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QV Requirements

- Certified personnel
 - HTCP level I or higher to observe QV sampling
 - Level I or higher of HMA ACT under a level I technician to split samples and do testing
 - Level I or higher to ensure sampling and testing is performed correctly, analyze test results and post resulting data
- Qualified lab – separate from contractor's lab

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QV Testing

- Bulk specific gravity of compacted mixture
- Maximum specific gravity
- Air voids
- VMA
- No tests for less than 501 tons
- 1 test for 501 to 30,000 tons
- One additional test for each additional 30k tons

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QV Results

- Quality is acceptable if
 - Air voids within 2.7 to 5.3%
 - VMA is within -1.5% of minimum
- If QV results are outside limits, engineer will investigate through dispute resolution
- Dispute resolution – bureau's AASHTO accredited lab and personnel will test retained QV sample and nearest QC retained sample

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Corrective Action

- Remove and replace nonconforming material
- Reduced pay (50%) for nonconforming material allowed to remain in place

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QMP Ride

- Contractor testing with inertial profiler
- Inertial profiler from list of approved devices
 - Calibrated
- Certified operator
- Profile final mainline riding surface
- Include in QC Plan
- Standard segment = 500 feet long
- Department may do verification testing

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QMP Ride Categories

- HMA I – multiple opportunities to improve ride (layer of HMA, wedge and level, milling or grinding)
- HMA II – single opportunity to improve ride
- HMA III – asphalt pavement sections with a bridge, bridge approach, railroad crossing or intersection.
- HMA IV – like HMA III but speed limit < 55 mph

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Ride Corrective Actions - Localized

Engineer to assess areas with IRI > 175 in/mi

1. Have contractor correct roughness
2. Leave in place with no pay reduction
3. Assess pay reduction (except HMA IV)
 - Length in feet x (IRI - 175)
 - Max \$250 for areas less than 25 feet long
 - Longer than 25 feet - \$10 per foot.

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Ride Corrective Actions - Excessive

IRI > 140 in/mi

- HMA I – correct to 60 in/mi
- HMA II – correct to 85 in/mi
- By milling and replacing full width
- Or correct using techniques approved by engineer
- Reprofile after correction

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- Questions?
- Comments?
- Experiences?

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