

# Maryland DOT / SHA Specifications, Policies & Procedures

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## Expected Outcomes

Industry - The Level 1 Tech will be able to properly sample from stockpiles, trucks, and belts. They will be able to accurately test the sampled product and record their test results. They will have knowledge of MD Specifications.

SHA -The Level 1 Tech will learn the skills needed to validate the sampling, testing, calculations, and paperwork to complete the QA testing on plant production. They will gain knowledge of Maryland Specifications.

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## Key Terms

**Quality Control** - Control of the production process to meet the specification requirements.

**Quality Assurance** - Procedure used by the buyer (state) to assure materials meet specification needs.



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## Key Terms

**Acceptance** - Any procedure used by the state that will assure the state that the material meets minimum specifications without a price adjustment. Includes:

- visual inspection,
- reviewing plant records,
- sampling and testing of mix,
- statistical analysis



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## Specifications thru the Years

- Method Specs - ? To 1994. Inspectors in Plants Daily
- QA/QC – 1994 – 1997 Plant and Field Operations Teams.
- QA/QC – 1998 to present date.  
Statewide Asphalt Team. Random Inspections;  
End-Result Specifications
- Performance Related Specs - The Future



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## End-Result Specifications

- Specification Stipulates Final Characteristics of the Product  
For Example: Voids Total Mix (VTM)  
Asphalt Content (AC), In-place  
Air Voids (VA)
- Contractor – Chooses Method to Achieve those Characteristics

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## **End-Result Specifications**

- **Various Ways of Specifying Acceptance Criteria**
  - minimum layer thickness, range of in-place values, statistical techniques
- **Elements of Method Specifications Incorporated**
- **Leads to a Greater Degree of Competition**

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## **Statistics in End-Results QC/QA Specification**

- **Variability- Inherent Product Variability, Sampling and Testing**
- **Properly Formulated Statistical Spec. Provides Best Insurance that:**
  - > Buyer is getting what they paid for
  - > Seller will be paid a fair price for their product

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## **Performance Specification**

- End Result Quality Characteristics based on Performance
- Product Payment is related to Expected Performance Over Time
- Warranty, Limited Warranty, Design/Build

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## **Performance Specification**

- Contractor- Greater Degree of Leeway
- Contractor- Responsible for Performance Within the Context of What They Have Control Over

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## **Perspective of Specification**

### State's View

- Quality is first
- Stewardship over Taxpayer's Money
- Partner vs. Police
- Delivery of a product that meets specs

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## **Perspective of Specification**

### Contractor/Producer's View

- Profit
- Company Image
- Do a good job
- Deliver a product that meets specs

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## Plant Quality Control Plans

QUALITY CONTROL PLAN – Category 500 Paving

- Master Plant Quality Control Plan.
- Field Quality Control Plan - specific to each contract/project.

Question: Of what importance is the Plant Quality Control Plan to the Level 1 Technician?

Answer: The QC Plan gives the current sampling frequency for your plant.



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## Record Keeping

The Contractor shall maintain and make available to the Engineer upon request complete records of sampling, testing, actions taken to correct problems and quality control inspection results. Provide copies of the reports when requested.

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## Record Keeping

GP-7.36: Documents shall be retained for three years after final payment....and make them available for inspection and audit...

Includes:

- HMA-1 Worksheets
- Form 88
- Core Reports

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## Quality Control - Producer

### ❖ 915.02.01 Certified HMA Plant

Producer is responsible for QC of plant operations to ensure that the material meets specifications.

QC process will be subject to unannounced periodic inspection by representatives of the Engineer when Administration projects are in progress.

The plant's certified technician shall fully participate in the inspections.



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## **Quality Control - Producer**

- Responsibilities of the Asphalt Producer:
- Notification for Inspection
- Quality Control – Use of QC Plan, QA Manual (test frequencies)
- Reports

915.02.01

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## **Responsibilities of the Administration**

- Split Samples to Evaluate Effectiveness of Plant QC Operation
- IA Audits

915.02.01

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## Acceptance (Agency)

- Conducting independent verification (Acceptance) sampling and testing separate from the contractor/producer.
- Periodically observing tests performed by the producer.
- Monitoring required control charts.

➤ MD Standard Specification 504.03

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## Acceptance (Agency)

- Directing the producer to take additional samples at any time and location.
- Monitoring the Contractor's conformance with the approved Quality Control Plan.
- Evaluating quality control sampling and testing by an Independent Assurance (IA) program.

➤ MD Standard Specification 504.03

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## Recertification of Asphalt Plant

**If Plant Approval is Rescinded:**

**A Professional Engineer shall submit documentation of corrective action.**

**When this documentation is approved, a comprehensive inspection will be done to recertify the Asphalt Plant.**

915.02.01

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## Technician Certification

- 915.02.01 Must be certified as per MARTCP
- 504.03 When a certified technician is deficient in their duties, certification will be rescinded. Replace technician with another certified tech before resuming production and paving operations.

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## Compaction – 504.03.06

What is the most important part that the Level 1 Tech plays in determining the compaction on the project?

Determining an accurate maximum specific gravity

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## Compaction – 504.03.06

What are the two Maryland approved methods of determining the density of the mat at a state project?

Core Method or Density Gauge

Which of the two above methods is considered to be the way to find the “true” density of the mat?

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## SHA Mix Specification

Lot size: 6000 tons

Sample Frequency: Minimum of 1/day/mix or 1/1000 tons, whichever yields higher frequency.

QA Sample Location: Behind the Paver

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## SHA Mix Specification

QC Sample Location: As approved in QC plan; only BTP results combined with QA.

QA test compared to QC by MSMT 733, t & F tests. If comparable, QC & QA results will be combined to determine final pay factor. If not, only State results will be used.

**Incentive / Disincentive**

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904.04.05 - Plant Control; The following tolerances shall apply:

TABLE 904 C - MIX TOLERANCES

PHYSICAL PROPERTY	TOLERANCE
Passing No. 4(4.75mm) sieve and larger,%	±7(a)
Passing No. 8(2.36mm) thru No. 100(150um) sieve, %	±4
Passing No. 200(75um) sieve, %	±2
Asphalt content, %	±0.4
Ratio of dust to binder material,	0.6 to 1.6 (b)
Mix temperature leaving plant versus design mix temperature, F (C)	±25 (14)
Deviation of maximum specific gravity per lot versus design max.sp.gr.	±0.30
Voids, total mix, (VTM),%	4 ±1.2
Voids, total mix, SR mix (VTM),%	3 ±2
Voids in mineral aggregate,(VMA), %	±1.2 from design target
Voids filled asphalt (VFA),%	Within spec
Bulk specific gravity, $G_{mb}$ , %	±0.022
Gmb at $N_{max}$ , %	±0.5

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## Why do we have plant control tolerances?

### What plant errors can affect the test results of a mix ?

- Quarry
- Trucking to the plant
- Handling of stockpiles
- Cold Feed Calibration
- Drum Mixer configuration - flights, etc.
- Slat Conveyor
- Silo
- Loading Procedure
- Sampling Procedure
- Testing Procedure
- Operator Error

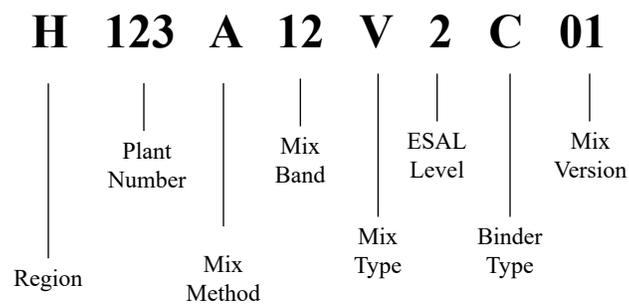
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## MDSHA Policies

- Loading Trucks from a Silo
  - Front - Back - Middle or
  - Back - Front - Middle
- Tack Truck Inspection
- One Plant per Mix
- Use Maryland's mix code.....

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## Mix Design Number

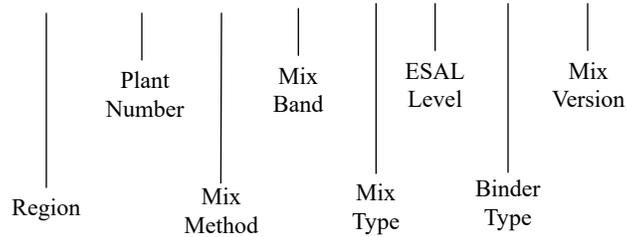


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## Mix Design Number

**H 123 A 12 V 2 C 01**



Common Binder Types: C 64S-22 (64-22)  
F 64H-22 (76-22)

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## Procedures

### ➤ MSMT Test Procedures

#### Maryland State Method of Tests

<http://www.roads.maryland.gov/OMT/msmtindex.pdf>

### ➤ AASHTO & ASTM Test Procedures

Do you have access to AASHTO and ASTM?

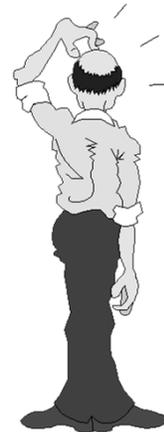
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## Review Questions

- ✓ What is the difference between QA, QC and Acceptance?
- ✓ What type specification does Maryland use?
- ✓ Why do you need a QC Plan?
- ✓ Where can you find sample frequencies?

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ANY  
QUESTIONS ?



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