

Specifying the Right Mixture and Level of Quality

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Contract Items

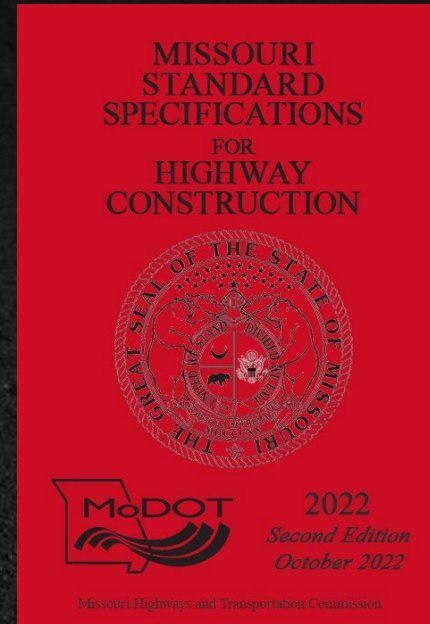
- Specifications and Standards
- Having or hiring a competent lab
- Tests and Testing
- Sampling and Sample Handling
- Weather
- Smoothness
- Identifying segregation
- Acceptance

Specification

- Clear, Correct, Complete, and Concise
- Written documentation describing the scope of work, any materials that are to be used, the methods of installation, and the quality of workmanship
- Prescriptive, Performance, **Proprietary**
- Responsibilities
- Acceptance and Payment

Use Existing Specifications

- Competitive Bid
- Local
 - MoDOT
 - St. Louis County
 - APWA



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Mixture Selection

Corridor Designation	Traffic	Layer Type	Recommended Mix	Asphalt Binder
Maintenance		Surface/Wedge	SL	PG 64-22
Residential		Surface	BP-2	PG 64-22
		Binder/Base	Bit. Base	PG 64-22
Collector	<600 Trucks Daily	Surface	BP-1	PG 64-22
		Binder/Base	Bit. Base	PG 64-22
	>600 Trucks Daily	Surface	SP095E/SP125E	PG 64-22
		Binder/Base	SP190F/SP250F	PG 64-22
Arterial		Surface	SP095C/SP125C	PG 64-22
		Binder/Base	SP190F/SP250F	PG 64-22

Thickness and Factors

Minimum Lift Thickness - Inches

SL	BP-2	BP-1	Bit. Base	SP095	SP125	SP190	SP250
1.0	1.5	1.75	3.0	1.5	2.0	2.25	3.0

Estimate Factors Ton/yd³

BP-2	1.934
BP-1	1.948
Bit. Base	1.943
SP095	1.913
SP125	1.927
SP190	1.940
SP250	1.946

Tack Coat

Tack Coat Application Rates

Surface Type	Target Rate: Undiluted (gal/yd ²)	Target Rate: 20% Diluted (gal/yd ²)
New Asphalt	0.05	0.06
Existing or Concrete	0.08	0.10
Coldmilled	0.10	0.13

What is Important?

- Quality.
- Experience/Expertise.
- Organization.
- Timeliness.

HAVING OR HIRING A COMPETENT LAB

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Quality

- *“the standard of something as measured against other things of a similar kind; the degree of excellence of something”*



- Find a lab that compares itself against others in the industry.

- AASHTO R18 Accreditation
- ASTM Accreditation

Experience/Expertise

- Overall Years of Experience
- Technician Certifications
 - State DOT
 - NCAT (Auburn)
 - Asphalt Institute

2 main components to HMA

Aggregate (93 – 96%) = Structure

Liquid Asphalt (4 – 7%) = Glue/Binder

ASPHALT TESTING

Asphalt Content

- Asphalt Content of an Asphalt Mixture - the overall percentage of liquid asphalt binder in the mixture.
- Asphalt Content affects the aggregate coating and binding, as well as the volumetric properties of an asphalt mix.
- Can be determined by:
 - 1.) Nuclear Method
 - 2.) Ignition Oven Method
 - 3.) Chemical Extraction Method

Asphalt Content



- Possible Field Issues:
- Excessive amounts of AC can lead to detrimental rutting, and flushing.
- Insufficient amounts of AC can lead to premature raveling, cracking, and moisture susceptibility issues due to lack of density.

Gradation

- Correct Aggregate Gradation will ensure proper aggregate particle sizing for desired mixture.
- Improper gradation can lead to density failures. Along with Film Thickness issues.

Plant Mix Bituminous Surface Leveling	
Sieve Size	Percent Passing by Weight
3/4 inch	100
1/2 inch	99-100
3/8 inch	90-100
No. 4	60-90
No. 8	40-70
No. 30	15-35
No. 200	5-12

Density

- Spot checked in the field, to ensure minimum density of HMA is being achieved.
- Acceptable – *Field Density Percent of Maximum Theoretical Density: 91.5% or above (FOR LOW-TYPE MIXES)*



TESTING FREQUENCIES

TEST	RECOMMENDED FREQUENCY
ASPHALT CONTENT	AT LEAST ONCE PER 1,000 TONS
GRADATION	AT LEAST ONCE PER 1,000 TONS
DENSITY	AT LEAST ONCE PER 500 TONS

- Job specific
- If production tonnage is low or unknown, daily frequencies can be utilized.



SAMPLING & SAMPLE HANDLING

"Your test results are only as good as your sample!"

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SAMPLING & SAMPLE HANDLING

- Sampling options:

- Plant Samples
 - Truck
 - Mini-Stockpile
- Roadway

Proper sample location is critical to the integrity of the sample.

- PRECAUTIONS:

- Do Not Overheat
- Keep Covered
- Do Not incorporate foreign substances into sample when pulling it. (tack, debris)
- Avoid segregated areas



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Weather

- Temperature (Ambient or Surface)
 - Surface
 - Base
- Moisture
 - Physically present
 - From previous rain event (ground moisture)
- Frozen pavement
- Reasonable Expectations / Limitations

Smoothness

- What are the options to choose from?



Smoothness

- IRI (International Roughness Index)
 - Used with High Speed/ Low Speed
 - Uses lasers to analyze pavement
 - Accurate (True Profile)



Smoothness

- Profile Index (California Style)
 - Low speed
 - Reasonable accuracy
 - Ability to identify bumps or dips



Smoothness

- Straight Edge
 - Typically, $\frac{1}{4}$ " tolerance within 10 foot
 - Cost effective
 - Quick informational checks



Smoothness

- Communicate expectations
- What results should I expect?
- What are my variables?
 - Traffic speed and usage
 - New/old construction?
 - Multi lift?
 - Intersections?
 - Utilities?

Identify Segregation

- Aggregate Segregation
 - Longitudinal strips
 - End of load segregation
 - Hand work
 - Around manholes/ utilities
 - Radius and variable widths
 - Headers
 - Situational paving (cul-de-sacs, islands)



Segregation



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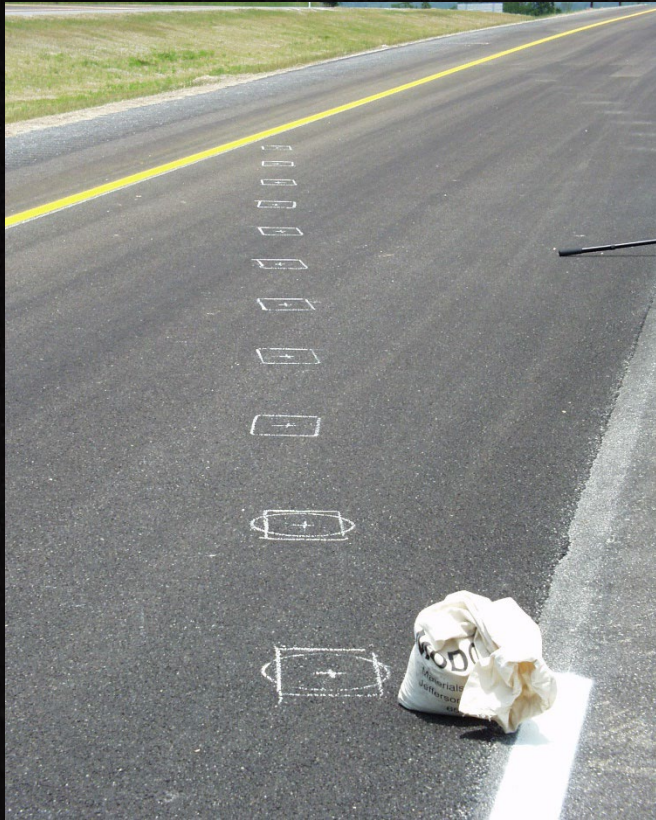
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Identify Segregation

- Density Segregation
 - Non-visual
 - Excessive deviation in density across the mat
 - Indicator of more consistent rolling pattern
 - Overall uniformity

Segregation Test



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