

**2011 HOT MIX ASPHALT (HMA) PAVEMENT
 GUIDE SPECIFICATIONS
 FOR
 LOCAL GOVERNMENTS**

This guide specification incorporates the latest asphalt pavement technologies. It attempts to present the best practices/procedures and processes, but it is not intended to replace sound engineering knowledge, judgment and experience.

The Indiana Department of Transportation (INDOT) Standard Specifications, Section 402, shall apply with the exceptions as noted herein. The current version of the INDOT Specifications, Recurring Special Provisions, and Supplemental Specifications are applicable.

HMA.01 Description

This work shall consist of one or more courses of Hot Mix Asphalt (HMA) or (WMA) base, intermediate, surface mixtures or other miscellaneous HMA application, produced from an INDOT Certified HMA plant, in accordance with Indiana Test Method (ITM) 583

HMA.02 Quality Control

HMA shall be supplied from a certified HMA plant in accordance with ITM 583 – Certified Volumetric Hot Mix Asphalt Producer Program. HMA shall be transported and placed according to a Quality Control Plan (QCP) prepared by the Contractor in accordance with ITM 803 – contractor Quality Control Plan for HMA Pavement, and submitted to the Architect/Engineer five (5) calendar days prior to commencing HMA paving operations.

HMA.03 Materials shall remain the same as 402.03

HMA.04 Design Mix Formula and Mixture Type

The design mix formula, shall be prepared in accordance with 402.05, and shall be based on the following table:

<i>Mixture Type</i>	<i>Type A *</i>	<i>Type B*</i>	<i>Type C*</i>	<i>Type D *</i>
<i>Design ESAL</i>	200,000	2,000,000	9,000,000	11,000,000
<i>AADT</i>	<4000	4000- 15,000	15,000-30,000	>30,000
<i>Surface</i>	4.75, 9.5, 12.5 mm	4.75, 9.5, 12.5 mm	4.75, 9.5, 12.5 mm	4.75, 9.5, 12.5 mm
<i>Surface - PG Binder</i>	64-22	64-22	70-22	70-22
<i>Intermediate</i>	9.5, 12.5,19.0,25.0 mm	9.5, 12.5,19.0,25.0 mm	9.5, 12.5, 19.0,25.0 mm	9.5, 12.5,19.0,25.0 mm
<i>Intermediate - PG Binder</i>	64-22	64-22	64-22	70-22
<i>Base</i>	19.0, 25.0 mm	19.0, 25.0 mm	19.0, 25.0mm	19.0, 25.0 mm
<i>Base - PG Binder</i>	64-22	64-22	64-22	64-22

*A higher category mix may be used for a lower category application if the contractor so elects. The substitution will be at no additional cost to the agency.

HMA may be produced as warm-mix asphalt (WMA) for HMA mixtures and type A, B and C. The DMF shall list the minimum plant discharge temperature for HMA and WMA as applicable to the mixture. The mixtures may be produced as warm-mix asphalt (WMA) by using a water injection foaming device or other approved additives per the manufactures recommendations.

When warm mix is delivered to the project each load ticket must be identified by having “WMA” printed on the ticket.

Recycled Materials (RAP/RAS % based on Binder Replacement %)

HMA mixtures utilizing RAP or RAS or a blend of RAP and RAS

Maximum Binder Replacement, %							
Mixture Category	Base and Intermediate				Surface		
	Dense Graded				Dense Graded		
	25.0 mm	19.0 mm	12.5 mm	9.5 mm	12.5 mm	9.5 mm	4.75 mm
A	40.0*				40.0*		
B	40.0*				40.0*		
C	40.0*				25.0		
D	40.0*				25.0		

*RAS materials shall not contribute more than 25% by weight (mass) of the total binder content for any HMA mixture.

The RAP coarse aggregate shall pass the maximum size sieve for the mixture being produced and the RAS shall be 100% passing the 1/2in. (12.5 mm) sieve.

Surface Aggregate Type: For Type C Mixtures, surface aggregates shall meet the requirements for less than 3,000,000 ESAL as per Section 904.03(d).

Section 904.03d (Table)

Coarse Aggregate Type	Traffic ESALs < 3,000,000
Air-Cooled Blast Furnace Slag	Yes
Steel Furnace Slag	Yes
Sandstone	Yes
Crushed Dolomite	Yes
Polish Resistant Aggregates	Yes
Crushed Stone	Yes
Gravel	Yes

For Type D mixtures, surface aggregates shall meet the requirements for less than 10,000,000 ESAL as per section 904.03(d).R

Section 904.3d.R (Table)

Coarse Aggregate Type	Traffic ESALs < 10,000,000
Air-Cooled Blast Furnace Slag	Yes
Steel Furnace Slag	Yes
Sandstone	Yes
Crushed Dolomite	Yes
Polish Resistant Aggregates	Yes
Crushed Stone	No
Gravel	No

HMA.05 Volumetric Mix Design shall remain as 402.5

HMA.06 Job Mix Formula

A HMA DMF/JMF per 401/402 will be developed by a certified HMA Producer. The DMF/JMF will be in an acceptable format and given to the contracting agency one week prior to use. A DMF/JMF used in the current or previous calendar year that was developed to N_{des} will be allowed.

HMA.07 Mix Criteria shall remain as 402.7

HMA.08 Recycled Materials

Recycled materials may be used as a substitute for a portion of new materials required to produce the HMA (WMA) mixture. Recycled materials may consist of reclaimed asphalt pavement (RAP) or recycled asphalt roofing shingles (RAS) or a blend of both. RAP shall be the product of cold milling or crushing of an existing pavement. The RAP shall be processed so that 100% will pass the 2 in. (50mm) sieve when entering the plant.

RAS shall consist of waste from a shingle manufacturing facility or tear-off shingles from roofs (post consumer). RAS shall meet AASHTO specification MP 15, Standard Specification for Use of Reclaimed Asphalt Shingle as an Additive in Hot Mix Asphalt and the mix design shall be done according to AASHTO PP 53 Standard Practice for Design Considerations When Using Reclaimed Asphalt Shingles in New Hot Mix Asphalt. RAS shall be 100% passing the ½" (12.2mm) sieve.

Recycled materials may be used as a substitute for a portion of the new materials required to produce the HMA mixture. When only RAP is used, the RAP shall not exceed 40% by weight (mass) of the total mixture. RAS may be substituted for RAP at a ratio of 1% RAP equal to 5% RAS. Total RAS shall not exceed 5% by weight (mass) of the total mixture. Up to 5% RAS may be used when the source is manufacturer waste. Up to 3% RAS can be used when source is post consumer.

HMA.09 Acceptance of Mixtures

Acceptance will be in accordance with the frequency Manual on the basis of a type D certification in accordance with 916(d). The HMA Certification shall be the quality control test representing the material and shall include air voids and binder content for material supplied to the project,

HMA.10 General shall remain the same as sections 402.10

HMA.11 Preparation of Surfaces to be Overlaid shall remain the same as 402.11

HMA.12 Weather Limitations

HMA courses less than 110 lb/syd are to be placed when the ambient and surface temperatures are 60° F or above. HMA courses equal to or greater than 110 lb/syd but less than 220 lb/syd are to be placed when the ambient and surface temperatures are 45° F or above. HMA courses equal to or greater than 220 lb/syd are to be placed when the ambient and surface temperatures are 32° F or above. Mixture shall not be placed on a frozen subgrade. However, HMA courses may be placed at lower temperatures if approved by the owner's representative.

HMA.13 Spreading and Finishing shall remain the same as 402.13

HMA.14 Joints shall remain the same as 402.14

HMA .15 Compaction

The HMA mixture shall be compacted with equipment in accordance with 409.03(d) immediately after the mixture has been spread and finished. Rollers shall not cause undue displacement, cracking, or shoving.

Rollers	Number of Roller Applications					
	Courses < 440 lb/syd (240 kg/m ²)				Courses > 440 lb/syd (240 kg/m ²)	
	Option 1	Option 2	Option 3	Option 4	Option 1	Option 2
Three Wheel	2		4		4	
Pneumatic Tire	2	4			4	
Tandem	2	2	2		4	
Vibratory Roller				6		8

HMA.16 Low Temperature Compaction Requirements

HMA courses less than 110 lb/syd are to be placed when the ambient and surface temperatures are 60° F or above. HMA courses equal to or greater than 110 lb/syd but less than 220 lb/syd are to be placed when the ambient and surface temperatures are 45° F or above. HMA courses equal to or greater than 220 lb/syd are to be placed when the ambient and surface temperatures are 32° F or above. Mixture shall not be placed on a frozen subgrade. However, HMA courses may be placed at lower temperatures if approved by the owner’s representative.

HMA.17 Shoulder Corrugations shall remain the same as 402.17

HMA.18 Pavement Smoothness shall remain the same as 402.18

HMA .19 Method of Measurement shall be as per HMA.20

HMA.20 Basis of Payment

	Per Ton	Per Square Yard	Lump Sum
HMA Surface	X	X	X
HMA Intermediate	X	X	X
HMA Base	X	X	X
