

**2017 RECOMMENDED GUIDE SPECIFICATIONS
FOR ASPHALT PAVEMENT
FOR
LOCAL GOVERNMENTS AND NON-GOVERNMENTAL APPLICATIONS**

This recommended 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 400- ASPHALT PAVEMENTS dated 2016, shall apply with the modifications as noted herein. Section numbers refer to Indiana Department of Transportation Standard Specifications.

HMA.01 Description

This work shall consist of one or more courses of Hot Mix Asphalt (HMA) base, intermediate, surface mixtures or other miscellaneous HMA application.

HMA.02 Quality Control

HMA shall be supplied from a Certified HMA Plant in accordance with Indiana Test Method (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 Contracting Agency five (5) calendar days prior to commencing HMA paving operations.

HMA.03 Materials

Asphalt Materials- PG binders for HMA shall be supplied by an approved INDOT supplier in accordance with ITM 581, Asphalt Supplier Certification (ASC) Program and shall meet the requirements of Section 902.01

Aggregate materials for HMA mixtures shall be supplied by an INDOT Certified Aggregate Producer (CAPP). The aggregates shall meet the requirements of Sec. 904.

The HMA fine aggregate materials shall meet the requirements of Sec. 904.02(b), except the fine aggregate angularity table shall be modified as follows:

FINE AGGREGATE ANGULARITY		
Type	Depth from Surface	
	≤ 4 inches	> 4 inches
A	(see note)	
B	40 (see note)	40
C	45	40
Note: for 4.75 mm mixtures the fine aggregate angularity shall be 40 for Type A and 45 for Type B and C		

The HMA coarse aggregate materials shall meet the requirements of 904.03(b), except the coarse aggregate angularity table shall be modified as follows:

COARSE AGGREGATE ANGULARITY		
Type	Depth from Surface	
	≤ 4 inches	> 4 inches
A	55	
B	75	50
C	85/80*	60
• Denotes two faced crushed requirements		

HMA coarse aggregates for surface mixtures shall meet the requirements of Section 904.03(d), except they may be modified as follows when the design speed or posted speed limit is equal to or less than 45 mph.

Coarse Aggregate Type	Traffic ESALs		
	< 3,000,000	< 10,000,000	≥ 10,000,000
Air-Cooled Blast Furnace Slag	Yes	Yes	Yes
Steel Furnace Slag	Yes	Yes	Yes
Sandstone	Yes	Yes	Yes
Crushed Dolomite	Yes	Yes	Yes
Polish Resistant Aggregates	Yes	Yes	Yes
Crushed Stone	Yes	Yes	(Note)
Gravel	Yes	Yes	(Note)
Note : Crushed Stone or gravel may be used in accordance with Indiana Test Method (ITM) 221			

HMA.04 Design Mix Formula and Mixture Type

The design mix formula (DMF), shall be prepared by an INDOT approved Mix Design Laboratory in accordance with Sec. 401.05, and submitted to the Contracting Agency in an acceptable format one week prior to use. The DMF shall be based on the Mixture Type (Design ESAL) and mixture designation of the following Table.

Mixture Type	Type A *	Type B*	Type C*
<i>Design ESAL</i>	<i><300,000</i>	<i>300,000 to <3,000,000</i>	<i>≥3,000,000</i>
<i>AADT (Average Annual Daily Traffic)***</i>	<i><4000</i>	<i>4000- 15,000</i>	<i>15,000-30,000</i>
<i>AADTT (Average Annual Daily Truck Traffic)***</i>	<i>< 50</i>	<i>50-1700</i>	<i>>1700</i>
<i>Commercial & Residential Application***</i>	<i>Residential Driveways, passenger car parking ,<500 stalls, < 20 **heavy trucks per day, service stations</i>	<i>Parking Lots with 20-300 **heavy trucks per day, Truck Stops</i>	<i>Heavy Commercial parking with 150-300 **heavy trucks per day</i>
Surface-			
Nominal Max. Aggregate Sizes (NMAS)	4.75 mm, 9.5 mm 12.5 mm	4.75 mm 9.5 mm 12.5 mm	4.75 mm 9.5 mm 12.5 mm
<i>PG Binder</i>	<i>64-22</i>	<i>64-22</i>	<i>70-22</i>
Intermediate-			

March 3, 2017

Nominal Max. Aggregate Sizes	9.5 mm 12.5 mm 19.0 mm 25.0 mm	9.5 mm 12.5 mm 19.0 mm 25.0 mm	9.5 mm 12.5 mm 19.0 mm 25.0 mm
<i>PG Binder</i>	64-22	64-22	64-22
Base-			
Nominal Max. Aggregate Sizes	19.0 mm 25.0 mm	19.0 mm 25.0 mm	19.0 mm 25.0 mm
<i>PG Binder</i>	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.

** Heavy trucks are commercial vehicles with normally 2 axles, six tires or larger.

*** This information is provided as an approximate comparison only.

The plant discharge temperature for any mixture shall not be more than 315°F whenever PG 58-28, PG 64-22, PG 64-28, or PG 70-22 binders are used or not more than 325° F whenever PG 70-28 or PG 76-22 binders are used. HMA mixtures may be produced by using a water injection foaming device or additives as specified herein and according to the manufactures recommendations.

HMA.05 Volumetric Mix Design

Design Mix Formula (DMF) shall be determined for each mixture from a volumetric mix design by a design laboratory selected from INDOT's list of Approved Mix Design Laboratories. A volumetric mixture shall be designed in accordance with Section 401.05 and AASHTO R 35 with the following tables and exceptions. All loose mixture shall be conditioned for four hours in accordance with AASHTO R 30 prior to testing.

GYRATORY COMPACTION EFFORT					
	N _{ini}	N _{des}	N _{max}	Max. % G _{mm} @N _{ini}	Max. % G _{mm} @N _{max}
Mix Type					
A	6	50	75	91.5	98.0
B	7	75	115	90.5	98.0
C	8	100	160	89.0	98.0

VOIDS FILLED WITH ASPHALT, VFA, CRITERIA @ N _{des}	
Type	VFA %
A	70-80
B	65-78
C	65-75

Material Adjustment Factor (MAF) shall not apply.

HMA.06 (intentionally left blank)

HMA.07 Mix Criteria

Mix criteria shall be according to Sec. 402.07, except Type A shall replace Type B in sections

March 3, 2017

402.07 (a) and 402.07 (b).

HMA.08 Recycled Material

Recycled Materials shall meet the requirements of Section 401.06, except the maximum binder replacement shall be according to the following Table

MAXIMUM BINDER REPLACEMENT%							
<u>Mixture Type</u>	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
Type A	40.0	40.0	40.0	40.0	40.0	40.0	40.0
Type B	40.0	40.0	40.0	40.0	40.0	40.0	40.0
Type C	40.0	40.0	40.0	40.0	25.0	25.0	25.0

*The contribution of RAS to any HMA mixture shall be $\leq 3.0\%$ by total mass of mixture and $\leq 15.0\%$ binder replacement

HMA Mixtures with a binder replacement greater than 25.0% and less than or equal to 40.0% by weight of total binder content utilizing RAP or a blend of RAP and RAS shall use a binder grade with the upper and lower temperature classification reduced by 6° C from the specified binder grade as shown below.

Specified Binder Grade for Binder Replacement $\leq 25.0\%$	Specified Binder Grade for Binder Replacement $> 25.0\%$ and $\leq 40.0\%$
PG 64-22	PG 58-28
PG 70-22	PG 64-28
PG 76-22	PG 70-28

HMA.09 Acceptance of Mixtures

Acceptance will be on the basis of a Type D Certification in accordance with Sec. 916(d). The HMA Certification shall be the quality control test representing the material and shall include air voids at N_{design} , and binder content for material supplied to the project. Type D Certification shall be submitted to the Contracting Agency's representative each day in which material is received.

The Minimum Testing Frequency for Type D Certification.

Base and Intermediate	one sample for 1st 250 ton and each 1000 ton thereafter
Surface	one sample for 1st 250 ton and each 600 ton thereafter.

CONSTRUCTION REQUIREMENTS

HMA.10 General

Shall be in accordance with Sec. 402.10

HMA.11 Preparation of Surfaces to be Overlaid

Shall be in accordance with Sec. 402.11. PCCP, milled asphalt surfaces and asphalt shall be tacked according to Section 406. Contact surfaces of curbing, gutters, manholes and other structures shall be tacked in accordance with Section 406.

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 provided the density of the HMA course is in accordance with Sec. 402.16 or if approved by the Contracting Agency's representative.

HMA.13 Spreading and Finishing

Shall be in accordance with Sec. 402.13

HMA.14 Joints

Shall be in accordance with Sec. 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.

A roller application is defined as one pass of the roller over the entire mat.

Compaction operations shall be completed in accordance with the one of the following options.

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 5	Option 1	Option 2
Three Wheel	2		4			4	
Pneumatic Tire	2	4				4	
Tandem	2	2	2			4	
Vibratory Roller				6			8
Oscillatory					6		

HMA.16 Low Temperature Compaction Requirements

Shall be in accordance with Sec. 402.16. Density test reports shall be furnished to the Contracting Agency.

HMA.17 Shoulder Corrugations

Shall be in accordance with Sec. 402.17

HMA.18 Pavement Smoothness

Shall be in accordance with Sec. 402.18

HMA .19 Method of Measurement

Shall be in accordance with Sec. 402.19 except the Material Adjustment Factor (MAF) shall not apply.

HMA.20 Basis of Payment

The accepted quantities for this work will be paid for at the contract unit price per ton for HMA of the type and Nominal Maximum Aggregate Size (NMAS) specified, complete in place.

Pay Item*

HMA Surface Type __, __mm
HMA Intermediate Type __, __mm
HMA Base Type __, __mm

Pay Unit

Ton
Ton
Ton

March 3, 2017

*Mixture Type shall include the Type from Table in HMA.04 and the Nominal Maximum Aggregate Size (NMAS)

If the user has questions regarding this guide specification, APAI encourages you to contact the member asphalt producer or contractor in your local area. A membership directory can be downloaded to your phone from the Apple or Google app store by searching for Asphalt Pavement Association of Indiana.

Also, remember that government agency personnel are welcomed as our complimentary guests at the association's annual Winter Conference and Trade Show, typically held in December in Indianapolis. Please consult our website for details each Fall regarding date and location.

Asphalt Pavement Association of Indiana, Inc.

Kirsten Pauley, PE

Technical Director

2346 South Lynhurst Drive, Suite 708

Indianapolis, IN 46241

317-258-0132 cell

www.asphaltindiana.org

Email: kpauley@asphaltindiana.org

NOTE: Please contact the above via email for a version of this document in *Word*

March 3, 2017