

# Guide Specification for Porous Asphalt Pavement

*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.*

*All numbered specification references in this document refer to the most recent version of the Indiana Department of Transportation (INDOT) Standard Specifications and current Indiana Test Methods (ITM).*

## **PAP.01 Description**

This work shall consist of constructing a Porous Asphalt Pavement (PAP) course comprised of aggregate and asphalt binder mixed in a Hot Mix Asphalt plant and spread and compacted on a prepared surface.

## **PAP.02 Quality Control**

PAP shall be supplied from a certified HMA plant in accordance with ITM 583: Certified Volumetric Hot Mix Asphalt Producer Program. PAP 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 Owner Representative prior to commencing HMA paving operations.

## **PAP.03 Materials**

Material shall be accordance with the following:

Asphalt Materials

Performance Graded Binder, PG 70-22, or PG 76-22..... 902.01(a)

Coarse Aggregates shall be Class B or higher ..... 904.03

Fibers .....AASHTO M 325

Fine Aggregates .....904.02

## **PAP.04 Mix Design Formula**

A Design Mix Formula (DMF) shall be prepared in accordance with 402.04 except that the DMF will be based on OG19.0 mm open graded mixture designation in accordance with 401.05. The DMF shall be submitted in the current INDOT format one week prior to use. The mixture may be produced as warm-mix asphalt (WMA) by using a water injection foaming device or additives in accordance with the manufactures recommendations. The DMF shall list the minimum plant discharge temperature for HMA and WMA as applicable to the mixture.

## **PAP.05 Volumetric Mix Design**

The DMF shall be determined for the PAP mixture from a volumetric mix design for OG19.0 mm open graded mixture in accordance with 401.05. The DMF shall meet the following criteria.

- Course aggregates will be steel slag, limestone or crushed gravel with a crushed content of  $\geq 90\%$  two face and one face.
- Binder selection will be PG 76-22 or PG 70-22 with fibers.
- Air void will be  $\geq 16\%$  using ASTM D 6752, Vacuum Sealing method

- VMA should be  $\geq 26\%$  using ASTM D 6752, Vacuum sealing method
- Draindown test will be  $\leq 3\%$  (open graded mixtures may incorporate fibers).
- Gyrotory compaction shall be 20 gyrations at 260 $\pm$  9 degrees F.

The single percentage of aggregate passing each required sieve shall be within the following limits:

Sieve	JMF Requirement	Production Tolerances
19.0mm	100%	-
12.5mm	70 – 90%	+/- 5%
9.5mm	40 – 65%	+/- 5%
4.75mm	15 – 30%	+/- 5%
2.36mm	8 – 15%	+/- 5%
0.60mm	5 – 9%	+/- 2%
0.075mm	1 – 8%	+/- 2%
Binder %	5.5% min	+/- 0.7%

### **PAP.06 Job Mix Formula**

A job mix formula (JMF) shall be developed by a Certified HMA Producer. A JMF used in current or previous calendar year that was developed per Ndes will be allowed. The DMF for each mixture shall be submitted as per PAP.04

### **PAP.07 Intentionally Left Blank**

### **PAP.08 Recycled Materials**

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 19.0 mm sieve when entering the plant. The aggregate in the recycled materials shall be 100% passing the 19.0 mm sieve and 90% to 100% passing the No. 4 (4.75mm) sieve.

Recycled materials may be used as a substitute for a portion of the new materials required to produce the PAP mixture. When only RAP is used, the RAP shall not exceed 25% by weight (mass) of the total mixture. RAS may be substituted for RAP at a ratio of 1% RAP equal to 5% RAP. Total RAS shall not exceed 5% by weight (mass) of the total mixture.

The combined aggregate properties of a mixture with recycled materials shall be determined in accordance with ITM 584 and shall be in accordance with 904. Gradation of the combined aggregates shall be in accordance with PAP.05.

### **PAP.09 Acceptance of Mixtures**

Acceptance of PAP mixtures will be based on test results from a minimum of one truck sample per day for up to 600 tons as shown on a type D certification in accordance with 916 furnished by the Certified HMA Supplier. The test results shown on the Type D certification shall be the quality control tests representing the material supplied and include air voids and binder content. Air voids tolerance shall be  $\pm 3.0\%$  and binder content tolerance shall be  $\pm 0.7\%$  from the DMF or JMF.

Single test values and averages will be reported to the nearest 0.1%. Rounding will be in accordance with 109.01(a).

Test results exceeding the tolerance limits will be considered as a failed material and will be adjudicated in accordance with 105.03.

Fibers incorporated into the mixture will be accepted on the basis of a type A certification for the specified material properties for each shipment of fibers. Fibers from different manufacturers and different types of fibers shall not be intermingled.

### **PAP.10 General Construction Requirements**

Equipment for PAP operations shall be in accordance with 409. Fuel oil, kerosene, or other solvents shall not be transported in open containers on any equipment at any time. Cleaning of equipment and tools shall not be accomplished on the pavement or paved shoulder areas.

Mix the aggregate and asphalt binder material within the established temperature range until all the materials are coated.

Segregation, flushing or bleeding of PAP mixtures will not be permitted. Corrective action shall be taken to prevent the continuation of these conditions. All areas showing an obvious excess or deficiency of asphalt materials shall be removed and replaced. All mixture that becomes loose and broken, mixed with dirt, or is in any way obviously defective shall be removed and replaced.

### **PAP.11 Preparation of Surfaces**

Surfaces on which a PAP mixture is to be placed shall be open graded free draining aggregate and free from objectionable or foreign materials at the time of placement. Contact surfaces of curbing, gutters, manholes, and other structures shall be tack coated in accordance with 406. Protect the mixture at all times from contamination by soil or other fine material during placement. Erosion controls and maintenance will be by others.

### **PAP.12 Weather Limitations**

Do not place the mixture during weather conditions that would cause its degradation, segregation, or contamination.

### **PAP.13 Spreading and Finishing**

The PAP layers will be placed in lifts with a minimum of 2 inches and a maximum of 4 inches. The mixture shall be placed upon an approved surface by means of a suitable asphalt paver. If hand work is required keep it to a minimum. Spread the mixture in a method that produces a smooth, uniform layer before compacting. Do not haul over the mixture.

### **PAP.14 Joints**

Longitudinal joints on roads and streets shall be offset from lane lines a distance of 6 inches whenever possible. Transverse joints shall be constructed by exposing a near vertical full depth face of the previous course.

### **PAP.15 Compaction**

The PAP 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.

Compact the mixture using a minimum of two (2) passes with a 10 ton static tandem steel wheel roller (do not use the roller in a vibratory mode), completely seating the aggregate particles. Do not over compact resulting in crushed or broken aggregate. Complete rolling before mix temperatures has dropped below 250 degrees F.

Traffic should be restricted for 24 hours after rolling.

**PAP.16 Intentionally Left Blank**

**PAP.17 Intentionally Left Blank**

**PAP.18 Pavement Smoothness and Acceptance**

Thickness Tolerance; Ensure the placed PAP conforms to the specified thickness by randomly checking the thickness during construction.

Surface Tolerance; Ensure that the finished surface is uniform and varies no more then +or- 1/2 inch from a 10-foot straight edge applied longitudinally to the asphalt mat.

Porosity Test will be performed by conducting a water hose test with five gallons per minute minimum. There should be immediate infiltration with no puddles.

**PAP.19 Method of Measurement**

The owner representative will verify that the quantity of PAP placed as specified per the plans and specifications or as directed by the owner.

**PAP.20 Basis of Payment**

<u>Item</u>	<u>Unit</u>	<u>Description</u>
PAP	Tons	Porous Asphalt Pavement
PAP	Square Yards	Porous Asphalt Pavement
PAP	Lump Sum	Porous Asphalt Pavement

Prepared by:  
Asphalt Pavement Association of Indiana  
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