

**CONSTRUCTION INSPECTOR'S CHECKLIST  
FOR  
HOT- MIX ASPHALT (HMA) SHOULDERS**

This checklist has been prepared to provide the field inspector a summary of easy-to-read step-by-step requirements relative to the proper construction of Hot-Mix Asphalt Shoulders (Section 482). The following questions are based on information found in Standard Specifications, Highway Standards and Construction Manual.

Have you checked the contract Special Provisions, Supplemental Specifications and Plans? \_\_\_\_\_

**1. GENERAL**

The work shall consist of constructing a HMA shoulder on a prepared subgrade, existing paved shoulder, or subbase. \_\_\_\_\_

HMA shoulders shall not be placed on frozen or muddy subgrade. \_\_\_\_\_

For pavement and shoulder resurface projects, HMA binder and surface course mixtures the same as that specified for the mainline pavement may be used in lieu of HMA shoulder mixture for the resurfacing of shoulders at the option of the contractor. \_\_\_\_\_

Shoulder strips (12 in (300mm)) shall be constructed of the HMA binder and surface course mixtures as that specified for the mainline pavement. \_\_\_\_\_

**2. SHOULDER GRADES**

a. Calculate and mark on the pavement edge, for both tangent and superelevated areas, the subgrade cut and offset for the shoulder structure shown on the plans. \_\_\_\_\_

b. Prior to bituminous placement, the earth subgrade should be checked with an instrument or hand template to ensure the required depth and cross section of the completed shoulder will be obtained. Refer to THICKNESS TESTS. \_\_\_\_\_

**3. SUBGRADE**

The subgrade shall be prepared according to Section 301. \_\_\_\_\_

The subgrade shall be compacted to not less than 95% of the standard dry density and have a minimum IBV of 8.0. The in place density of the completed shoulder subgrade will be tested every 1500 ft (450 m) ([Sampling Schedule I](#), PPG). \_\_\_\_\_

When HMA shoulders are constructed adjacent to a pavement constructed on an improved (lime-modified) subgrade and additional material is needed to extend the improved subgrade to the bottom of the HMA shoulder, the additional material shall be subbase granular material, Type C, conforming to Section 311 (Art. 482.04 and Standard 482001).

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The subgrade shall be drained during the placing and compacting of the bituminous shoulder by cutting lateral ditches through any adjacent berms of earth.

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**4. PLANT AND MATERIALS**

HMA Mixtures will meet the following requirements:

- a. Materials will meet the requirements of Section 1030. \_\_\_\_\_
- b. Hot-Mix Plant will meet the requirements of Article 1102.01. \_\_\_\_\_
- c. The amount of asphalt binder used in the top lift of HMA shoulder mixture shall be increased 0.5 percent more than required in the mix design. (Art. 482.02) \_\_\_\_\_
- d. The HMA shall be delivered at a temperature of 250° to 350° F (120° - 175° C) (Art. 312.05)

**5. EQUIPMENT REQUIREMENTS**

- a. The transportation of the HMA mixture shall conform to Article 1030.08. \_\_\_\_\_
- b. Spreading and finishing machine. (Art. 312.04) \_\_\_\_\_
- c. Tandem rollers shall be 6 to 12 tons (5.5 to 11 metric tons) total weight; 190 to 400 pounds per inch (33 to 70 N/mm) of width on drive wheel(s). (Art. 312.04) \_\_\_\_\_
- d. Self-propelled pneumatic-tired roller; not less than 300 pounds per inch (53 N/mm) of width of tire tread in contact with the HMA surface, tire pressure, 60 to 120 psi (415 to 825 kPa). (Art. 312.04) \_\_\_\_\_
- e. Vibrating rollers shall meet the requirements of Article 1101.01(g). \_\_\_\_\_
- f. Trench roller, 300 to 400 pounds per inch (53 to 70 N/mm) of width on the compaction wheel. (Art. 312.04) \_\_\_\_\_

**6. TEMPERATURE RECORDS**

Occasional temperature checks shall be taken and recorded from the delivered material in the truck and behind the spreading machine. \_\_\_\_\_

**7. PLACING AND COMPACTING**

The bottom lifts shall be placed with a mechanical spreader approved by the Engineer. The machine shall be operated from the mainline pavement. (Art. 482.05) \_\_\_\_\_

When the shoulder width is 10 ft (3m) or greater, the top lift shall be placed with a spreading and finishing machine. (Art. 482.05) \_\_\_\_\_

The HMA mixture shall be spread to provide a minimum compacted lift in accordance with the table below. A maximum compacted lift of 6 in (150 mm) is allowed provided the required density is obtained. (Art. 312.05) \_\_\_\_\_

Nominal Maximum Aggregate Size of Mixture	Minimum Compacted Lift Thickness
CA 12 – ½ in (12.5 mm)	1 ½ in (38 mm)
CA 10 – ¾ in (19 mm)	2 ¼ in (57 mm)
CA 6 – 1 in (25 mm)	3 in (75 mm)

The top lift shall be a maximum 3 in (75 mm) compacted layer. (Art. 482.05) \_\_\_\_\_

Each layer shall be compacted using a vibratory compactor and a tandem roller. \_\_\_\_\_

On resurfacing projects with shoulder width of 6 ft (1.8 m) or less, the shoulder resurfacing may be placed simultaneously with the traffic lane. \_\_\_\_\_

Shoulder resurfacing with widths greater than 6 ft (1.8 m) shall be placed in a separate operation. \_\_\_\_\_

**8. DENSITY REQUIREMENTS**

The HMA shoulder shall be compacted to meet the following density requirements (Art. 1030.05 (3) (4)):

- a. The first layer shall be compacted to not less than 92% of the theoretical density. \_\_\_\_\_
- b. Subsequent layers shall be compacted to 93% to 97.4% of the theoretical density. \_\_\_\_\_
- c. The density of each layer will be obtained by approved nuclear methods or from specimens furnished by the contractor. \_\_\_\_\_

- d. Density testing frequency is one test per 1/2 mile (800 m) per lift, per side, randomly located. ([Sampling Schedule 4](#), PPG). \_\_\_\_\_

**9. THICKNESS TEST (Art. 482.06)**

The thickness of the bituminous shoulder will be checked at least every 1000 ft (300 m) when the shoulder is constructed and paid for as a square yard (square meter) unit of measure. (See [Documentation Section](#) of the Construction Manual)

- a. Before and after cross sections with a rod and level, or before and after measurements taken from an established reference elevation such as a stringline or edge of pavement. \_\_\_\_\_
- b. Shoulder areas less than 90% of the plan nominal thickness shall be brought to the proper thickness by placing additional shoulder material or by complete removal and replacement of the deficient shoulder area. \_\_\_\_\_
- c. If corrective action is needed, the final shoulder elevation shall not exceed the plan elevation or elevation established by the engineer by more than 1/8 in (3 mm). \_\_\_\_\_

**10. RUMBLE STRIPS (Section 642)**

- a. Rumble strip pattern will be as shown on the plans or Standard 642001. \_\_\_\_\_
- b. Corrugations shall be omitted when falling within the limits of a structure, sideroad, entrance or ramp entrance and exit. \_\_\_\_\_
- c. Equipment shall be a self-propelled milling machine with a rotary-type cutting head(s). \_\_\_\_\_

**11. DOCUMENTATION OF FINAL CONTRACT QUANTITIES**

When HMA shoulders are constructed along the edges of the completed pavement structure, the HMA shoulder will be paid for at the contract unit prices per square yard (square meter) for HMA Shoulders of the thickness specified. The method of measurement shall be as follows:

- a. Contract Quantities – The requirements for the use of contract quantities shall conform to Article 202.07(a). \_\_\_\_\_
- b. Measured Quantities – The shoulder shall be measured in place and the area completed in square yards (square meters). The width for measurement will be from the edge of the pavement to the top edge of the HMA shoulder as shown on the plans or as directed by the engineer. \_\_\_\_\_

When existing shoulders are overlaid in conjunction with a pavement and shoulder resurfacing project, HMA shoulders will be measured for payment in tons (metric tons), according to Article 406.13, except the requirement that payment will not be made for any HMA mixture in excess of 103% of the quantity specified by the engineer will not apply.

When the contractor chooses the option to place HMA shoulders using HMA binder and surface mixture simultaneously with the traffic lane, the following shall apply (Art. 406.13):

- a. The quantity of HMA mixture placed on the traffic lane will be limited to a calculated tonnage based upon actual mat width and length, plan thickness or a revised thickness authorized by the engineer, and design mix weight per inch (millimeter) of thickness.
- b. The difference between the total actual tonnage placed and the calculated tonnage used on the traffic lane will be measured and paid for as HMA Shoulders according to Section 482.

When a HMA wedge is placed simultaneously with the binder course as specified in Article 406.10, the quantity of binder course placed on the traffic lane will be limited to 103% of the quantity specified by the engineer. The difference between the total actual tonnage placed and 103% of the tonnage specified by the engineer will be measured and paid for as Bituminous Shoulders according to Section 482.

The HMA binder and surface course mixtures used in construction of shoulder strips for pavement resurfacing will be measured for payment in tons (metric tons) as specified in Article 406.13, except that the thickness of surface course will be limited to that specified for the adjacent resurfacing. Surface course used in excess of this amount will be measured for payment as binder course.

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