

SECTION 287

ASPHALT TREATED PERMEABLE BASE

287-1 Description.

Construct asphalt treated permeable base (ATPB) and outlet pipe for use under concrete pavement, in accordance with the details shown in the Plans and the Design Standards, Index No. 287. Meet the plant and equipment requirements of Section 320 and the general construction requirements of Section 330, except as noted below.

287-2 Materials.

Meet the following requirements:

Coarse Aggregate, Stone, Slag, or Crushed Gravel	
Grade No. 57 or 67.....	Section 901
Superpave PG Asphalt Binder (PG 67-22) ⁽¹⁾	916-1
Hydrated Lime ⁽²⁾	AASHTO M-303-89 Type 1
Polyvinyl-Chloride Pipe ⁽³⁾	Section 948
Polyethylene Pipe ⁽³⁾	Section 948
Geosynthetic Material	Section 985

1. Use PG 67-22 in the ATPB containing 0.75% heat-stable anti-strip additive (by weight of asphalt) from an approved source. Introduce and mix the anti-strip additive at the terminal.

2. For mixtures containing granite, add hydrated lime at a dosage rate of 1.0% by weight of the total dry aggregate in lieu of adding 0.75% anti-strip additive. Submit certified test results for each shipment of hydrated lime indicating compliance with the specifications. In addition, meet the requirements of 337-9.2 and 337-9.3.

3. Use either polyvinyl chloride pipe or polyethylene pipe, unless otherwise specified in the Contract Documents.

287-3 Composition of Mixture.

287-3.1 General: Use ATPB composed of a combination of coarse aggregate and asphalt cement. Use a mix design verified by the Engineer.

287-3.2 Mix Design: Submit a proposed mix design along with representative samples of all component materials to the Engineer, at least two weeks before the scheduled start of production. Establish the design asphalt content within the range of 2.0 - 4.0%, by weight of total mixture. During the mix design process, the Engineer may adjust the asphalt content within the 2.0 - 4.0% range. The Engineer may increase or decrease the specified asphalt content during production of the mix after testing and visual inspection. Ensure that a minimum of 95% of the aggregate is coated. There will be no separate payment for the bituminous material in the mix. Establish the mix temperature within the range of 230°F to 250°F, or as approved by the Engineer.

287-4 Control of Quality.

Provide the necessary control of the ATPB and construction in accordance with the applicable provisions of 320-2 and 330-2.

287-5 Acceptance of the Mixture at the Plant.

The ATPB mixture will be accepted at the plant with respect to 334-5.1 with the following exceptions:

1. The mixture will be accepted with respect to gradation ($P_{-1/2}$ if No. 57 stone is used and $P_{-3/8}$ if No. 67 stone is used) and asphalt binder content (P_b) only.
2. Testing in accordance with AASHTO T312-12 and FM 1-T209 (and conditioning of the mix prior to testing) will not be required as part of 334-5.1.1.1.
3. The standard LOT size will be, 2,000 tons, with each LOT subdivided into four equal sublots of 500 tons each.
4. Initial production requirements of 334-5.1.3 do not apply.
5. The Between-Laboratory Precision Values described in Table 334-6 are modified to include ($P_{-1/2}$ and $P_{-3/8}$) with a maximum difference per FM 1-T030 (Figure 2).
6. Table 334-5 (Master Production Range) is replaced by Table 287-1.

Table 287-1 ATPB Master Production Range	
Characteristic	Tolerance ⁽¹⁾
Asphalt Binder Content (%)	Target $\pm$ 0.60
Passing 1/2 inch Sieve (%) if using No. 57 stone	Target $\pm$ 12.00
Passing 3/8 inch Sieve (%) if using No. 67 stone	Target $\pm$ 12.00

(1) Tolerances for sample size of $n = 1$ from the verified mix design

287-5.1 Individual Test Tolerances for ATPB Production: In the event that an individual Quality Control test result of a subplot for gradation ($P_{-1/2}$ if No. 57 stone is used and $P_{-3/8}$ if No. 67 stone is used), or asphalt binder content does not meet the requirements of Table 287-1, take steps to correct the situation and actions taken shall be reported to the Engineer.

In the event that two consecutive individual Quality Control test results for gradation ($P_{-1/2}$ if No. 57 stone is used and $P_{-3/8}$ if No. 67 stone is used) or asphalt binder content do not meet the requirements of Table 287-1, the LOT will be automatically terminated and production of the mixture stopped until the problem is adequately resolved (to the satisfaction of the Engineer), unless it can be demonstrated to the satisfaction of the Engineer that the problem can immediately be (or already has been) resolved. Evaluate any material represented by the failing test result in accordance with 334-5.1.9.

287-6 Acceptance of the Mixture at the Roadway.

Acceptance of the Contractor's methods of placement and compaction will be based upon the completion of a 500 foot test section, (initially and at other times as determined by the Engineer), acceptable to the Engineer, prior to further placement. In the event that the placement/compaction method deviates from the approved method, cease placement of the mix until the problem is adequately resolved to the satisfaction of the Engineer.

287-7 Temperature and Storage Limitations.

Place the ATPB material when the atmospheric temperature is above 50°F and rising. Do not use ATPB material that was mixed more than two hours prior to placement.

287-8 Construction Requirements.

287-8.1 Placement: Ensure that the structural course on which ATPB is to be placed conforms to the compaction and elevation tolerances specified in the Contract Documents and is free of loose or extraneous material. Fill any area of the structural course which is lower than the grade established by the Plans with structural course material, at no additional cost to the Department.

Place and compact ATPB in one lift, with a compacted thickness of plus 4 inches or minus 1/2 inch (except the trench which includes the subdrainage pipe), in accordance with these Specifications, lines, grades, dimensions and notes as shown in the Plans.

Place and compact ATPB material around the subdrainage pipe for the full width of the trench, in layers not exceeding 8 inches (loose measure). Do not displace or damage the subdrainage pipe or filter fabric.

Remove and replace all ATPB material which is greater than 1/2 inch below the grade shown in the Plans or, in the opinion of the Engineer, is damaged or contaminated, at no additional cost to the Department.

287-8.2 Compaction: Compact the ATPB by one of the following methods:

1. A steel-wheeled, tandem roller which will produce an operating weight of not more than 140 PLI of drum width.

2. A steel-wheeled tandem roller weighing from 8 to 12 tons.

Compact the ATPB material (in the static mode only) as approved by the Engineer. Begin compaction as soon as the surface temperature has cooled to 190°F, or as approved by the Engineer and complete compaction before the surface temperature has cooled to 100°F. If necessary, cool the ATPB material with water.

287-8.3 Surface Requirements: Ensure that the finished surface of the ATPB does not vary more than plus or minus 1/2 inch from the grade shown in the Plans.

The Engineer may approve removal of high spots to within specified tolerance by a method which does not produce contaminating fines. Remove and replace ATPB material that is outside the established tolerance, at no additional cost to the Department. Grinding or milling will not be permitted.

287-9 Subdrainage Pipe and Geosynthetic Material.

Place the subdrainage pipe and geosynthetic material (filter fabric) in accordance with the Plans and Design Standards, Index No. 287.

287-10 Outlet Pipe.

Install outlet fittings and pipes concurrent with subdrainage pipe to provide positive gravity drainage and eliminate soil intrusion. The Engineer will restrict installation of additional sections of ATPB, until appropriate outlets are installed.

Ensure that all fittings and materials are designed and installed to eliminate soil intrusion into the system.

Connect the open end of the outlet pipe into either an existing drainage structure, existing ditch pavement or terminate with a concrete apron.

Do not block the drainage system at any time. Ensure that at the time of inspection and project acceptance, all outlet pipes and concrete aprons are clear of earth material, vegetation, and other debris.

287-11 Compensation.

Meet the requirements of 334-8 with the following exceptions:

1. Pay factors will be calculated for asphalt binder content and the percentages passing the 1/2 inch and the 3/8 inch sieves only.
2. Table 287-2 replaces Table 334-6.
3. Table 287-3 replaces Table 334-7.
4. The Composite Pay Factor in 334-8.3 is replaced with the following:

$$\text{CPF} = [(0.25 \times \text{PF } 1/2 \text{ inch or } 3/8 \text{ inch}) + (0.75 \times \text{PF AC})]$$

Note: Use the PF for the 1/2 inch sieve if No. 57 stone is used in the mixture or use the PF for the 3/8 inch sieve if No. 67 stone is used in the mixture.

Table 287-2 Small Quantity Pay Table for ATPB		
Pay Factor	1-Test Deviation	2-Test Average Deviation
Asphalt Binder Content (%)		
1.00	0.00-0.50	0.00-0.35
0.90	0.51-0.60	0.36-0.42
0.80	>0.60	>0.42
1/2 inch Sieve (%) if using No. 57 stone		
1.00	0.00-11.00	0.00-7.78
0.90	11.01-12.00	7.79-8.49
0.80	>12.00	>8.49
3/8 inch Sieve (%) if using No. 67 stone		
1.00	0.00- 11.00	0.00- 7.78
0.90	11.01-12.00	7.79-8.49
0.80	>12.00	>8.49

Table 287-3 Specification Limits for ATPB	
Quality Characteristic	Specification Limits
Asphalt Binder Content (%)	Target $\pm$ 0.45
Passing 1/2 inch sieve (%) if using No. 57 stone	Target $\pm$ 10.00
Passing 3/8 inch sieve (%) if using No. 67 stone	Target $\pm$ 10.00

287-12 Low Quality Material.

Meet the requirements of 334-5.1.9. For ATPB, use the Master Production Range defined in Table 287-1 in lieu of Table 334-5.

287-13 Method of Measurement.

287-13.1 Asphalt Treated Permeable Base: The quantity of ATPB to be paid for will be the plan quantity, in cubic yards, completed and accepted, subject to 9-3.2. No allowance will be made for ATPB placed outside plan dimensions, unless otherwise ordered by the Engineer.

287-13.2 Outlet Pipe: The quantity of outlet pipe to be paid for will be the length, in feet, measured in place along the centerline and gradient of the pipe, completed and accepted.

287-14 Basis of Payment.

287-14.1 Asphalt Permeable Base: Price and payment will be full compensation for work specified in this Section, including furnishing all labor, materials (including the ATPB material, geosynthetic material, and subdrainage pipe), tools, equipment, and incidentals, necessary to complete the work.

287-14.2 Outlet Pipe: Price and payment will be full compensation for work specified in this Section, including removal of existing shoulder pavement, trench excavation, pipe and fittings, standard aprons, galvanized hardware cloth (rodent screens), grouting around and stubbing into existing or proposed drainage structures or ditch pavement; restoration of ditch pavement, sod and other areas disturbed by the Contractor, backfill in place, disposal of excess materials and incidentals, necessary to complete the work.

287-14.3 Payment Items: Payment will be made under:

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| Item No. 287- 1- | Asphalt Treated Permeable Base - per cubic yard. |
| Item No. 446- 71-1 | Edgedrain Outlet Pipe - per foot. |