

SECTION 360—ASPHALT TREATED PERMEABLE BASE COURSE

360.1 DESCRIPTION—This work is the construction of an asphalt treated permeable base course (ATPBC) on a prepared surface. When placed on subgrade, it includes the preparation of subgrade as specified in [Section 210](#).

360.2 MATERIAL—

(a) **Bituminous Material.** Asphalt Cement, Class PG 64-22, as specified in [Section 702](#).

(b) **Coarse Aggregate.** Type A or Type B, [Section 703.2](#). When using crushed gravel, provide a minimum of 75% crushed particles with at least three faces resulting from fracture.

(c) **Fine Aggregate.** Type A or Type B, [Section 703.1](#).

(d) **Additives.**

1. Hydrated Lime. Before adding the asphalt cement, add hydrated lime to the aggregate to reduce stripping potential.

Furnish hydrated lime conforming to [ASTM C 1097](#) and add the lime as follows:

- Add at least 1% hydrated lime by mass (weight) of the total dry aggregate.
- Provide a separate bin or tank and feeder system to store and accurately proportion the lime, in dry form, into the aggregate.
- Provide a convenient and accurate means of calibrating the proportioning device.
- Interlock the proportioning device with the aggregate feed or weight system.
- Mix the lime and aggregate to uniformly coat the aggregate with lime.
- Furnish aggregate containing at least 3% free moisture.
- Do not stockpile lime treated aggregate.
- Control the feeder system by a proportioning device accurate to within 10% of the specified amount.
- Provide a flow indicator or sensor and interlock with the plant controls such that production is interrupted if there is a stoppage of the lime feed.
- Before production, obtain approval of the method to introduce and mix the lime and aggregate.

2. Heat-Stable, Anti-Stripping Additive. The Contractor may use an anti-stripping additive other than hydrated lime. Blend the additive with the asphalt cement before adding the additive and asphalt cement to the mixture. Use the manufacturer's recommended dosage of the additive, but not less than 0.25% by mass (weight) of the asphalt. Select an additive that does not harm the completed bituminous concrete mixture and that is compatible with the aggregate and asphalt supplied for the project.

(e) **Mixture Design and Production.**

1. Design. Size, uniformly grade, and combine aggregate fractions according to Table A below. Marshall test requirements do not apply. Design a JMF with an initial target bitumen content of 2.5% by mass

(weight). If necessary, adjust the bitumen content within the range specified in Table A below to uniformly coat the aggregate and ensure the aggregate has no observable runoff of excess bitumen.

Test materials, proportions, and the mixture at the bituminous concrete plant laboratory. Verify conformance with the uniformity requirements specified in this Section. When required, the Department will perform the tests at the MTD. Provide a JMF that conforms to all Department requirements. Submit a copy of the JMF to the District Materials Engineer/District Materials Manager at least 3 weeks before the scheduled start of producing the mixture for the project. If the Department has not used the JMF on previous projects, provide test results from previous mixture production that show the mixture conformed to all JMF production tolerances.

2. QC Plan. Prepare and submit a QC Plan, as specified in [Section 106](#), at the start of the project and at least annually thereafter. Do not start ATPBC production until after the Representative reviews the QC Plan.

3. Production. During the first day of production, take at least three bitumen content and gradation tests to verify the mixture conforms to the JMF. After the first day, perform tests for bitumen content and aggregate gradation according to the QC Plan and [PTM No. 1](#). Produce ATPBC conforming to the gradation requirements in Table A and with a bitumen content within 0.8% of the JMF (n=1). Ensure the aggregate is uniformly coated with bitumen and no runoff of excess bitumen is observed.

4. Acceptance of the Mixture. Obtain material certification from the material producer using the results of QC tests for bitumen content and gradation. Provide the certification to the Inspector-in-Charge within 1 working day after taking QC tests.

TABLE A
Composition of Mixture
(Total Percent by Mass (Weight) Passing Square Openings Based on Laboratory Sieve Tests)

Sieve Size	Percent Passing
37.5 mm (1 1/2-inch)	100
25.0 mm (1-inch)	95 – 100
12.5 mm (1/2-inch)	35 - 65
4.75 mm (No. 4)	12 – 24
1.18 mm (No. 16)	6 - 16
75 µm (No. 200)	0 – 5
Bitumen Content	2.0% - 3.0%*

* For approved gravel and slag mixtures, the Representative may allow the Contractor to exceed the upper limit.

360.3 CONSTRUCTION—[Section 401.3](#), with modifications as follows:

(b) Weather Limitations. Replace with the following:

Do not place ATPBC on surfaces that are unstable, frozen, or below a temperature of 2 °C (35F) and when the air temperature is below is 2 °C (35F). If work is halted because of weather conditions, the Representative may allow the Contractor to place limited quantities of ATPBC that are en-route to the project.

(c) Bituminous Mixing Plant. Add the following:

3. Plant Requirements. The Contractor is not required to provide equipment for developing the design and control test according to the Department's modified Marshall Method.

4. Preparation of Mixture. Before mixing, dry the aggregate as necessary. Heat the bituminous material so that combining with aggregate produces a completed mixture. Coat the aggregate with the bituminous material to form a film of adequate thickness to provide the required binding properties. Produce ATPBC at a temperature below 163 °C (325F) that also provides suitable viscosity for adequate coating of aggregate particles, and that does not cause segregation of asphalt and aggregate during transportation.

Do not stockpile ATPBC. The ATPBC must be placed within 8 hours from when it is made.

(f) Rollers. Replace with the following:

Use steel-wheel power rollers with a manufacturer's certified metal mass (weight) of 7 tonnes to 9 tonnes (8 tons to 10 tons).

(h) Spreading and Finishing. Replace with the following:

Use a slip form paver, as specified in [Section 401.3\(e\)](#), or a mechanical spreader. Spread and strike off the mixture for the entire lane width or as much lane as practical. Place the mixture in maximum 100 mm (4-inch) compacted lifts. Adjust screed assemblies to provide the cross section and depth indicated. Construct the profile to the design grade line. Use fully automated sensors to control profile and transverse grade. Allow the mixture to cool to 38 °C (100F) before placing subsequent layers or pavement courses. Perform handwork at locations directed by the Representative.

(i) Compaction. Replace with the following:

Seat ATPBC using a 7 tonne (8 ton) to 9 tonne (10 ton), steel-wheeled roller, or vibratory roller operated in the static mode only. Compact ATPBC by applying four roller passes. One roller pass is defined as one trip of the roller in one direction over any one spot. Additional passes are allowed only to eliminate any surface irregularities, or creases. Perform rolling only when the mat has cooled sufficiently to avoid showing or lateral movement of the ATPBC. Do not compact the material to the point that it is not free draining or the aggregate is crushed.

(j) Mat Density Acceptance. Delete this section.

(k) Joints. Replace with the following

1. Longitudinal Joints. Spread the ATPBC to overlap the edge of the lane previously placed by 25 mm to 50 mm (1 inch to 2 inches). Maintain the uniform uncompacted depth adjacent to a compacted lane necessary to provide a smooth joint after compaction.

2. Transverse Joints. At the end of each day's work and when more than a 30 minute interruption occurs in ATPBC paving operations, install a temporary vertical bulkhead to form a straight transverse construction joint. The joint shall be the full depth and width of the ATPBC. Instead of a temporary bulkhead, the Contractor may saw construction joints.

(l) Surface Tolerance. Replace the requirements for correcting irregularities with the following:

Test the finished surface at locations the Representative suspects are irregular and at transverse joints and paving notches. Test the surface in stages using a 3 m (10-foot) straightedge. At each stage, hold the straightedge in contact with the surface and parallel to the road centerline and, in successive positions, test the pavement surface

from one side to the other. Advance the test location to the next stage by moving the straightedge along the pavement centerline by not more than 1.5 m (5 feet).

Correct irregularities of more than 13 mm (1/2 inch) by loosening surface mixture and removing or adding ATPBC. For irregularities that develop after compaction is completed, correct the irregularity by a method that does not produce contaminating fines or damage the base. Do not grind or mill the ATPBC. The area is defective if irregularities or defects remain after final compaction.

(m) Tests for Depth: Binder and Wearing Courses. Replace with the following:

Carefully dig or drill one 150 mm (6-inch) diameter test hole to the full depth of the ATPBC for each 2500 m² (3,000 square yards), or less, of completed base course. The Representative may require additional test holes in areas the Representative suspects are deficient in depth. The Representative will measure the depth of the base course. Using material acceptable to the Representative, backfill the test holes and compact the material to fill the test hole flush with the completed base course.

Remove and replace sections deficient in depth by 13 mm (1/2 inch) or more. Start correction at the point of determined deficiency and continue correction longitudinally and transversely until the depth is within 13 mm (1/2 inch) of the indicated depth.

(n) Protection of Courses. Replace with the following:

[Section 105.13](#) and as follows: Traffic is not permitted on the asphalt treated permeable base material, except for trucks and equipment required to place the next layer. Replace areas damaged or contaminated, as directed and at no cost to the Department. If necessary, re-compact the ATPBC before starting subsequent paving.

Protect the surface from damage before and during the concrete paving process.

(o) Defective Work. Replace with the following:

Unless otherwise directed in writing by the District Executive, remove and replace ATPBC deficient in surface tolerance, deficient in depth, defective in asphalt content, or excessive in percent passing the 75 µm (No. 200 sieve). The ATPBC is defective in asphalt content if production tolerances are exceeded, percent of coated aggregate particles is less than 95%, or the mixture contains observable runoff of excess bitumen.

With written permission from the District Executive, the Contractor may fill low areas during construction of the next pavement course.

Acceptance testing and QA testing does not relieve the Contractor of responsibility for defective material or workmanship.

360.4 MEASUREMENT AND PAYMENT—Square Meter (Square Yard) or Tonne (Ton)