

SECTION 1004 ASPHALT CONCRETE

Delete this Section in its entirety and replace with the following:

**SECTION 1004
ASPHALT CONCRETE**

1004-1 GENERAL: Asphalt concrete shall consist of aggregates and asphalt combined in a central plant and meeting requirements of Table 10-9. Mix types used shall be as specified.

1004-2 MATERIALS: Accurate records shall be kept, including proof of deliveries of materials for use in asphalt concrete. Copies of these records shall be furnished to the Engineer upon request. Materials shall conform to the following Subsections:

Asphalt	1003-1
Additives	1003-4
Aggregates	1001-5
Hydrated Lime	1002-3

a. **Asphalt:** Asphalt cement used in mixtures shall be polymer modified and as follows:

Table 1004-1: Asphalt Cement Usage

Road Type	Mixture Type	Structure Type	Grade of Asphalt Cement
Arterial	A	Wearing Course	PG 76-22m
	B	Binder Course	PG 76-22m
	B	Base Course	PG 64-22
Collector	B with Granite Fines	Wearing Course	PG 76-22m
	B	Binder Course	PG 76-22m
	B	Base Course	PG 64-22
Local	B with Granite Fines	Wearing Course	PG 70-22m
	B	Binder Course	PG 70-22m
Incidental Paving	C	Incidental Paving	PG 70-22m
Utility Trench Patching	As Required for Road Type ¹	Wearing Course	As Required for Road Type
	B	Base Course	PG 64-22 ²

- Granite Fines are allowed but not required for wearing courses associated with Utility Trench Patching for Collector and Local Road Types.
- Binder course Mixture Type and Asphalt Cement Grade for corresponding Road Type may be used as base course associated with Utility Trench Patching at no additional cost to the Owner.

When mixtures are used for bike paths, curbs, detour roads, driveways, guardrail widening, islands, joint repair, leveling, or parking lots, PG 64-22 asphalt cement may be used in lieu of the polymer modified asphalts. Unless otherwise noted on the plans, PG 64-22 asphalt cement may also be used on shoulders in lieu of the polymer modified asphalts.

Polymer modified asphalt cement shall consist of an asphalt cement to which a minimum of 3% by

weight polymer has been added. The resulting material shall be homogeneous and smooth without detectable strands of polymer.

b. Additives:

1. **Anti-Strip:** An anti-strip additive shall be added at the minimum rate of 0.5% by weight of asphalt and mixed with asphalt cement at the plant. Additional anti-strip additive shall be added in accordance with Subsection 1004-4(b).
2. **Silicone:** Silicone additives, when needed, shall be dispersed into asphalt by methods and in concentrations given in the QPL.
3. **Hydrated Lime:** Hydrated lime may be incorporated into asphalt concrete mixtures at the rate specified in the approved job mix formula. Minimum rate shall be 1.5% by weight of total mixture. Hydrated lime shall be mixed with aggregates prior to mixing with asphalt.

c. Aggregates: Aggregate shall conform to Table 10-9. All aggregates shall have friction rating of I, II, or III in accordance with Table 1001-1.

1. **Crushed Concrete:** Crushed concrete may be used in mixtures up to 70% by weight of aggregates. Crushed concrete shall be stockpiled separate from other aggregates at the plant.
2. **Reclaimed Asphalt Concrete:** Whenever polymer modified asphalt is required and for all wearing course mixes, reclaimed asphaltic concrete shall not be used. Reclaimed asphalt concrete may be used in binder or base mixtures up to 20% by weight of aggregate. Reclaimed asphalt concrete shall contain no expanded clay aggregate and shall be stockpiled separate from other aggregates at the plant.

A separate cold feed system shall be provided for reclaimed asphalt concrete, and new aggregates shall be heated to a sufficiently high temperature to produce a mix at required discharge temperature.

1004-3 EQUIPMENT: Plant and hauling equipment shall be LaDOTD certified. The central mixing plant shall be equipped with an asphalt working tank meeting LaDOTD specifications. In addition there shall be an asphalt storage tank of sufficient capacity to hold enough asphalt for one full day's operation of the plant. The storage tank shall have adequate heating and circulating equipment and insulation to maintain proper uniform temperature. Storage tanks shall be approved by the Engineer prior to use.

1004-4 MIX DESIGN AND CONTROL:

- a. **General:** The contractor shall be responsible for design, production and hauling of mixtures, and shall constantly monitor equipment, materials and processes to ensure that mixtures are produced in accordance with specifications. If specifications are not being met and satisfactory control adjustments are not being made, operations shall be discontinued until proper adjustments and uniform operations are established.

The contractor shall conduct tests as necessary, in addition to required tests, to produce mixtures within specifications.

When the plant is in operation, the contractor shall have a DOTD Certified Asphalt Concrete Technician at the plant or jobsite who is capable of designing asphalt concrete mixes, conducting any test or analysis necessary to put the plant into operation and producing a mix meeting specifications. Daily plant operations shall not begin unless the Certified Asphalt Concrete Technician is at the plant.

- b. **Job Mix Formula:** The contractor shall design mixtures in accordance with DOTD TR 303, Method A; however, Method B may be used when approved. The job mix formula shall include the recommended formula and supporting design data. The recommended formula shall be submitted for approval to the engineer. No mixture shall be produced until the proposed job mix formula has been approved.

The proposed job mix formula shall indicate a single anti-strip additive rate which is 0.1% greater than the percentage which will yield a minimum of 90% coating when tested by DOTD TR 317, but not more than 1.2% by weight of asphalt.

The job mix formula shall indicate a single rate of hydrated lime additive when used. Hydrated lime additive shall not be less than 1.5% by weight of total mixture.

The job mix formula shall produce a mixture with a minimum Tensile Strength Ratio (TSR) of 75% when tested by DOTD TR 322.

The job mix formula shall indicate optimum mixing temperature. When aggregates with a water absorption value greater than 2%, determined by AASHTO T 84 for fine aggregate and AASHTO T 85 for coarse aggregate, or aggregates with an asphalt absorption value greater than 0.5%, determined by DOTD TR 320, are used, initial optimum asphalt content shall be increased to compensate for asphalt absorbed by aggregates.

1004-5 HANDLING OF AGGREGATES: Aggregates shall be stored at the plant so that no intermixing will occur. Material shall be stockpiled so that no detrimental degradation or segregation of aggregates will occur, no foreign material will be incorporated into aggregates, and there will be no intermingling of materials. Stockpiles shall be well drained.

Blending of aggregates shall be done from cold feed bins and not in stockpiles or on the ground.

Gradation and other properties of aggregate in stockpiles shall be such that when aggregates are combined in proper proportions, the combined gradation will conform to the approved job mix formula.

Proportioning of material at the cold feed shall be established to meet the approved job mix gradation requirements. Plants operating with only cold feed control shall not require additional manipulation to meet job mix requirements.

- a. **Drying:** Aggregates shall be heated and dried to produce a mixture meeting specifications. Material fed through dryer shall be held to an amount which can be adequately heated and dried. When proper drying is not achieved and quality of the mix is impaired, production rate of dryer shall be adjusted to obtain satisfactory results. Burner fuel used shall be clean burning so there is no contamination of aggregates.
- b. **Hot Aggregate Storage:** In batch plants, hot aggregate shall be so stored in bins as to minimize segregation and loss of temperature of aggregates. When plant operation is interrupted and material in storage cools to 25°F or more below specified mixing temperature, aggregate in bins shall be discarded. When a plant changes type of mix that requires a change of materials, aggregate in bins shall be discarded.

1004-6 PROCESSING OF ASPHALT AND AGGREGATES: Aggregates shall be combined to meet the approved job mix formula.

The minimum discharge temperature of asphaltic concrete produced shall be 290 degrees Fahrenheit and the maximum discharge temperature shall be 325 Fahrenheit.

Aggregate Moisture Content: No mix shall be produced when the moisture content of a sample of

combined aggregates, taken from the belt feeding the drum/dryer, is equal to or exceeds 8%.

Maximum moisture content of final mixture shall be 0.5% by weight when tested by DOTD TR 319.

When automatic adjustments or other critical control devices are not functioning, the plant shall not operate.

- a. **Plants with Pugmills:** Combined aggregate shall be mixed dry, after which asphalt shall be sprayed over aggregates and mixed to produce a mixture in which aggregate particles are uniformly coated. Mixing times shall be in accordance with the approved job mix formula.
- b. **Drum-mixer and Continuous Mix Plants:** The system shall provide positive weight control of cold aggregates fed by a belt scale or other device interlocked with the asphalt measuring system to maintain required proportions of combined aggregates and asphalt. Aggregates shall be heated, dried and mixed with asphalt to produce a mixture in which aggregate particles are uniformly coated. The first and last output of the plant shall be wasted after each interruption.

The Certified Asphalt Concrete Plant Technician shall measure moisture content of cold feed aggregates daily when starting the plant. Adequate scheduled tests during plant operations and adjustments to the plant shall be made to correct for moisture in the aggregate.

Provisions shall be made for introducing the latest moisture content of cold feed aggregates into belt weighing system, thereby correcting wet aggregate weight to dry aggregate weight. Dry weight of aggregate flow shall be displayed digitally in units of weight and time, and the quantity totaled. The rate of flow of asphalt anti-strip and lime (when used) shall also be digitally displayed and the quantity totaled.

For mineral filler, a separate bin and feeder shall be furnished with its drive interlocked with aggregate feeders. Mineral filler shall be introduced into drum near asphalt discharge.

c. **Scales and Printer Systems:**

1. **Scales:** To determine the total weight of mix loaded in trucks, springless dial scales or load cell scales for weigh hoppers shall be provided. When weigh hoppers are not used, truck platform scales shall be provided. When drum-mixer process is used, belt scales shall be provided for conveyors.
2. **Printer System for Batch Plants:** An approved printer system shall be provided which will print separately the weight of aggregates and asphalt. These weights shall be used for calculating percent asphalt in the mixture. When a mixture is loaded directly into haul truck, these weights shall be used to determine pay weights for the mix. Printing equipment shall also print zero weight for each batch and total weight of mixture loaded in trucks.

In case of a printing mechanism breakdown, the plant will be permitted to operate during the 48-hour period immediately following the breakdown, provided an accurate weight of mixture can be determined and repeated breakdowns do not occur.

3. **Printer System for Plants With Storage or Surge Bins:** When storage or surge bins are used, truck-platform scales or a weigh hopper shall be provided to determine pay weights for the mix. The weigh hopper shall be equipped with an approved automatic printer system that will print zero weight, batch weight and total weight of mixture loaded into truck.

Truck-platform scales shall be of sufficient length to weigh the entire unit transporting the mix. Scales shall be equipped with an approved automatic printer system that will print tare weight and total weight of unit and mix.

Scales with electronic digital readout displays, that do not automatically reset to zero after tare weight is obtained, shall print tare weight, zero weight, and either total weight of mix loaded into unit or total weight of unit and mixture. Scales with electronic digital readout displays that automatically return to zero after tare weight is obtained shall print tare weight and either total weight of mix loaded into unit or total weight of unit and mixture.

When scales are located so that a truck leaves the scales between empty weighing and loaded weighing, printer shall print tare weight, zero weight before loaded weighing, and total weight of unit and mix. In case of a printing mechanism breakdown, the plant will be permitted to operate during the 48-hour period immediately following the breakdown provided an accurate weight of mixture can be determined and repeated breakdowns do not occur.

1004-7 STORAGE SILOS AND SURGE BINS: Storage silos or surge bins for storing asphalt concrete mixtures may be used.

- a. **Conditions of Use:** Use of silos or bins shall conform to specification limitations on retention time, type of mixture, heater operation, bin atmosphere, bin level or other characteristics.

An indicator which is activated when material in bin drops below top of sloped portion shall be affixed to each bin and be visible to operator. Mixtures shall be maintained above this level during production.

- b. **Heated Silos:** Storage silo heating system shall be capable of maintaining mix temperature without localized heating.

Maximum allowable storage time for asphalt concrete mixtures is 18 hours unless test results and other data indicate that additional storage time is not detrimental to mix.

- c. **Unheated Surge Bins:** Maximum allowable storage time for unheated surge bins is 2 hours unless test results and other data indicate that additional storage time is not detrimental to mix.

- d. **Loading and Unloading Mixtures:** Mixtures shall be conveyed from plant to bin or silo by an enclosed continuous system designed to prevent spillage and to remove mix from plant as fast as it is produced. Mixture in silo or surge bin shall remain within $\pm 15^{\circ}\text{F}$ of plant discharge temperature.

When mixture is placed in silo or bin through a surge device, an automatic warning system shall be provided to audibly warn operator of a gate malfunction.

Silo or bin unloading gates shall be of a type that will not cause segregation or be detrimental to mix.

TABLE 10-9

ASPHALT CONCRETE MIXTURES

U.S. SIEVE % PASSING	TYPE A ⁵	TYPE B			TYPE C			MIX TOLERANCE ³
	Wearing Course	Wearing Course	Binder Course	Base Course	Wearing Course	Binder Course	Base Course	
1½"	---	---	---	100	---	Same Gradation	Same Gradation	---
1"	100	100	100	80-100	---	As Type B	As Type B Base Course	+6
¾"	95-100	95-100	85-100	---	---	Binder Course		+6
½"	80-95	90-100	70-100	---	100			
⅜"	70-88	70-100	60-95	---	90-100			+6
No. 4 ⁴	50-75	50-75	40-70	35-70	55-85			+6
No. 10	28-55	32-55	28-50	---	30-65			+6
No. 40	14-30	16-33	16-33	16-40	14-30			+5
No. 80	8-20	8-20	8-20	---	8-20			+4
No. 200	3-10	3-10	3-10	3-15	3-8			+2
Extracted Asphalt	---	---	---	---	---		As Needed	+0.4
Mixing Temperature ¹	---	---	---	---	---			+10°F
% Crushed, min. ²	90min	90min	70min	As Needed	80	As Needed		---
Marshall Stability, lb ⁶								
No. of Blows	75	75	75	75	50	50	50	
Av. of 4 Tests:								
Design	2200	1700	1600	1200	1200	1200	1100	
Minimum	1800	1500	1400	1000	1000	1000	900	
Individual Test, min.	1500	1300	1200	800	800	800	80	
Marshall Flow, 1/100"	6-15	6-15	5-15	15 Max.	8-18	8-15	15 Max.	
% Voids	3-5	3-5	3-5	3-5	2-4	3-5	3-5	
% VFA	70-85	70-85	70-80	70-80	75-85	70-80	70-80	

Notes for Table 10-9

1 Determined by Job Mix Formula.

2 Determined by DOTD TR 306.

3 Mix tolerance for mixing temperature for mixes with polymer modified asphalt cement is 0°F.

4 All mixes designated as "Granite Fines" (GF) shall conform to the following requirement: No more than 15% by weight of the total mixture shall be natural sand. Granite fines shall replace the remaining sand required to meet the specified gradation.

5 At least 30% of the total aggregates by weight for Type A mixes shall have a Skid Resistant Rating of 1, and not more than 10% by weight of this material shall pass No. 10 sieve.

6 Determined by DOTD TR 305.