

ASPHALT PAVING NON-COUNTY ROADS

1.0 GENERAL

1.1 Scope - This specification governs materials and installation for hot mix asphalt on prepared subgrade or aggregate base course to lines, grades and compacted thickness as indicated on the Drawings for non-county roads only. This specification also includes all temporary cold mix asphalt as approved by the District for non-county roads.

1.2 Submittals

Hot Mix Design:

- A. Contractor shall submit the proposed asphalt concrete mix design and test results which conform to these specifications. The proposed mix design shall be reviewed and approved by the Engineer prior to commencing work.
- B. Contractor shall provide a hot mix design that conforms to the applicable requirements as part of this specification and complies with the following design requirements set forth in Section 39-1.03B of the CALTRANS Standard Specifications.

Quality Characteristic	Test Method	HMA Type		
		A	B	RHMA-G
Air Voids Content (%)	CT 367 ^a	4.0	4.0	Special Provisions
Voids in mineral aggregate (% min)	LP-2			
No. 4 grading		17.0	17.0	--
3/8" grading		15.0	15.0	--
1/2" grading		14.0	14.0	18.0-23.0 ^b
3/4" grading		13.0	13.0	18.0-23.0 ^b
Voids filled with asphalt (%)	LP-3			
No. 4 grading		76.0-80.0	76.0-80.0	Noted
3/8" grading		73.0-76.0	73.0-76.0	
1/2" grading		65.0-75.0	65.0-75.0	
3/4" grading		65.0-75.0	65.0-75.0	
Dust proportion	LP-4			
No. 4 and 3/8" gradings		0.9-2.0	0.9-2.0	Noted
1/2" and 3/4" gradings		0.6-1.3	0.6-1.3	
Stabilometer value (min.) ^c	CT 366			
No. 4 and 3/8" gradings		30	30	--
1/2" and 3/4" gradings		37	35	23

Notes:

- Calculate the air voids content of each specimen using California Test 309 and Lab Procedure LP-1. Modify California Test 367, Paragraph C5, to use the exact air voids content specified in the selection of OBC.
- Voids in mineral aggregate for RHMA-G must be within this range.
- Modify California Test 304, Part 2.B.2.c: "After compaction in the compactor, cool to $140^{\circ} \pm 5^{\circ}\text{F}$ by allowing the briquettes to cool at room temperature for 1/2-hour, then place the briquettes in the oven at 140°F for a minimum of 2 hours and not more than 3 hours.
- Report this value in the job mix formula submittal.

- C. Mix shall have a tensile strength ratio of at least 70, as determined by California Test 371.

Cold Mix Design:

- A. The aggregate and asphalt shall be thoroughly mixed so that the asphalt material is uniformly distributed throughout and a minimum of 90% of the aggregate particles are uniformly coated when placed on the roadway. Prior to commencing work, it shall be the responsibility of the contractor to submit to the Director one of the following mix designs.

Sieve Size	Stabilize Base	Dense Binder	Dense T&L	Dense Top	Open Binder	Open Top
2"	100					
1.5"		100			100	
1"		95-100				
3/4"			100		90-100	
1/2"		60-90	90-100	100	30-100	100
3/8"				85-100	10-60	85-100
#4	25-65	30-70	30-75	50-90	0-25	10-50
#8		20-60	20-65	25-65	0-10	0-15
#30		8-35	8-35	8-35		
#50		3-20	3-20	3-20		
#200	0-100	0-3	0-3	0-3	0-2	0-2
% Bitumen						
	2.5-4	3-4.7	3.3-5	4-5.8	2.8-4	3-4.4
Gal/Ton Cutback						
	7-14	8-13	9-14	11-16		

2.0 MATERIALS

2.1 Hot Mix Asphalt

- A. Asphalt Binder: Steam-refined paving asphalt conforming to Section 92-1.02B "Grades" of the CALTRANS Standard Specifications. Contractor shall furnish asphalt in conformance with the CALTRANS "Certification Program for Suppliers of Asphalt".
- B. Tack Coat: Grade SC-70, conforming to Section 93-1.01 of the CALTRANS Standard Specifications.
- C. Hot mix asphalt shall be produced in a batch mixing plant or a continuous mixing plant in accordance with Section 39-1.08 of the CALTRANS Standard Specifications.

2.2 Slurry Seal

- A. Slurry seal, Type II, shall be applied in conformance with the provisions in Section 37-2, and all applicable referenced sections of the CALTRANS Standard Specifications, where indicated on the drawings.

2.3 Hot Mix Asphalt Equipment

- A. Spreading and Compacting Equipment:
 - 1. Spreading equipment shall conform to Section 39-1.10 and all applicable referenced sections, of the CALTRANS Standard Specifications. Only in areas inaccessible to the machine, by approval of the Engineer, will hand spreading be permitted.
 - 2. Compaction equipment shall conform to Section 39-1.10 and all applicable referenced sections, of the CALTRANS Standard Specifications.

3.0 EXECUTION

3.1 Examination

- A. Verification of Conditions - Verify surfaces and site conditions are ready to receive work. If unsatisfactory conditions exist, Engineer reserves the right to stop installation until such conditions have been corrected. Beginning application means acceptance of existing conditions.

3.2 Hot Mix Asphalt Project Conditions

- A. Placement of hot mix asphalt shall be performed only when surface is dry and when atmospheric temperature is above 50°F.
- B. Do not place hot mix asphalt when weather is foggy, rainy nor when base on which material is to be placed is in wet or frozen conditions nor when, in the opinion of the Engineer, weather conditions will prevent proper handling, finishing, and/or compaction of the mixtures.

3.3 Hot Mix Asphalt Preparation

- A. All asphalt shall be saw cut prior to placement of new asphalt. Any trench crossing a driveway shall be saw cut in such a way to not cause any detriment to the existing driveway. Any saw cutting to private driveways or roads shall be marked prior to any work for review and approval by the Engineer. No saw cut shall take place without prior approval of the Engineer.
- B. Protect concrete pavements and walks, curbs and bases, and other improvements adjacent to the operations with suitable materials.
- C. Building and other surfaces shall be covered with paper or other protection, when required.
- D. Contractor shall be responsible for any damage caused by Contractor's employees. All damage caused by the contractor's operations shall be repaired to the satisfaction of the Engineer at no additional cost to the property owner.
- E. Immediately prior to applying tack coat the subgrade to receive hot mix asphalt shall conform to the compaction requirement and elevation tolerances specified for the material involved and shall be cleaned to remove any loose or extraneous material.

3.4 Tack Coat

- A. A tack coat of asphaltic emulsion shall be applied to all vertical surfaces of existing pavement, curbs, gutters, and construction joints in the surfacing against which additional material is to be placed, or as otherwise specified herein. A tack coat shall only be applied in advance of hot mix asphalt.
- B. Tack coat shall be applied in one application at a rate of 0.1 gallons per square yard of surface covered.

- C. If the hot mix asphalt is to be placed on an existing base or pavement which was not constructed as part of the contract, the contractor shall clean the surface by sweeping, flushing, or other means to remove all loose particles of paving, all dirt and all other extraneous material immediately before applying the tack coat.

3.5 Hot Mix Asphalt

- A. Hot mix asphalt shall be handled in such a way that the temperature is controlled to the best of the contractor's ability. The asphalt shall remain in the delivery truck until placement and shall not be temporarily placed in staging or storage area. Transport the mixture from the mixing plant to the point of use in vehicles having tight bodies previously cleaned of all foreign materials. Cover each load with canvas or other suitable material of sufficient size and thickness to protect the asphalt mixture from the weather.
- B. Placing materials in a windrow, then picking it up and placing it in the asphalt paver with loading equipment will be permitted provided that:

1. Hot mix temperatures:

Asphalt Arrives On Site	275-325°F
Asphalt Is Rolled Above	185°F

2. The asphalt paver is of such design that the material will fall into a hopper which has a movable bottom conveyor to feed and screed.
3. The loader is constructed and operated so that substantially all of the material deposited into windrows is picked up and deposited into the paving machine.
4. The windrow is deposited only so far in advance of the paver to provide for continuous operation of the paver and not so far as to allow the temperature of the Hot mix asphalt in the windrow to fall below 185°F.
5. Asphalt mixtures shall not be handled, spread or windrowed in a manner that will stain the finished surface of any pavement or other improvements.
6. The completed mixture shall be deposited on the prepared subgrade at a uniform quantity per linear foot, as necessary

to provide the required compacted thickness without resorting to spotting, picking-up or otherwise shifting the mixture.

- C. Spreading - All layers of hot mix asphalt shall be spread with an asphalt paver and shall conform to Section 39-1.11 and all applicable referenced sections of the CALTRANS Standard Specifications. At locations where the hot mix asphalt is to be placed over areas inaccessible to spreading and rolling equipment, all layers of hot mix asphalt shall be distributed directly out of the back of the dump truck and spread by hand. hot mix asphalt spread by hand shall be compacted thoroughly to the required lines, grades and cross-sections by means of pneumatic tampers, or by other methods that will produce the same degree of compaction as pneumatic tampers.
- D. Compaction - A pass shall be on movement of a roller in either direction. A coverage shall be as many passes as are necessary to cover the entire width being paved. Overlap between passes during any coverage, made to ensure compaction without displacement of material in accordance with good rolling practice, shall be considered to be part of the coverage being made and not part of a subsequent coverage. Each coverage shall be completed before subsequent coverages are started.

Rolling shall commence at the lower edge and shall progress toward the highest portion, except that when compacting layers which exceed 0.25-foot in compacted thickness, and if directed by the Engineer, rolling shall commence at the center and shall progress outwards.

Compacting of open graded asphalt concrete shall consist of two coverages. If necessary, only one coverage of the open graded asphalt concrete may be ordered by the Engineer to prevent a break in the bond of asphalt between the aggregate particles.

All other asphalt concrete and asphalt concrete base shall be compacted as follows:

Initial or breakdown compaction shall consist of three coverages of a layer of asphalt mixture and shall be performed with a 2-axle or 3-axle tandem or a 3-wheel roller weighting not less than 12-tons. Where the thickness of the layer of asphalt mixture is less than 0.15-foot, fewer coverages than specified above may be ordered by the Engineer if necessary to prevent damage to the layer being compacted. The initial or breakdown compaction shall be followed

immediately by additional rolling consisting of three coverages with a steel-tired roller weighing not less than 8-tons at a temperature above 185° F. Each layer of asphalt concrete and asphalt concrete base shall be compacted additionally without delay by a final rolling consisting of not less than one coverage with a steel-tired roller weighing not less than 8-tons. Except as otherwise provided for low rates of production, a separate finish roller will be required.

Rolling shall be performed so that cracking, shoving, or displacement will be avoided. Rolling where 3-axle tandem rollers may be used shall be under the control of the Engineer, but in general, no 3-axle tandem roller shall be used in rolling over a crown or a warped section when the center axle is in the locked position.

Provided it is demonstrated to the satisfaction of the Engineer that one roller can performed the work, the required minimum rolling equipment specified may be reduced to a 2-axle tandem roller, weighing at least 8-tons for each paver under any of the following conditions.

1. When asphalt concrete or asphalt concrete base is placed at a rate of 50-tons, or less, per hour at any location.
2. When asphalt concrete or asphalt concrete base is placed at a rate of 100-tons, or less, per hour and at the locations or under the conditions as follows:
 - Placed on miscellaneous areas as approved by the Engineer; or
 - When the width to be placed is less than 8-feet.

When rolling equipment is reduced as provided in this section the rolling requirements may be reduced to at least three complete coverages with the tandem roller.

Upon completion of rolling operations, if ordered by the Engineer, the asphalt concrete or asphalt concrete base shall be cooled by applying water.

The completed surfacing shall be thoroughly compacted, smooth, and free from ruts, humps, depressions, or irregularities. Any ridges, indentations, or other objectionable marks left in the surface of the asphalt concrete by blading or other equipment shall be eliminated by rolling or other means. The use of any equipment that leaves ridges, indentations or other objectionable marks in the

asphalt concrete shall be discontinued, and acceptable equipment shall be furnished by the contractor.

- E. Segregation shall be avoided and the surfacing shall be free of pockets of coarse or fine material. hot mix asphalt containing hardened lumps shall not be used. In areas inaccessible to paving and compacting equipment where spreading is done by hand, minimize the amount of segregation.
- F. At all locations, or as directed by the Engineer, the asphalt concrete shall be square and at least 2 inches thick when conforming to existing surfacing.
- G. Upon completion of final rolling, traffic shall not be permitted on the finished pavement for at least 4 hours, or until the Hot mix asphalt has cooled sufficiently to withstand traffic without being deformed as determined by the Engineer.

3.6 Cold Mix Asphalt

- A. Cold mix asphalt shall be placed before the end of each work day (where approved by the District) for newly installed pipeline trenches.
- B. Compact the cold mix asphalt material with a smooth drum roller, vibratory plate, or approved compaction equipment. Equipment to be used for compaction is subject to review and rejection by the Engineer. Contractor is responsible for adequately grading and compacting cold mix to the satisfaction of District and the Engineer.
- C. Contractor is responsible for all maintenance of cold mix up to the installation of the final pavement. Contractor is required to make repairs to cold mix as necessary and/or directed by the Engineer.

3.7 Hot Mix Field Quality Control

- A. All hot mix asphalt shall match the grades indicated on the Drawings and shall be completely free from unintended hollows and high spots.
- B. Cracks, settling of surface, improper drainage, improper compaction, and sloppy connection to previously laid surfaces will be construed as improper workmanship and will not be accepted.

3.8 Striping

- A. All striping removed or damaged during hot mix installation shall be corrected within one week of final pavement. If damage occurs before final pavement is scheduled the contractor in the interim can temporarily use marking paint for the stop bar until the final striping is scheduled.
- B. Standard striping is required at elevations above 2,500 feet and thermoplastic is required where previously used below 2,500 feet. The contractor is responsible to use either product that matches the existing striping.

3.9 Workmanship and Warranty

- A. Contractor shall provide written warranty against defects in materials or workmanship for a period of not less than one year upon acceptance of work.

END OF SECTION

