

SECTION 9 ASPHALT CONCRETE

9-1 GENERAL - Work shall consist of furnishing and placing asphalt concrete as shown on the Contract Plans and as specified by the Project Specifications. Unless otherwise specified in the Contract Plans or in the Special Provisions, the following asphalt concrete mixes shall be used. Asphalt concrete shall be Type A HMA, conforming to Section 39, "Hot Mix Asphalt," of the State Specifications. "PG" grade asphalts shall refer and conform to Section 92, "Asphalts," of the State Specifications.

Base Course:	3/4" Maximum Sized Aggregate, PG64-10 Asphalt
Surface Course:	1/2" Maximum Sized Aggregate, PG64-10 Asphalt
AC Dikes:	3/8" Maximum Sized Aggregate, PG64-10 Asphalt

Failed area pavement repairs shall use ¾" MSA. Driveways, pathways, and paved shoulders shall use ½" MSA when only one course of asphalt concrete is required or when work is performed separately from roadway paving.

9-2 ASPHALT BINDER - Asphalt binder to be mixed with aggregate shall be steam-refined paving asphalt conforming to Grade PG 64-10 as specified in Section 92, "Asphalts," of the State Specifications.

The actual percentage of asphalt to be used will be determined through a complete asphalt concrete mix design performed on the materials intended for use on this project, based on CA Test No. 367. The mix design shall produce asphalt concrete with an air void content of 4 percent, and conform to Section 39-1.03B, "Hot Mix Asphalt Mix Design," of the State Specifications.

9-3 AGGREGATES - Aggregate shall be of gradation conforming to "HMA Types A" of Section 39-1.02E, "Aggregate" of the State Specifications. Aggregate furnished for the asphalt concrete shall be hard, sound, durable aggregate of uniform quality free from vegetable or organic matter and other deleterious substances. Upon request by Contractor, Engineer may accept "Type B" gradation conforming to the above specifications, at his sole discretion and determination.

9-3.1 Reclaimed Asphalt Pavement (RAP) – RAP asphalt concrete shall conform to all governing provisions, including but not limited to Section 39-1.02F, of the State Specifications. Upon request, Contractor shall submit results of a gradation test on the materials per CA Test No. 202. Contractor shall facilitate inspections by the Engineer of aggregate stockpiles intended to be used for RAP. The Engineer shall inspect the stockpiles to determine the cleanliness of aggregates, which shall be free of all organic debris and deleterious materials, including but not limited to- vegetation debris; plant and tree branches and sticks; wires; plastic, brick, or ceramic particles; remnant pieces of pavement reflectors, markers, and fabric. The acceptance of materials shall be the Engineer's sole discretion and determination, which shall be final. Only stockpiles accepted by the Engineer shall be used to produce RAP for the Project. Use of RAP aggregates shall not exceed 15% of the total aggregate blend by volume.

9.3.2 RAP Considered a Value-Engineering Change Proposal – Unless Contractor can demonstrate that the Contract Bid Price contemplates the use of RAP, said use shall be considered to be a Value Engineering Change Proposal for the Contractor's convenience, subject to the provisions of Section 8-6.5 of the General Provisions. Contractor shall submit a request for a Contract Change Order and all supporting documentation, and City shall be entitled to share in the resulting cost savings, all as specified in said Section 8-6.5.

To demonstrate that the Contract Bid Price contemplates the use of RAP, Contractor shall disclose to City his bid documents used in the preparation of the Bid for Contract work item(s) involving RAP. Said documents shall include but not be limited to all quotes, price and quantity estimates, any and all calculations or written information that Contractor has used to prepare the Bid, presented in a clear and legible format to illustrate the derivation of the Bid Price(s) of the affected Bid Item(s).

9-4 MATERIAL TEMPERATURE AND WEATHER CONDITIONS - At the time of delivery to the site of the work, the temperature of the mixture shall not be lower than 250°F, or higher than 320°F, regardless of ambient temperature. When feather-edging, the Engineer may require asphalt concrete to be 300°F minimum. Asphalt concrete shall not be placed when the atmospheric temperature is below 50°F, or during unsuitable weather. Placement shall not occur on surfaces with ponded water or excessive moisture as determined by the Engineer. It shall be Contractor's responsibility to schedule operations to avoid placing asphalt concrete in the rain or fog. If paving operations are in progress, and rain or fog forces a stoppage of work, loaded trucks in transit shall return to the plant and no compensation shall be allowed for unused materials.

Contractor shall furnish and install canvas tarpaulin to cover asphalt concrete from the time that the mixture is loaded into transport vehicles until it is discharged at the job site. Failure to cover asphalt shall constitute grounds for categorical rejection of the uncovered load.

9-5 PLACEMENT - Contractor's attention is directed to Section 9-11 of these Technical Provisions regarding the requirement of a tack coat. A surface course of asphalt concrete consisting of a mixture of aggregate and asphalt that has been mixed at a central mixing plant shall be spread and compacted on the prepared subgrade to the specified thickness. Batch data and load slips shall be presented to the Engineer as asphalt concrete is delivered to the paving site to allow verification of location and use. Failure to present these documents shall constitute ground for rejection of any contractor claims regarding disputed construction quantities.

The Contractor shall protect all building foundations, planters, screens, etc., from splash, roller scrape, or over spray. Vegetation between the edge of pavement and gutter lip shall be removed. Contractor may use high-pressure air (minimum 90 psi) to clean loose materials from cracks. Any surface to be overlaid shall be cleaned by sweeping, flushing or other means necessary to remove all loose particles of paving, all dirt, and all other extraneous material. Pavements impregnated with grease, oil, or fuel shall be thoroughly scrubbed and then flushed and swept clean.

Unless otherwise indicated elsewhere, asphalt concrete shall be placed in the number of layers and thicknesses as indicated below:

<i>Total thickness</i>	<i>No. of layers</i>	<i>Requirements</i>
0.25' or less	1	
0.25' to 0.50'	2	Both layers 0.12' minimum , 0.25' maximum,
Greater than 0.50'	3 minimum	Top layer 0.15' minimum and 0.25 maximum; all other layers 0.35' maximum

Asphalt concrete shall not be placed over another layer until the temperature of the underlying layer is 160°F, unless otherwise directed by the Engineer. Longitudinal joints in the top layer shall correspond with the final lane lines or edges of traffic lanes. Longitudinal joints in underlying layers shall be offset from the nearest joint in the top layer by approximately six inches. The surface on which the pavement is to be constructed, including any previously-installed asphalt concrete base lift, shall be thoroughly cleaned by whatever means necessary prior to the application of tack coat and the placement of the surface layer.

Handworking, raking, and repetitive handling of asphalt concrete shall be minimized. Any asphalt concrete material which has fallen onto the adjacent roadway surface shall be removed from the site. Failure to comply with this requirement shall constitute ground for rejection of the paving by the Engineer.

Initial rolling shall be performed when the sum of the air temperature and the temperature of the asphalt concrete is between 300°F and 375°F. Finish rolling shall be started after the pavement has cooled sufficiently to permit removal of the roller marks, and shall be continued in whatever direction is necessary to produce a pavement surface free of indentations.

Asphalt concrete shall be compacted to 93% of the theoretical (Rice) density as determined by Test ASTM D-2041 and ASTM D-3203, and shall be finished to the lines, grades, and cross section shown on the contract plans. Contractor's attention is directed to the additional requirements specified in the "Special Quality Control Provisions" included in Section 9-7 of the Standard Specifications.

If the test results for any part of the asphalt concrete mat placed indicate that the relative compaction is below 93% of theoretical density, but above 92%, the Contractor shall be so advised. The Contractor shall promptly adjust the construction materials, equipment, and/or methods of installation as to attain the required compaction. Asphalt concrete paving operations shall not continue until the Engineer has reviewed and approved the Contractor's proposed adjustments. If the test results for any part of the asphalt concrete mat placed indicate that the compaction is less than 92% of theoretical density, the asphalt concrete represented by that lot shall be removed and replaced or deducted from the contract payments at the discretion of the City. Asphalt concrete paving operations shall not continue until the Contractor makes any adjustment to the materials, equipment, and/or methods of installation necessary to meet the required compaction. The proposed adjustments shall be reviewed and approved by the Engineer.

Areas inaccessible to the spreading and compaction equipment may be placed and compacted by such procedures as may be

approved by the Engineer. Compaction in these areas shall be no less than 90% of theoretical density. Compaction less than 90% of theoretical density shall be caused for rejection of the asphalt concrete lot represented.

The pavement surface, when completed, shall be smooth, dense and of uniform texture and appearance. All areas shall drain and be free of standing water. The compacted thickness shall not vary by more than 0.02 feet from that shown on the Contract Plans.

At the end of each work period (day), the Contractor shall construct temporary asphalt concrete ramps at all transverse joints, intersections with side streets and existing driveway locations, and crosswalks where there is a vertical deviation in adjacent elevations. The asphalt concrete ramps shall be tapered on a slope as shown on the Plan but not less than 30:1 horizontal to vertical, or as directed by the Engineer. Asphalt concrete for ramps shall be equal in qualities to those specified by Contract, and may be spread and compacted by any method that will produce a smooth riding surface. Asphalt concrete ramps shall be completely removed, including all loose material from the underlying surface, before placing the permanent surfacing. Prior to opening the roadway to public traffic, the Contractor shall furnish and place temporary pavement delineation in conformance with the provisions of Section 6-12.7, "Temporary Traffic Striping and Pavement Marking," of the General Provisions.

9-6 TOLERANCES - The asphalt concrete shall be evenly spread upon the subgrade or base to such a depth that, after rolling, it will conform to the specified cross section and grade of the course being constructed. Upon completion, the pavement shall be true to grade and cross section. When a ten (10)-foot straightedge is laid on the finished surface parallel to the center line of the roadway, the surface shall not vary from the lower edge of the straightedge more than one-eighth inch (0.01 foot), except at intersections or at change of grade. The transverse slope of the finished surface shall be uniform such that no depressions greater than one-fourth inch (0.02 foot) are present when tested with a straightedge ten (10) feet long laid in a direction transverse to the centerline. Any areas that are not within these tolerances shall be brought to grade immediately following the initial rolling.

However, if the paving material has been cooled below the lower limits of the spreading temperatures specified, the surface of the pavement shall be brought to a true grade and cross sectioned by removing the paving material in the area to be repaired by an approved method to provide a minimum laying depth of one inch of new pavement material at the join line. Repairs shall not be made to pavement surfaces by feather edging at the joining. Cost of this work shall be entirely at the Contractor's expense.

9-7 REJECTION OF DEFECTIVE PAVING AND CORRECTIVE MEASURES - Failure to meet any test requirement (including compaction requirements), surface irregularities, and separation of fines from aggregates shall be cause for rejection. The finished pavement surface shall be smooth and free of cracks, shoving, displacement, and segregation of coarse and fine materials. Paving shall be to a clean neat joint with existing grade. Paving with evidence of poor workmanship such as rock pockets, ripples, voids, or out of tolerance as defined above, shall be rejected. At the discretion of the Engineer the Contractor may be allowed to:

- 1) Attempt to correct surface defects by such measures as fog sealing, slurry sealing. A seal coat, if allowed by the Engineer, shall be in accordance with Section 10, "Bituminous Seal Coats," of these Technical Provisions.
- 2) Attempt other corrective measures, as approved by the Engineer that will not affect the quality or integrity of the asphalt concrete in place.
- 3) Place an additional layer of asphalt concrete over the defective paving.
- 4) Agree to a reduction in the Contract Unit Price for the material involved.

Such measures if allowed by the Engineer shall be solely at the Contractor's risk and expense. In proceeding with such measures the Contractor agrees they do not obligate the Engineer to accept the work. The Contractor further agrees that the Engineers decision as to the acceptability of such corrective measures is not subject to a claim pursuant to Section 10, "Protests and Claim by Contractor," of the General Provisions of the City Standard Specifications. Should the asphalt concrete paving not be corrected to the satisfaction of the City, it shall be removed and replaced at no expense to the City.

SPECIAL QUALITY CONTROL PROVISIONS

Core samples of the installed asphalt concrete will be taken at the discretion of the Engineer. Said samples shall be tested for percent air voids per the current Standard Test D3203 at the time of Work. Test results of representative samples from the same lot or project location shall be averaged. The averaged air void value over 10% by volume shall result in the rejection of the subject lot. The asphalt concrete represented by that lot shall be removed and replaced, or the quantity shall be deducted from the Contract Price. Average air void values between 8% and 10% by volume shall result in a reduction in payment for the asphalt concrete represented by that lot. The reduction in payment shall be per The "Reduced Payment

Factors for Percent Maximum Theoretical Density” found in State Specifications Section 39-2.03, “Acceptance Criteria,” for asphalt concrete, except that the range of “Reduced Payment Factor” shall run from 0.2500 for 90% density to 0.0125 for 91.9% density. The factors in the State Specifications for densities greater than 97% shall apply.

These Special Quality Control Provisions shall be in addition to all requirements and specifications herein and shall not be construed to substitute, replace, or void any other provisions of Contract.

9-8 CERTIFICATES OF COMPLIANCE - The Contractor shall furnish the Engineer, at least two (2) weeks prior to the start of work, with a list of material sources together with Certificates of Compliance, indicating that materials to be incorporated in the work fulfill the requirements of these specifications. The material supplier or representative shall sign the Certificates of Compliance. The Engineer may permit the use of paving materials, aggregate, cement, lime, anti-strip agents, asphalt, or any combination thereof prior to sampling and testing when accompanied by a Certificate of Compliance.

Mix Design- The certificate accompanying the mix design submitted by the Contractor shall indicate that said mix design is able to achieve a compaction equal to a minimum of 96% of theoretical density, or a maximum of 4% air voids, in lab tests.

9-9 EQUIPMENT - All equipment used shall be in good working condition and shall be capable of performing the work intended in a safe and satisfactory manner.

Paving Equipment: Asphalt concrete surfacing shall be placed with a self-propelled (vibrator type) asphalt paving machine, except where inaccessibility precludes its use. The paving equipment shall utilize automatic screed controls and sensing devices that enable it to control the paving thickness, longitudinal grade, and transverse screed slope. Use of motor graders or loaders with paving attachments shall not be allowed. Use of pick-up machines shall not be allowed when the subgrade receiving asphalt concrete is not itself asphalt concrete or cement-treated base. When approved by the Engineer, asphalt concrete may be spread by means of a spreader box and, where necessary, by hand.

Rollers: Self-propelled compacting rollers shall comply with applicable requirements of the State Standard Specifications.

If in the opinion of the Engineer, the equipment proposed by the Contractor will not produce a surface conforming to the grade, tolerance, and finish specified in the project plans, specifications and provisions, the Engineer shall reserve the right to reject said equipment. If the Contractor insists, he may proceed with work using said equipment at his own risk. If the completed work fails to meet the project plans and specifications' requirements for grades, tolerance, and finish, the work shall be rejected; and the Contractor shall remove and replace the work at his own expense.

9-10 PRIME COAT - The prime coat shall be liquid asphalt grade MC-70 in conformance with Section 93, “Liquid Asphalts,” of the State Standard Specifications and as specified herein. A prime coat shall be applied to the finish surface of aggregate base at a rate of 0.25 gallons per square yard prior to asphalt concrete pavement construction.

9-11 TACK COAT - The tack coat shall be asphalt grade RS-1 or SS-1h in accordance with Section 94, “Asphaltic Emulsions,” of the State Standard Specifications, and applied per Section 39-1.09C of the State Specifications and as specified herein.

A tack coat shall be applied to all vertical surfaces abutting the asphalt concrete paving, to all surfaces upon which asphalt concrete overlay or resurfacing is to be constructed and to such other areas as may be directed by the Engineer, at the rate of 0.02 to 0.10 gallons per square yard. The exact rate shall be as approved by the Engineer and shall provide a thorough coating of the area to receive asphalt concrete leveling course. Surfaces to receive tack coat shall be clean and free of loose and foreign material before application.

9-12 MEASUREMENT - Asphalt concrete shall be measured by the ton. Measurement by tons will be based on certified weigh-meters, certificates showing gross, tare and net weight, and plant source, and the type and grading of the mix for each load. No measurement shall be made, regardless of acceptance of certifications, for any surfacing not meeting requirements, placed outside the lines shown, or rejected for any reason. Certificates must be given to the City at the time of delivery of the asphalt concrete. Certificates will not be accepted after the fact.

9-13 PAYMENT - Shall be at the Contract unit price bid. Said price and payment shall be full compensation for furnishing and placing the surfacing, complete in place, in accordance with the Contract Plans and specifications, including all labor, materials, equipment, compacting, prime coat, tack coat, and incidentals, and no additional compensation shall be made therefor.