

CHAPTER 6

ASPHALT PAVING

SECTION 6.01 GENERAL

This Section covers the requirements for bituminous surface paving on roads. All streets shall be surfaced in accordance with the following:

- A. 6-inch minimum or more (based on pavement design) crushed gravel base course over prepared subgrade.
- B. 3-inch minimum or more (based on pavement design) compacted thickness plant mix asphalt surfacing.
- C. 1-inch minimum or more (based on pavement design) compacted thickness plant mix asphalt overlay.

SECTION 6.02 ROAD SUB-GRADE PREPARATION

- A. If the pavement design does not require any sub-base materials, the sub-grade shall be scarified to a depth of 8 inches the full width of roadway section and the loosened material shall be moistened and compacted to the equivalent of 95% of the maximum dry density as measured by AASHTO T-99 (Standard).
- B. If the pavement design or trench conditions require sub-base imported materials, the sub-grade shall be over-excavated to the depth specified across the full width of roadway section and replaced with select granular material, (which as a minimum meets the A-1-a AASHTO classification as indicated in the following table) and be moistened and compacted as above.

<u>Sieve size</u>	<u>Percent passing</u>
No. 10 Sieve	50 max
No. 40 Sieve	30 max
No. 200 Sieve	15 max

- C. No organic material, soft clay, spongy material, frozen earth, or other deleterious material will be permitted in the scarified or imported subgrade layer. Rough subgrades shall be shaped and graded to within a tolerance of 0.15 feet of design grade and drainage shall be maintained at all times.
- D. During the rolling operation, moisture content of the sub-grade layer shall be maintained at not less than 97% or more than 105% of optimum moisture content. Rolling shall be continued until the entire road bed, (to one foot back of curb) is compacted to the specified density to a minimum depth of 8 inches.

SECTION 6.03 BASE COURSE

- A. Base for all streets shall consist of select material, either natural or crushed, placed on a prepared sub-grade in reasonable close conformance with the lines, grades and dimensions shown on the plans.
- B. Unless otherwise approved by the City Engineer, the road base material shall be crushed rock or gravel and shall conform to the following gradation by weight:

<u>Sieve Size</u>	<u>Average Gradation</u>	<u>% Passing</u>	<u>Individual Sample Tolerances</u>
1"	100%	100	-5
1/2"	85%	70-100	-5
#4	55%	41-68	+/-4
#16	31%	21-41	+/-3
#50	19%	10-27	+/-2
#200	9%	4-13	+/-2

- C. Roadbase material shall be uniform in quality and well graded from course to fine.
- D. Before placing the road base the supplier or contractor furnishing the material shall submit, if required by the City Engineer or City Inspector, sieve analysis of stock-piled material showing that it meets the above requirements.
- E. Roadbase material shall be deposited and spread in uniform layer, without segregation of size with such depth that when compacted the layer will have the required thickness.
- F. Each layer shall be compacted for the full width and depth by rolling with a pneumatic roller weighing at least 10 tons. Alternate grading and rolling will be required to provide a smooth, even and uniformly compacted course true to cross section and grade. Places inaccessible to rolling shall be compacted with mechanically operated hand tampers.
- G. The gravel base shall be compacted to not less than 95% maximum dry density as determined by AASHTO T-1 80. Surfaces shall be true to the established grade with thickness being not less than 1/4 inch from the required layer thickness and with the surface elevation varying not more than 3/8 inch in ten-feet from the true profile and cross section.

SECTION 6.04 BITUMINOUS SURFACE COURSE

A. Over the compacted base course the Contractor shall place and compact a bituminous surface course. The surface course shall consist of a mixture of mineral aggregate and bituminous binder. Gradation of aggregate shall conform to one of the following gradations:

1. 3/4" Gradation:

<u>Sieve Size</u>	<u>Desirable Average Gradation</u>	<u>% Passing Gradation Band</u>	<u>Tolerances Individual Samples</u>
3/4"	100	100	-5
3/8"	85	70-100	-5
No. 4	62	48-76	+/-4
No. 8	48	36-59	+/-4
No. 16	36	27-45	+/-3
No. 50	23	16-29	+/-2
No. 200	8	5-11	+/-2

2. 1/2" Gradation:

<u>Sieve Size</u>	<u>Desirable Average Gradation</u>	<u>% Passing Gradation Band</u>	<u>Tolerances Individual Samples</u>
1/2"	100	100	-5
No. 4	81	61-100	-4
No. 8	59	43-75	+/-4
No. 16	44	32-55	+/-3
No. 50	26	19-33	+/-2
No. 200	10	7-12	+/-2

The aggregate shall be uniform quality and free from clay, vegetative matter and other deleterious substances.

- B. The Contractor shall establish a mix gradation and the amount of bituminous material shall be subject to the approval of the City Engineer and shall meet the requirements of the gradation selected. The asphalt content by weight shall be between 4.5 and 7 percent. Regardless of the bituminous content there shall not be more than 3% voids in the aggregate.
- C. The bituminous material for surface course shall be AC 5, AC 10 or AC 15 asphalt cement conforming to the requirements of ASTM D-445, 85-100 penetration at a temperature from 250 to 300 degrees F. Asphalt cement conforming to the requirements of ASTM M20-60 may be used when specifically approved by the City Engineer. The bituminous material shall be free of water and will contain no mineral matter other than that naturally contained in the asphalt.
- D. The bituminous surface course shall be mixed at a mixing plant and spread and compacted on the prepared base in conformance with the lines and dimensions shown on the plans and in accordance with these Specifications. All Structure edges (curbs, etc.) shall receive a "bituminous tack" coat.

SECTION 6.05 FULL DEPTH ASPHALT

- A. Upon the approval of the City Engineer, the contractor may be allowed to install "full depth" asphalt. Full depth asphalt is defined as a roadway section where the granular base course is replaced (substituted) with a thickness of bituminous course (asphalt) of equivalent strength. The contractor shall supply the City Engineer with pavement design calculations demonstrating that the substituted full depth section has equivalent strength to the standard composite section.
- B. If the pavement design does not require any sub-base materials, the sub-grade shall be scarified to a depth of 8 inches the full width of roadway section and the loosened material shall be moistened and compacted to the equivalent of 95% of the maximum dry density as measured by AASHTO T-99 (Standard).

SECTION 6.06 CONSTRUCTION METHODS AND EQUIPMENT

- A. The methods employed in performing the work, all equipment, tools, and machinery and other appliances used in handling the materials and executing the work shall be the responsibility of the Contractor. The Contractor shall make such changes in the methods employed and in the equipment used as are necessary whenever the bituminous material being produced does not meet the specifications herein established.

SECTION 6.07 SPREADING AND COMPACTION

- A. The bituminous mixtures shall be spread with self-propelled mechanical spreading and conditioning equipment capable of distributing at least a 12-foot width. Unless otherwise designated or directed by the City Engineer or City Inspector, bituminous base course more than 4 inches in total compacted thickness shall be spread in two or more courses,

with no courses exceeding 4 inches in compacted thickness and no courses less than 1 inch in thickness. The mixture shall be spread and struck off in such a manner that the finished surface shall result in a uniform smooth surface. The longitudinal joints in succeeding courses shall be off-set at least 6-inches transversely to avoid a vertical joint through more than one course.

- B. The temperature of the bituminous mix shall be between 250 degrees F and 325 degrees F when placing.
- C. After the mixture has been spread, the surface shall be rolled with a power driven roller, weighing not less than 10 tons, in longitudinal direction commencing at the outside edge or lower side and proceeding to the higher side. Each pass of the roller shall overlap the preceding pass at least one-half the width of the roller. Rolling shall continue until 95% of the laboratory density as determined in accordance with ASTM Designation D-1559 for the bituminous mixture being used has been obtained.
- D. Rolling operations shall be conducted in such a manner that shoving or distortion will not develop beneath the roller.
- E. The surface of the pavement, after compaction, shall be uniform and true to the established crown and grade. When tested with a ten (10) foot straight edge placed parallel to the centerline of the pavement, the surface of the pavement at any point shall not deviate from the lower edge of the straight edge by more than one eighth of an inch. All high and low spots shall be remedied immediately by removing the wearing course material over the affected areas and replacing it with fresh, hot wearing course and surface finish material and immediately compacting it to conform with the surrounding area.
- F. The Contractor shall be responsible to keep all traffic off the completed surface for a minimum period of 24 hours.

SECTION 6.08 WEATHER LIMITATIONS

- A. No bituminous surface shall be placed when the temperature of the air or road bed is below 50 degrees F, during rainy weather when the base is wet, or during other unfavorable weather conditions as determined by the City Engineer or City Inspector. The air temperature shall be measured in the shade.

SECTION 6.09 FLAGGING

- A. Flagmen shall be required as directed to facilitate the safe control of traffic over highways and streets under construction at such locations as required and directed by the Public Works Director or the Streets Department Superintendent. Flagging shall be performed by adequately trained and equipped flagmen. All flagging shall be done as described in the Safety Orders covering flagmen of the Industrial Commission of Utah.

SECTION 6.10 TRENCH SETTLEMENT LIMITATIONS

- A. All trench and associated street improvement areas must meet the minimum compaction requirements stated in Section 7. Should there be any problems meeting the compaction requirements stated therein due to saturated soil conditions and/or at the discretion of the City Engineer, the following may be required prior to concrete and asphalt work:
1. Trenches excavated and backfilled in the Fall shall set until June 1 at which time the compaction shall be rechecked to determine the adequacy thereof. Contractor shall be responsible to maintain said trenches until final road surface is in place and accepted.
 2. Trenches excavated and backfilled in the Spring or Summer shall set for 90 days or more and then be rechecked.
 3. Trenches may not be excavated in a public street right-of-way during the period from December 1 to March 1 unless approved otherwise by the City Engineer.
 4. A proof roll of the excavated and backfilled material shall be provided. Proof roll shall be completed with a fully loaded dump, concrete, water truck, etc. weighing a minimum of 20 tons. Any proof-rolled areas found to be yielding or cracking shall be removed, stabilized and proof-rolled again prior to acceptance.