

CHAPTER 3.04 STREET CONSTRUCTION

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3.04.005 GENERAL. This Chapter covers the requirements for bituminous surface paving on roads. All streets shall be surfaced in accordance with the following specifications, unless otherwise specified by the City Engineer.

3.04.010 BASE COURSE. Base course for all streets shall consist of select material, either natural or crushed, and shall be graded to either one of the following:

1 Inch Gradation

<u>Sieve Size</u>	<u>Ideal Gradation</u> (Percent Passing)	<u>Ideal Gradation</u> (Tolerance)
1 inch	100	0
½ inch	85	∇ 6
No. 4 sieve	55	∇ 6
No. 16 sieve	31	∇ 4
No. 200 sieve	9	∇ 2

¾ Inch Gradation

¾ Inch	100	0
3/8 Inch	85	∇ 7
No. 4	61	∇ 6
No. 16	33	∇ 5
No. 200	9	∇ 2

A. The material shall be deposited and spread in a uniform layer, without segregation of size, with such depth that when compacted, the layer will have the required thickness as stated above.

B. Each layer shall be compacted for the full width and depth. Alternate blading 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.

3.04.015 SURFACE PAVING. This Section covers the requirements for bituminous surface paving on roads. All streets shall be surfaced in accordance with the following, unless otherwise specified by the City Engineer.

Classification of Streets shall be the responsibility of the City Engineer.

A. Local Streets.

1. Minor Streets.

- a. Eight (8) inch minimum compacted thickness granular borrow.
- b. Eight (8) inch minimum crushed gravel base course over prepared sub-grade;
- c. Three (3) inch minimum compacted thickness plant mix asphalt surfacing on streets.

2. Standard Residential Streets.

- a. Eight (8) inch minimum compacted thickness granular borrow.
- b. Eight (8) inch minimum crushed gravel base course over prepared sub-grade;
- c. Three (3) inch minimum compacted thickness plant mix asphalt surfacing on streets.

3. Low Impact Residential Road

- a. Eight (8) inch minimum compacted thickness granular borrow.
- b. Eight (8) inch minimum untreated gravel base course over prepared sub-grade;
- c. Three (3) inch minimum compacted thickness plant mix asphalt surfacing on streets.

B. Collector Streets.

- 1. Twelve (12) inch minimum compacted thickness granular borrow.
- 2. Eight (8) inch minimum crushed gravel base course over prepared sub-grade;
- 3. Three (3) inch minimum compacted thickness plant mix asphalt surfacing on streets.

C. Arterial Streets.

1. Minor Arterial Street.

- a. Fifteen (15) inch minimum compacted thickness granular borrow.
- b. Ten (10) inch minimum crushed gravel base course over prepared sub-grade;
- c. Three and one-half (3½) inch minimum compacted thickness plant mix asphalt surfacing on streets.

2. Major Arterial Streets.

- a. Eighteen (18) inch minimum compacted thickness granular borrow.
- b. Twelve (12) inch minimum crushed gravel base course over prepared sub-grade;
- c. Four (4) inch minimum compacted thickness plant mix asphalt surfacing on streets.

Note: The subdivider may submit a pavement design for review on any street.

D. The gravel base course shall be compacted to not less than ninety five (95) percent maximum dry density as determined by AASHTO T-99. During rolling operation, moisture content of the base course layer shall be maintained at not less than ninety seven (97) percent or more than one hundred-five (105) percent of optimum moisture content. Surfaces shall be true to the established grade with the thickness being not less than ¼ inch from the required layer thickness and with the surface elevation varying not more than 3/8 inch in ten (10) feet from the true profile and cross section.

3.04.020 BITUMINOUS SURFACE COURSE. Over the dry, dust-free compacted course the Contractor shall place and compact a bituminous surface course. The surface course shall consist of a mixture of mineral aggregate and binder. Gradation of aggregate shall conform to the following:

<u>Sieve Size</u>	<u>Ideal Gradation</u>	<u>Ideal Gradation</u>
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	(Percent Passing)	Tolerance
3/4 inch	100	0
3/8 inch	80	∇ 11
No. 4	50	∇ 8
No. 16	24	∇ 7
No. 50	15	∇ 6
No. 200	6	∇ 2

A. 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. Regardless of the bituminous content, there shall not be more than three (3) percent voids in the aggregate.

B. The bituminous material for the surface course shall be AC-10 asphalt cement conforming to the requirements of AASHTO —226.

C. 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.

D. All traffic shall be kept off the completed surface for a minimum of twenty four (24) hours.

3.04.025 CONSTRUCTION METHODS AND EQUIPMENT. 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.

3.04.030 SPREADING AND COMPACTION. The bituminous mixtures shall be spread with self propelled, mechanical spreading and conditioning equipment capable of distributing at least a twelve (12) foot width. 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 offset at least six (6) inches transversely to avoid a vertical joint through more than one course. Compacted surface course lifts shall be limited to a maximum of three (3) inches. Prior to placement of bituminous material, all exposed vertical facings on curb and existing pavement shall receive a complete asphalt tack coat at a rate 0.08 gal/per square yard. Care shall be exercised to prevent over spraying on finish concrete surfaces.

A. The temperature of the bituminous mix shall be between 250° F. and 325° F. when being placed.

B. After the mixture has been spread, the surface shall be rolled in a 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 ninety five (95) percent of the laboratory density, as determined in accordance with ASTM Designation D-1559 (Marshall Test), for the bituminous mixture being used has been obtained.

C. Rolling operations shall be conducted in such a manner that shoving or distortion will not develop beneath the roller.

D. 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 (1/8) 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.

3.04.035 WEATHER LIMITATIONS: No bituminous surface course shall be placed when the temperature of the

air or roadbed is 50° F or below, during rainy weather, when the base is wet, or during other unfavorable weather conditions as determined by the City Engineer. No bituminous plant mix seal coat shall be placed when the temperature of the air or roadbed is less than 70° F, during rainy weather, when the pavement surface is wet, or during other unfavorable weather conditions as determined by the City Engineer, see Section 3.04.060. The air temperature shall be measured in the shade. No bituminous surface course shall be placed after October 15th without written approval from Tremonton City Public Works Director.

3.04.040 BITUMINOUS SEAL COAT: Following installation of surface course, all completed asphalt areas shall receive a bituminous seal coat preferably a minimum of twelve (12) months after bituminous paving as directed by the City Engineer. Bituminous material shall be an approved emulsified asphalt used for seal coating. Cover material shall consist of clean, hard, rough, durable, and sound fragments of broken stone, crushed gravel, or crushed slag conforming to the following requirements:

A. The dry mineral aggregate shall be uniformly graded to the gradation limits specified below, when tested in accordance with AASHTO Designation T-27.

<u>Percentage Passing Sieves</u>	
<u>Sieve Size</u>	<u>% Passing</u>
½ inch	100
3/8 inch	85-100
No. 4	5-20
No. 8	0-5
No. 200	0-1

B. Acceptance of cover material with respect to gradation shall be based on the average gradation of five (5) samples taken from a test lot of 5,000 tons. The samples shall be obtained from the stockpile prior to use. A test lot shall be obtained when the average gradation of the five (5) samples is within the specified gradation band and when the number of individual samples in each test lot outside the gradation band does not exceed two (2) and when they are not outside the band by more than two (2) percentage points on any one sieve.

C. The total amount of material passing the No. 200 sieve shall be determined by washing with water in accordance with AASHTO Designation T-11.

D. That portion of the aggregate retained on the No. 4 sieve shall be clean and free of clay coatings and shall have not less than eighty (80) percent by weight of particles with at least one clean mechanically fractured face when tested in accordance with Department Test Procedure 8-929.

E. The aggregate shall have a percentage of wear not exceeding thirty (30) when tested in accordance with AASHTO Designation T-96.

F. The crushed mineral aggregate shall have a weighted percent of loss not exceeding ten (10) percent by weight when subjected to five (5) cycles of sodium sulfate and tested in accordance with AASHTO T-104.

G. The aggregate shall be of such nature that when the particles are thoroughly coated with the bituminous material specified for the project not less than ninety (90) percent of the coating shall be retained when tested in accordance with Department Test Procedure 8-945.

H. The maximum dry unit weight of material shall not exceed one hundred (100) pounds per cubic foot when measured according to the loose weight determination as described in AASHTO Designation T-19 and the moisture content shall be determined according to ASTM D-2216.

3.04.045 SEAL COAT PROTECTION. Seal coat operations shall not be started until the surface to be sealed has been thoroughly compacted. In no event shall seal coat be placed on newly constructed bituminous surfaces within seven (7) days after such surfaces are laid and preferably a minimum of twelve (12) months after placing asphalt pavement as directed by the City Engineer. Prior to placing the seal coat, the existing surface shall be cleaned of all dirt, sand, dust, or other objectionable material.

3.04.050 APPLICATION OF BITUMINOUS SEAL COAT MATERIAL. The material shall be sprayed over the prepared surface by means of a pressure distributor. The material shall be applied in such a manner that an inspection of the spread can be made and any defects corrected before the cover material is applied. The rate of application shall be determined by the City Engineer. Application of bituminous material shall not be more than 1,000 feet in advance of the placing of cover material.

A. The contractor shall be responsible to cover all existing manholes and valve boxes with felt paper prior to the installation of the seal coat to protect these facilities from being covered with the bituminous seal coat materials.

B. Joints between applications shall be made by starting and stopping the distributor on building paper. Valve action shall be instantaneous, both in starting and cut off. The distributor shall attain the proper application speed at the time the spray bar is opened.

C. The contractor shall be responsible to furnish and place the required asphalt emulsion at a uniform rate and application coverage of 0.43 gallons per square yard or as directed by the City's project representative. The emulsion shall be CRS-2 with a LMCRS2A rubber additive as approved by the City Engineer. The material shall be sprayed over the prepared surface by means of a pressure distributor. The material shall be applied in such a manner that an inspection of the spread can be made and any defects corrected before the cover materials is applied. The application of bituminous emulsion material shall not be more than one thousand (1,000) feet in advance of the placing of cover material.

D. The temperature range of the bituminous material at the time of application shall be such that the viscosity will be between fifty (50) and one hundred (100) centistokes as determined in accordance with ASTM Designation D-2170. The exact temperature range shall be designated by the City Engineer.

3.04.055 SPREADING AND COMPACTING OF SEAL COAT COVER MATERIAL. Prior to the placing of the cover material, the contractor shall perform a test of the spreading equipment at a location approved by the City. The test shall determine the exact rate of application of the emulsion and cover material and to calibrate the contractors equipment.

A. The cover material shall be spread immediately after applying the bituminous material by means of an approved spreader, which can be adjusted to uniformly spread the required amount of aggregate. Provisions shall be made so that the larger particles will be deposited first. The rate of cover material application, in pounds per square yard, shall be determined by the City Engineer. Immediately after spreading, the cover material shall be hand broomed, if necessary, to distribute the aggregate uniformly over the surface. After the cover material has been satisfactorily spread, the surface shall be rolled by pneumatic-tired rollers in a longitudinal direction. Rolling performed with pneumatic-tire rollers shall adequately seat the cover material and shall consist of at least two (2) complete coverage's. Rolling shall be complete the same day the bituminous material and cover material are applied.

B. On completion of final rolling, traffic shall be permitted to travel over the seal coat. Between seven (7) and thirty (30) days following application of the seal coat, the Contractor shall return to the site and broom clean any excess chips from the roadway and curb and gutter.

3.04.060 SEAL COAT WEATHER AND SEASONAL LIMITATIONS. Seal coat shall be applied only between June 1st and September 15th and when the air temperature in the shade and the roadbed temperature are above 70E F. Seal coat shall not be applied during rain, fog, or other adverse weather conditions. Seal coat placed after September 15th shall be placed only upon written authorization from the City Engineer, and then only when the air temperature in the shade and the roadbed temperature are above 70E F.

3.04.065 BITUMINOUS PLANT MIX SEAL COAT. Where determined by the City Engineer that the bituminous surface course is unacceptable due to material or construction defects, the Contractor shall place and compact a bituminous plant mix seal coat over the bituminous surface course. The seal coat shall consist of a mixture of mineral aggregate and bituminous binder. Gradation of the aggregate shall conform to the following:

<u>Sieve Size</u>	<u>% Passing</u>	
	<u>Type A</u>	<u>Type B</u>
½ inch	100	100
3/8 inch	95-100	95-100
No. 4	30-50	30-50
No. 8	10-25	22-37
No. 16		15-28
No. 50		8-16
No. 200		5-10

A. 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. Regardless of the bituminous content, there shall not be more than three (3) percent voids in the mix.

B. The bituminous material shall be AC-10 asphalt cement conforming to the requirements of AASHTO —226.

C. A tack coat shall be applied to all existing pavement prior to pouring the plant mix seal coat. The bituminous material shall be Grade CS-1 Emulsion applied at the rate of 0.08 gallons per square yard.

D. The bituminous plant mix seal coat shall be mixed at a mixing plant and spread and compacted on the prepared pavement in accordance with the lines and dimensions shown on the plans and in accordance with these specifications.