

CITY OF ODESSA
STANDARD SPECIFICATIONS

ITEM 34
CUT-BACK ASPHALTIC CONCRETE PAVEMENT
(LIMESTONE ROCK ASPHALT ADMIXTURE)

34.1 DESCRIPTION

This item shall consist of a binder course, a leveling-up course, a surface course, or any combination of these courses as shown on the plans, each of which is to be composed of a compacted mixture of mineral aggregate, limestone rock asphalt and asphaltic material, and shall be constructed on the previously completed and approved subgrade, sub-base course, base course or in the case of bridge, on the prepared floor slab, all in accordance with these specifications and in conformity with the lines, grades, quantities and typical cross-sections shown on the plans.

34.2 MATERIALS

A. Mineral Aggregate

The mineral aggregate shall be composed of an aggregate of crushed stone and crushed gravel, gravel and sand and limestone rock asphalt. Samples of aggregate and limestone rock asphalt shall be submitted in accordance with the methods prescribed in Item 47 under General Conditions of the Agreement and approval of both the material and of the source of supply must be obtained from the Engineer prior to delivery.

1. Aggregate

Aggregate shall consist of clean, tough, durable fragments of rock crushed gravel, gravel or sand as hereinafter specified of uniform quality throughout; and shall be free from dirt, organic or other injurious matter occurring either free or as a coating on the aggregate. The rock or gravel from which the aggregate is made shall have an abrasion of not more than forty (40) when subjected to the Los Angeles abrasion test (A.A.S.H.O. T-96). The crushed gravel shall be so crushed that 89 to 100% of the particles shall have more than one crushed face. Sand shall be composed of durable stone particles free from loam or other injurious foreign matter.

2. Uncrushed Gravel

The use of uncrushed gravel will be allowed only in Type "N" coarse graded binder course mixture.

3. Limestone Rock Asphalt

The limestone rock asphalt shall be uniform, well-graded, natural limestone rock asphalt of five (5) to nine (9) per cent of asphalt and ninety-one (91) to ninety-five (95) per cent of limestone, practically free from sulfates, iron pyrites, alumina or other objectionable matter. The material shall be the product of a pulverizer using one-quarter ($\frac{1}{4}$) inch grates, and when tested with the standard laboratory screens, ninety (90) to one hundred (100) per cent shall pass the one-quarter ($\frac{1}{4}$) inch screen, if necessary, in order to prevent setting up during transit of the pulverized limestone rock asphalt or the paving mixture water, not to exceed four (4) per cent by weight of the limestone rock asphalt may be added.

If the pulverized limestone rock asphalt has consolidated or contains lumps, a suitable beater shall be used to satisfactorily break the consolidated particles or lumps of asphalt apart before being introduced into the No. 1 bin.

B. Asphaltic Material

1. Paving Mixture

The asphaltic material for the paving mixture shall be of the type and grade shown on plans and shall meet the requirements of the item "Asphalts, Oils and Emulsions".

2. Tack Coat

The Asphaltic Material for tack coat shall meet the requirements for emulsified asphalt, 3'-11", or cut-back asphalt, RC-2. If RC-2 cut-back asphalt is used, it may, upon instructions from the Engineer, be diluted by the addition of not to exceed fifteen (15) per cent of an approved grade of gasoline and/or kerosene, by volume. The asphaltic materials shall meet the requirements of the item "Asphalts, Oils and Emulsions".

34.3 PAVING MIXTURES

A. Types

The paving mixture shall consist of a uniform mixture of aggregate limestone rock asphalt and asphaltic material. The grading of each constituent of the mineral aggregate shall be such as to produce, when properly proportioned, a mixture, which when tested in accordance with T.H.D. Bulletin C-14, will conform to the limitations for master grading given below for the type specified. The limestone rock asphalt shall form twenty (20) per cent of the mixture by weight. The exact grading of the aggregate and the asphalt content to be used in these mixtures, within the limits specified, will be designated by the Engineer and the mixture produced shall be uniform. The gradings shown include the limestone rock asphalt.

Type "N" (Coarse Graded Binder Course)

Passing 2¼" Screen ----- 100%
Passing 2" Screen ----- 97 to 100%
Passing 2" Screen Retained on 1" Screen ----- 15 to 40%
Passing 1" Screen Retained on ½" Screen ----- 15 to 40%
Passing ½" Screen Retained on ¼" Screen ----- 10 to 20%
Passing ¼" Screen Retained on 10-mesh Sieve ---- 10 to 20%
Passing 10-mesh Sieve ----- 10 to 35%
The Asphaltic Material shall form from 3½ to 5% of the mixture
by weight.

Type "O" (Fine Graded Binder or Leveling-up Course)

Passing 1¼" Screen ----- 100%
Passing 1" Screen ----- 97 to 100%
Passing 1" Screen Retained on ½" Screen ----- 25 to 50%
Passing ½" Screen Retained on ¼" Screen ----- 20 to 40%
Passing ¼" Screen Retained on 10-mesh Sieve --- 10 to 20%
Passing 10-mesh Sieve ----- 10 to 35%
The Asphaltic Material shall form from 3½ to 5% of the mixture
by weight.

Type "P" (Coarse Graded Surface Course)

Passing 1" Screen ----- 100%
Passing ¾" Screen ----- 97 to 100%
Passing ¾" Screen Retained on ½" Screen ----- 20 to 40%
Passing ½" Screen Retained on ¼" Screen ----- 20 to 40%
Passing ¼" Screen Retained on 10-mesh Sieve ---- 10 to 25%
Passing 10-mesh Sieve ----- 10 to 35%
The Asphaltic Material shall form from 4 to 6% of the mixture by weight.

Type "Q" (Fine Graded Surface Course)

Passing 5/8" Screen ----- 100%
Passing ½" Screen ----- 97 to 100%
Passing ½" Screen Retained on ¼" Screen ----- 30 to 60%
Passing ¼" Screen Retained on 10-mesh Sieve ---- 20 to 40%
Passing 10-mesh Sieve ----- 15 to 35%
The Asphaltic Material shall form from 3½ to 6½% of the mixture
by weight.

Type "R" (Fine Graded Surface Course)

Passing ½" Screen ----- 100%
Passing ½" Screen Retained on 3/8" Screen ----- 0 to 10%
Passing 3/8" Screen Retained on 10-mesh Sieve - 55 to 80%
Passing 10-mesh Sieve ----- 20 to 35%
The Asphaltic Material shall form from 3½ to 4½% of the mixture
by weight.

The exact percentage of the asphaltic material to be introduced into the above mixtures, within the limits specified, shall be as directed by the Engineer.

The type and amount of the mixture used shall be as specified on the plans.

B. Central Mixing Plants

The material may be mixed on the job or at some central mixing plant and shipped ready to use.

C. Extraction to Test Grading of Material Aggregate

When required by the Engineer, samples of the mixture may be taken from the trucks or from the finished pavement, and when a sample whose weight is not less than three thousand (3,000) grams multiplied by the maximum size aggregate in inches, is tested by extraction test method, T.H.D. Bulletin C-14 and subsequent revisions, it shall not vary from the grading proportions of mineral aggregate specified, according to the mix being tested, by more than five (5) per cent in any particular.

Mixing plants that will not continuously produce a mixture meeting all of the above requirements will be condemned and shall be removed from the job.

34.4 EQUIPMENT

A. Mixing Plants

Mixing plants may be either the weight-batching type or the continuous mixing type. Both types of plants shall be equipped with satisfactory conveyors, power units, aggregate handling equipment, and aggregate screens and binds, and shall consist of the following essential pieces of equipment.

1. Weight-Batching Type

Bin Storage:

The various sizes of mineral aggregate as made or received shall be placed in the proper bins or stored or stockpiled separately, and shall be handled in such a manner as to eliminate segregation or contamination with foreign materials. The size of the bins shall coordinate with the full capacity of the plant and shall be sufficient to store the amount of aggregates required to keep the plant in continuous operation. The number of bins used shall be as required for producing the particular type of pavement being mixed.

Bin No. 1 - Will contain limestone rock asphalt.

Bin No. 2 - Will contain aggregate, 90 to 100% of which will pass the 10-mesh Sieve

Bin No. 3 - Will contain aggregate, 95 to 100% of which will pass the ½" screen and 85 to 100% of which will be retained on the 10-mesh Sieve.

Bin No. 4 - Will contain aggregate, all of which will pass the largest screen size permitted for the type of mixture being produced, and 85 to 100% of which will be retained on ½" screen.

The use of additional bids will be permitted, and if used, the Engineer will specify the aggregate sizes for each bin. Bin storage shall be provided with tight cut-off gates so that there will be no leakage of the mineral aggregate into the weigh box.

Weigh Box:

The weigh box shall be of sufficient capacity to hold a complete batch of aggregate without wasting or leveling by hand and shall be so designed that the entire batch will quickly discharge into the mixer. The weigh box shall be open at the top so that if, in charging, an excess of one size mineral aggregate is introduced into the weigh box, it may be removed by the operator. The weigh box shall be provided with a close fitting and quick operating cut-off gate, so that there will be no leakage of the mineral aggregate into the mixer.

Batching Scales:

The scales used for weighing the different grades of mineral aggregate may be either of the springless dial type or the multi-beam type. If the springless dial type, an adjustable indicating pointer shall be provided for each grade of the mineral aggregate, allowing accurate setting of the weight for the various sizes. If scales are of the multi-beam type, they shall have sufficient weighing beams to weigh each grade of aggregate separately. All scales shall have a tare beam for balancing. The beam scales must also be equipped with a tell-take dial indicator of the springless dial type, indicating over and under load of at least fifty (50) pounds. Scales that are not accurate to within four (4) pounds per one thousand (1,000) pounds net load will not be considered satisfactory. In case vibration of the plant interferes with accurate weighing, the scales shall be satisfactorily insulated against shock and vibration.

Asphalt Proportioning Equipment:

The draw-off valve at the asphalt bucket shall be of a quick cut-off type that will not leak any asphaltic material into the bucket after the required amount of the asphaltic material has been drawn. The scales for weighing the asphaltic material shall be of the springless dial type or the multi-beam type. If of the springless dial type, they shall be arranged for quick adjustment at zero to provide for the change in tare. A pointer shall be provided to indicate the weight of the asphaltic material required for one batch. If of the multi-beam type, they shall be equipped with a tare beam and a tell-tale indicator of the springless dial type. The scales shall be satisfactorily insulated against vibration. The asphaltic material shall be sprayed into the mixer through an approved spray bar that will distribute the asphaltic material uniformly throughout the length of the mixer.

Mixer:

The mixer shall be of the pug mill type and shall have a capacity of not less than fifteen hundred (1,500) pounds in a single batch. The number of blades and position of same shall be such as to give a uniform and complete circulation of the batch in the mixer. Any mixer that has a tendency to segregate the mineral aggregate or fails to secure a thorough and uniform mixing with the asphaltic material will be condemned as inadequate to produce a satisfactory mix. This determination will be made by mixing the standard batch for the required time, then dumping the mixture and taking samples from different parts of it. These will be tested by the extraction test and must show that the batch is uniform throughout. All mixers shall be provided with an automatic time lock on their discharge gates, and shall be locked for the required mixing period. The dump door or doors of the mixer shall be tight to prevent the spilling of dry mineral aggregate or dust from the pug mill.

2. Continuous Mixing Plant

Mixer

The mixer shall be of the pug mill continuous type and shall have a capacity of not less than forty (40) tons of mixture per hour. Any mixer that has a tendency to segregate the aggregate or fails to secure a thorough and uniform mixing of the aggregate with the asphaltic material shall not be used. This shall be determined by taking samples from different parts of a truck load and testing by the extraction test. These tests must show that the load is uniform throughout.

The plant shall provide for positive separation of aggregate into the same number of bins as required for the weight-batch plant and these parts shall be properly combined as they enter the pug mill in such manner that control of the combined aggregate is comparable to that obtained by weight-batching.

All requirements for determining the temperature of the various ingredients entering into the mixture, as specified for the weight-batching plant, shall be met.

B. Forms

The use of forms will not be required except where necessary to support the edges of the pavement during rolling. If the pavement will stand rolling without undue movement, binder twine or small rope may be used to align the edges.

C. Motor Grader

The motor grader shall be a self-propelled power grader; it shall be equipped with pneumatic tired wheels; shall have a blade length of not less than twelve (12) feet; shall have wheel base of not less than sixteen (16) feet; and shall be tight and in good operating condition and approved by the Engineer.

D. Pneumatic Tire Rollers

The pneumatic roller shall be an acceptable roller consisting of pneumatic tire wheels, the weight capable of being varied uniformly from 100 pounds to 325 pounds per inch of width of tire tread. The roller shall be drawn by suitable pneumatic tire equipment.

E. Two Axle Tandem Roller

The roller shall be an acceptable power driven tandem roller weighing not less than eight (8) tons.

F. Three Wheel Roller

This roller shall be an acceptable power driven three wheel roller weighing not less than ten (10) tons.

G. Three Axle Tandem Roller

This roller shall be an acceptable power driven three axle roller weighing not less than ten (10) tons.

H. Straight Edges and Templates

The Contractor shall provide acceptable sixteen (16) foot straight edges for surface testing. Satisfactory templates shall be provided as required by the Engineer.

I. Truck Scales

A set of standard platform truck scales shall be placed at a location approved by the Engineer. Scales shall be accurate to within four (4) pounds per once thousand (1,000) pounds total load. The truck scales shall have a rated capacity of not less than five thousand (5,000) pounds more than the total load to be weighed. A weather-tight building of sufficient size to house the checker while operating the scales shall be provided.

All equipment shall be maintained in good repair and operating condition and shall be approved by the Engineer.

34.5 STORAGE, PROPORTIONS, AND MIXING

A. Storage of Asphaltic Material

The asphaltic material storage shall be ample to meet the requirements of the plant. Asphaltic material in storage may be heated by steam coils, which shall be absolutely tight in order to prevent leakage of moisture into the asphalt. No direct fire heating of asphaltic material will be permitted. Agitation of asphalt with steam or air will not be permitted. The asphaltic material shall not be heated to a temperature above the recommended applied temperature for the grade specified under the item "Asphalts, Oils and Emulsions".

WARNING TO CONTRACTORS: Attention is directed to the fact that the asphaltic material is very inflammable. The utmost care shall be taken to prevent open flames from coming into contact with the asphaltic material or the gases of same. The Contractor shall be responsible for any fires or accidents which may result from heating the asphaltic materials.

B. Proportioning

The proportioning of the various materials entering into the asphaltic mixture shall be as directed by the Engineer and in accordance with these specifications. The Engineer or his authorized representative shall have access at any time to any parts of the paving plants. Satisfactory equipment and construction methods shall be used as herein specified.

C. Drying Mineral Aggregate

All mineral aggregate, before being mixed with asphalt, must be dry enough to allow thorough adhesion of the asphalt to the surface of same. If the mineral aggregate has a moisture content greater than its water absorption value when tested in accordance with T.H.D. Bulletin C-14, it shall be considered to contain free moisture and the mixing operations shall be stopped until the mineral aggregate is dried to a point equal to or less than the water absorption value for the mineral aggregate. The Contractor shall use an approved method to dry the mineral aggregate.

If aggregates are mixed before or during drying operations, they shall be proportioned by a mechanical device that will give a uniform and constant feed of each of the sizes incorporated. After drying, the aggregate shall be screened into the bin sizes specified.

D. Mixing

In the charging of the weigh box and the charging of the mixer from the weigh box, such methods or devices shall be used as are necessary to secure a uniform asphaltic mixture. In introducing the batch into the mixer, all aggregate shall be introduced first; shall be mixed thoroughly for a period of five (5) to twenty (20) seconds, as directed, to uniformly distribute the various sizes throughout the batch before the asphaltic material is added; the asphaltic material shall then be added and the mixing continued for a total mixing period of not less than

thirty (30) seconds. This mixing period may be increased, if in the opinion of the Engineer, the mixture is not uniform. Mixtures that do not remain workable a sufficient period of time to permit proper spreading, blading, and rolling will not be acceptable.

34.6 CONSTRUCTION METHODS

The asphaltic mixture, tack coat or prime coat shall be placed only when the weather conditions, in the opinion of the Engineer, are suitable.

A. Prime Coat

If a prime coat is required, it will be applied and paid for as a separate item. The tack coat or asphaltic concrete shall not be applied on a previously primed flexible base until the primed base has completely cured to the satisfaction of the Engineer.

B. Tack Coat

Before the asphaltic mixture is laid, the surface upon which the tack coat is to be placed shall be cleaned thoroughly to the satisfaction of the Engineer. The surface shall be given a uniform application of tack coat meeting the requirements for tack coat under asphaltic materials of this specification. The tack coat shall be applied, as directed by the Engineer, with an approved sprayer at a rate of not to exceed 0.10 gallon per square yard of surface. Where the mixture will adhere to the surface on which it is to be placed without the use of a tack coat, the tack coat may be eliminated by the Engineer. All contact surfaces of curbs and structures and all joints shall be painted with a thin uniform coat of the asphaltic material used for the tack coat, when directed by the Engineer. The tack coat shall be rolled with pneumatic tires.

C. Placing

If the mixtures are shipped to the job, the railroad cars shall first be cleaned of all foreign matter, and the material shall be loaded in such manner as to prevent segregation. The asphaltic concrete mixture, prepared as specified, shall be hauled to the work in tight vehicles previously cleaned of all foreign materials. The dispatching of the vehicles shall be so that all material delivered may be placed and shall have received its initial rolling in daylight. The mixture shall be laid only on an approved base course or pavement which has been tack-coated as previously specified and shall be free of all foreign materials. All contact surfaces of curbs and structures and all joints shall be painted with a thin, uniform coating of cut-back or emulsified asphalt as required for tack-coating the base. The mixture shall be thoroughly aerated by blading and then spread into place with a motor grader, in a uniform layer of such depth that after receiving ultimate compaction by rolling, the requirements of the typical cross section have been fulfilled. Hand spreading will be permitted where the mixture is placed on narrow strips or small irregular areas, adjacent to flush curbs, gutters, liners, and structures. The surface mixture shall be finished uniformly high so that when compacted it will be slightly above the edge of the curb or flush structure.

D. Compacting

1. As directed by the Engineer, the pavement shall be compressed thoroughly and uniformly with the specified rollers.

2. Rolling

Rolling with the three wheel and tandem rollers shall start longitudinally at the sides and proceed toward the center of the pavement, overlapping on successive trips by at least half the width of the rear wheels. Alternate trips of the roller shall be slightly different in length. On super-elevated curves, rolling shall begin at the low side and progress toward the high side. Rolling with the pneumatic roller shall be done as directed by the Engineer. Rolling shall be continued until no further compression can be obtained and all roller marks are eliminated. One tandem roller and at least one three wheel roller, as above specified, shall be provided for each job. If the Contractor elects, he may substitute the three axle tandem roller for the two axle tandem roller and/or the three wheel roller, but in no case shall less than two rollers be in use on each job. Additional three wheel rollers shall be provided if needed. Rolling with pneumatic rollers will be required where satisfactory compaction cannot be secured with flat wheel rollers. The motion of the roller shall be slow enough at all times to avoid displacement of the mixture. If any displacement occurs, it shall be corrected at once by the use of rakes and of fresh mixture where required. The roller shall not be allowed to stand on pavement which has not been fully compacted. To prevent adhesion of the surface mixture to the roller, the wheels shall be kept thoroughly moistened with water, but an excess of water will not be permitted. All rollers must be in good mechanical condition. Necessary precautions shall be taken to prevent the dropping of gasoline, oil, grease, cinders or other foreign matter on the pavement, either when the rollers are in operation or when standing.

3. Hand Tamping

The edges of the pavement along curbs, headers, and similar structures, and at all places not accessible to the roller, or in such positions as will not allow thorough compaction with the roller, shall be thoroughly compacted with lightly oiled tamps.

4. When more than one course is to be laid, each course shall be allowed to thoroughly cure before placing the succeeding course.

E. Surface Tests

The surface of the pavement, after compression, shall be smooth and true to established line, grade and cross section, and when tested with 16' straight edge placed parallel to the center line of the roadway, it shall have no deviation in excess of 1/16 inch per foot from the nearest point of contact. The maximum ordinate measured from the face of the straight edge shall not exceed 1/4" at any point. Any point in the surface not meeting the requirements shall be immediately corrected.

F. Opening to Traffic

The pavement shall be opened to traffic when directed by the Engineer. All construction traffic allowed on the pavement shall comply with the State laws governing traffic on highways.

34.7 MEASUREMENT

- A. Cut-back asphaltic concrete pavement will be measured by the ton or two thousand (2,000) pounds of the type or types actually used in the completed and accepted work, in accordance with the plans and specifications for the project. Measurement by weight will be made on the truck scales as provided. Records will be kept on tare load, total loads and net load of cut-back asphaltic concrete (rock asphalt admixture) for each load of same.
- B. Tack coat will be measured in gallons at the applied temperature at point of application on the road. When gasoline is added to the cut-back asphalt for tack coat, as ordered, measurement for payment will be made after gasoline is added.

34.8 PAYMENT

- A. Work performed and materials furnished as prescribed for this item, measured as provided under "Measurement", will be paid for at the unit price bid for "Cut-back Asphaltic Concrete Pavement (Rock Asphalt Admixture)" of the type specified, which price shall each be full compensation for furnishing all materials, for all heating, mixing, hauling, cleaning base course, placing asphaltic mixture, all blading, rolling and finishing, and for all labor, tools, equipment and incidentals necessary to complete the work.
- B. Tack coat, measured as provided under "Measurement" will be paid for at the unit price bid for "Tack Coat" of the type and grade specified, which price shall be full compensation for furnishing, preparing, hauling and placing the asphaltic material; for all labor, tools, equipment and incidentals necessary to complete the work.
- C. The prime coat, performed where required, will be measured and paid for in accordance with the provisions governing the item "Prime Coat".
- D. All templates, straight edges, scales and other weighing and measuring devices necessary for the proper construction and checking of the work shall be furnished, operated and maintained by the Contractor at his entire expense.