

CITY OF ODESSA
STANDARD SPECIFICATIONS

ITEM 35
COLD MIX LIMESTONE ROCK ASPHALT PAVEMENT

35.1 DESCRIPTION

This item shall consist of a surface course, a leveling-up course, or a combination of these courses as shown on plans, composed of a compacted layer of natural limestone rock asphalt, cold mixed with a prescribed flux and shall be constructed on the completed and approved base course, previously placed surface course, or, in the case of a bridge on the prepared floor slab, all in accordance with these specifications and in conformity with the lines, grades, quantities, and typical cross section shown on plans.

35.2 MATERIALS

A. Rock Asphalt

The rock asphalt for this item shall be material obtained from deposits which for a period of at least two (2) years have produced raw rock asphalt that has been used as surfacing and proved satisfactory in service when placed in the general manner prescribed herein.

The rock asphalt shall be uniform and well graded and shall be practically free from sulfates, iron pyrites, alumine, or other objectionable matter.

The natural limestone rock asphalt furnished shall have from five (5) to nine (9) percent of naturally impregnated asphalt and ninety-one (91) to ninety-five percent of limestone.

Prior to delivery of any rock asphalt, the Contractor shall designate to the Engineer in writing a definite percent of natural asphalt content of all acceptable material and shall not deviate from this designated percent by more than one and five-tenths (1.5) percent, shall be within the limits allowed by this provision and shall not be changed during construction of the project without the approval of the Engineer.

No material shall be used before the course has been approved and the material has been sampled, tested and approved for use. The Contractor shall notify the Engineer in advance if change in source of material is desired, and both the new source and material shall be approved by the Engineer prior to use.

B. Asphaltic Material

1. Flux

The fluxing material to be used shall have the following characteristics:

| | Min. | Max. |
|--|------|------|
| Viscosity (Furol) 60 cc at 122E F. ----- | 50 | 100 |
| Flash Point (Closed Cup) ----- | 250 | ---- |
| Loss 50 gm. 5 hrs., at 325E F. ----- | 0 | 5 |

It shall be free from foreign matter and practically free from water.

2. Tack Coat

The asphaltic material for tack coat shall meet the requirements for emulsified asphalt, EA-11M, 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) percent of an approved grade of gasoline and/or kerosene, by volume; and the asphaltic materials shall meet the requirements of Item "Asphalts, Oils, and Emulsions".

35.3 PAVING MIXTURES

A. Types

The paving mixture shall consist of a uniform mixture of crushed limestone rock asphalt, and flux. The grading shall be such as to produce, when properly proportioned, a mixture which, when tested in accordance with Texas Highway Department Bulletin C-14, will conform to the limitations for grading given below for the type specified, shall be approximately as designated by the Engineer, and the mixture produced shall be uniform.

Type "A"

| | |
|-------------------------------|-----------|
| Retained on 1" screen ----- | 0% |
| Retained on 3/4" screen ----- | 0 to 15% |
| Retained on 1/2" screen ----- | 15 to 35% |
| Retained on 1/4" screen ----- | 40 to 60% |
| Passing 10-mesh sieve ----- | 20 to 35% |

Type "AA"

| | |
|-------------------------------|-----------|
| Retained on 1" screen ----- | 0% |
| Retained on 3/4" screen ----- | 0 to 15% |
| Retained on 1/2" screen ----- | 15 to 35% |
| Retained on 1/4" screen ----- | 40 to 60% |
| Passing 10-mesh sieve ----- | 30 to 45% |

Type "B"

| | |
|-------------------------------|-----------|
| Retained on 5/8" screen ----- | 0% |
| Retained on 1/2" screen ----- | 0 to 10% |
| Retained on 1/4" screen ----- | 35 to 60% |
| Passing 10-mesh sieve ----- | 20 to 35% |

Type "BB"

| | |
|-------------------------------|-----------|
| Retained on 5/8" screen ----- | 0% |
| Retained on 1/2" screen ----- | 0 to 10% |
| Retained on 1/4" screen ----- | 35 to 60% |
| Passing 10-mesh sieve ----- | 30 to 40% |

Type "C"

| | |
|-------------------------------|-----------|
| Retained on 1/2" screen ----- | 0% |
| Retained on 3/8" screen ----- | 0 to 10% |
| Retained on 1/4" screen ----- | 35 to 50% |
| Passing 10-mesh sieve ----- | 20 to 35% |

Type "CC"

| | |
|-------------------------------|-----------|
| Retained on 1/2" screen ----- | 0% |
| Retained on 3/8" screen ----- | 0 to 10% |
| Retained on 1/4" screen ----- | 35 to 50% |
| Passing 10-mesh sieve ----- | 35 to 50% |

Type "D"

| | |
|-------------------------------|-----------|
| Retained on 3/8" screen ----- | 0% |
| Retained on 1/4" screen ----- | 0 to 10% |
| Passing 10-mesh sieve ----- | 35 to 50% |

B. Water Content

If the rock asphalt mixture is prepared at some central point and shipped to the work, water may be added to prevent setting-up in transit. If water is added, the total water so added shall not exceed four (4) percent by weight. If the rock asphalt mixture is prepared on or adjacent to the project, the addition of water will not be permitted unless authorized by the Engineer. The amount of water that may be added shall be as designated by the Engineer but shall not exceed four (4) percent by weight. In order to insure uniformity of the rock asphalt mixture a suitable measuring device shall be used to accurately measure the amount of water to be incorporated into each batch. All water in the mixture in excess of four (4) percent by weight at the time of placing shall be deducted in determining the severe yards for payment on the basis of one hundred (100) pounds per square yard per inch of thickness. The method of determining the water content, of the mixture shall be as prescribed in Texas Highway Department Bulletin C-14 and subsequent revisions.

C. Central Mixing Plants

The materials may be mixed on the job or at some central mixing plant and shipped ready for use. Mixtures that do not remain workable a sufficient period of time to permit proper spreading, blading and rolling will not be acceptable.

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

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

35.4 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, aggregate screens and bins, and shall consist of the following essential pieces of equipment.

1. Weight Batching Type

Measuring Box:

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

Batching Scales:

If the Contractor elects to weigh the materials, the scales shall be of the springless dial type or the multi-beam type. If scales are 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 material required for one batch. If of the multi-beam type, the scales shall be equipped with a tare beam for balancing and a tell-tale indicator of the springless dial type, indicating over and under load. 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 or vibration.

Mixer:

The mixer shall be of the pug mill type and shall have a capacity of not less than one thousand five hundred (1,500) pounds in a single batch. The number of blades and the 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 rock asphalt or fails to secure a thorough and uniform mixing with the flux will be condemned as inadequate to produce a satisfactory mix. The dump door or doors of the mixer shall be tight to the rock asphalt so that there will be no spilling from the pug mill. The flux shall be sprayed into the mixer through an approved spray bar that will distribute the flux uniformly throughout the length of the mixer.

2. Continuous Mixing Type

Mixer:

The mixer shall be an approved 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 materials shall not be used. The pumps used to introduce flux oil and water into the mix shall be provided with accurate recording meters so that control of the flux oil content of the mixture 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. Spreading and Finishing Machine

The spreading and finishing machine, when required by the Engineer, shall be of the screeding and troweling type, or of a type approved by the Engineer and shall be capable of producing a surface that will meet the requirements of the typical cross-section and the surface test.

C. 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.

D. Motor Grader

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

E. Pneumatic Tire Rollers

The pneumatic roller shall be an acceptable roller consist of pneumatic tire wheels, the weight capable of being varied uniformly from one hundred (100) pounds to three hundred twenty-five (325) pounds per inch of width of tire tread. The roller shall be drawn by suitable pneumatic tire equipment.

F. Two Axle Tandem Roller

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

G. Three Wheel Roller

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

H. Three Axle Tandem Roller

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

I. 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.

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

35.5 STORAGE, PROPORTIONS AND MIXING

A. Storage of Rock Asphalt

Storage of the crushed limestone rock asphalt, or the rock asphalt mixture upon the ground will not be permitted except in an emergency, and then only with the written consent of the Engineer. Material that comes in contact with earth or other objectionable foreign matter shall be rejected. In case the rock asphalt or the rock asphalt mixture has set in transit or in storage to the extent that is cannot be readily mixed or handled on the road, it shall be reprocessed to conform to its original gradation before being used. Storage or handling of the crushed rock asphalt or the rock asphalt mixture shall be in such manner as to prevent undue segregation.

B. Storage of Heating and Flux

The flux storage shall be ample to meet the requirements of the plant. The flux may be heated by steam coils or direct fire to the temperature not to exceed 180E F. If direct fire heating is used, the heating equipment shall be such that it will insure positive circulation of the flux while being heated and shall be approved by the Engineer. Care shall be taken not to injure the flux by subjecting it to undue continuous heat.

C. Proportioning

The crushed limestone rock asphalt and the flux shall be proportioned by weight or by volume based on weight. The exact proportion of each constituent by weight of paving mixture shall be as directed by the Engineer within the following limits:

Crushed Limestone Rock Asphalt, 96½ to 97½%

Flux Material, 2½ to 3½%

D. Mixing

In introducing the batch into the mixer, the sequence of addition of aggregate and flux oil and the amount of mixing shall be determined by the Engineer and shall be done in a manner to minimize formation of "flux balls" and produce optimum conditions for a homogeneous mix. The mixer shall be equipped with an approved spray bar or other device that will distribute the flux oil quickly and uniformly throughout the mixer. Any mixer that has a tendency to segregate the rock asphalt aggregate or fails to secure a thorough and uniform mixing with the flux oil shall not be used.

Mixtures that do not remain workable a sufficient period of time to permit proper spreading and rolling will not be accepted.

35.6 CONSTRUCTION METHODS

The rock asphalt 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 rock asphalt mixture 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 rock asphalt 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 a uniform application of tack coat meeting the requirements of tack coat under asphaltic materials of this specification. This tack coat shall be applied, as directed by the Engineer, with an approved sprayer at a rate of not to exceed 0.10 gallons 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 curb 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 coarse shall first be cleaned of all foreign matter, and the material shall be loaded in such a manner as to prevent segregation. The rock asphalt 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 all joints shall be painted with a thin, uniform coating of cut-back or emulsified asphalt as required for tack-coating base. The mixture shall be thoroughly aerated 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-sections will 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, lines 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.

If, in the opinion of the Engineer, the mixture is suitable for placing without aeration, it shall be spread with the specified spreading and finishing machine when so directed.

D. Compacting

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

E. Surface Tests

The surface of the pavement, after compression, shall be smooth and true to the established line, grade and cross-section, and when tested with a sixteen (16) foot straight edge placed parallel to the center line of the roadway, it shall have no deviation in excess of 1/16" 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 these 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.

35.7 MEASUREMENT

- A. The rock asphalt mixture will be measured by the square yard of completed and accepted work in accordance with the plans and specifications for the project. All water in excess of four (4) percent by weight in the mixture at the time of placing shall be deducted from the net weight to determine the quantity for which payment is made.

- B. Tack coat will be measured for payment but will be considered as subsidiary to the surfacing.

35.8 PAYMENT

- A. Work performed and materials furnished as prescribed by this item measured as provided under "Measurement", will be paid for at the unit price bid for "cold mix limestone rock asphalt pavement" of the types and thicknesses specified, which price shall be full compensation for furnishing all materials, for all heating, mixing, hauling, cleaning base course, placing rock asphalt mixture, all blading, rolling, and finishing, and for all labor, tools, equipment and incidentals necessary to complete the work.
- B. Prime coat, performed where required, will be measured and paid for in accordance with the provisions governing the item "Prime Coat".
- C. All templates, straightedges, 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 expense.