

Item No. 206S
Asphalt Stabilized Base

206S.1 Description

This item shall govern Asphalt Stabilized Base (ASB) courses composed of a compacted mixture of aggregates and asphalt cement mixed hot in a mixing plant. The ASB shall be constructed on previously completed and approved subgrade, base material, existing pavement or bituminous surface in accordance with the details shown on the Drawings and the requirements specified herein.

This specification is applicable for projects or work involving either inch-pound or SI units. Within the text and accompanying tables, the inch-pound units are given preference followed by SI units shown within parentheses.

206S.2 Submittals

The submittal requirements of this specification item may include:

- A. A mix design identifying classification and gradation of aggregate materials, source and designation of the asphalt cement and quantities of aggregate materials and asphalt cement required in the proposed application to meet the specified strength (grade) requirements,
- B. An update in the mix design, if source of material changes during construction,
- C. A Job Mix Formula for each mix design prior to placement of ASB, and
- D. A plan describing the construction equipment proposed for the work and identifying the type and condition of each equipment item.

206S.3 Materials

A. Asphalt Material:

The asphalt cement for the asphalt stabilized mixture shall be the grade shown on the Drawings or designated by the Engineer or designated representative and shall meet the requirements of Standard Specification Item No. 301, "Asphalts, Oils and Emulsions". The Contractor shall notify the Engineer or designated representative of the source of the asphalt material prior to the design of the asphalt stabilized mixture. This source shall not be changed during the course of the project without the authorization of the Engineer or designated representative. If the source of asphalt material is changed, the moisture resistance of the new material combination will be evaluated to verify that the requirements of section 206S.4 are met.

Asphalt material for tack coat, if directed, shall conform to Standard Specification Item No. 307S, "Tack Coat".

B. Aggregate:

The aggregate shall meet all requirements of and conform to Type A of Specification Item 340S, "Hot Mix Asphalt Concrete Pavement". When shown on the drawings, the gravel portion of the aggregate shall be so crushed as to have a minimum of 60

percent of the particles retained on the # 4 (4.75 mm) sieve with two or more mechanically induced crushed faces, as determined by TxDOT Test Method Tex-460-A (Part I).

206S.4 Asphalt Stabilized Mixtures

Asphalt Stabilized Base mixture shall consist of a uniform mixture of aggregate, hot asphalt cement and additives if allowed or required on the Drawings. The mix will be designed in accordance with TxDOT Test Method Tex-126-E to conform to the requirements herein.

A. Mixture Design.

The Contractor shall submit to the Engineer or designated representative a mix design: (1) which has been reviewed, signed and sealed by a Registered Professional Engineer, currently Licensed in the State of Texas, or (2) prepared and certified by a Level II Quality Management and Mix Design Specialist as certified by the Hot Mix Asphalt Center. The mix design will be valid for one (1) year provided that there are no significant changes in the material being produced.

Unless otherwise shown on the Drawings, the mixture of aggregate, asphalt and additives proposed for use will be evaluated in the design stage for moisture susceptibility, in accordance with TxDOT Standard Specification Item No. 301, "Asphalt Anti-stripping Agents". The Engineer or designated representative may waive this test if a similar design, using the same ingredients, has proven satisfactory.

To substantiate the design, trial batches shall be produced and tested using all the proposed project materials and equipment prior to any ASB placement. The Engineer or designated representative may waive trial mixtures if similar designs have proven satisfactory.

A Job Mix Formula shall be submitted for each project for review by the Engineer or designated representative before ASB is placed. The ASB mixture shall contain between 3.0 and 9.0 percent asphalt cement when designed in accordance with TxDOT Test Method Tex-126-E. At optimum asphalt content, the design specimens shall have the following minimum strength when tested in accordance with TxDOT Test Method Tex-126-E.

<i>SLOW STRENGTH*</i>		
<i>GRADE</i>	<i>PSI</i>	<i>kPa</i>
1	50	345
2	40	275
3	30	205
4*	30	205

* Unless a higher minimum strength is shown on the Drawings.

B. Grades

The aggregate gradation shall conform to the master grading limits shown below for the grade of mix specified on the Drawings.

Sieve Size		Grade			
US	SI	1	2	3	4
1 3/4"	45 mm		100	100	As Shown On Drawings
1 1/2"	38 mm	100	90-100		
1	25 mm	90-100			
3/8	9.5 mm	45-70			
#4	4.75 mm	30-55	25-55		
#40	425 μm	15-30	15-40	15-40	

C. Tolerances:

Gradation approval may be based on stockpile samples if a single stockpile is used. If more than one stockpile is used, the mixture will be tested in accordance with TxDOT Test Method Tex-210-F or TxDOT Test Method Tex-228-F will be used in conjunction with combined cold feed belt samples tested in accordance with TxDOT Test Method Tex-229-F. Other tests of proven accuracy may be used if approved by the Engineer or designated representative. The gradation of the aggregate shall not vary from the master grading limits for the specified grade except that a tolerance of 2 percent is allowed on the sieve size for each mixture grade in the table above, which shows 100 percent passing. When disagreements concerning the determination of specification compliance occur between allowed sampling and testing procedures, extracted aggregate testing shall take precedence over the cold feed belt sampling.

The asphalt content shall not vary by more than 0.5 percent from that designated by the Engineer or designated representative using TxDOT Test Method Tex-210-F or Test Method Tex-228-F.

If the produced mixture varies from the master grading limits and/or the asphalt content tolerance, adjustments shall be made by the Contractor until the mixture meets these requirements.

206S.5 Equipment

The equipment for the handling of all materials and for mixing, placing and compacting of the mixture shall be maintained in good repair and operating condition and subject to the approval of the Engineer or designated representative. Any equipment found to be defective or which may potentially yield a negative impact on the quality of the paving mixture will not be allowed.

All equipment shall conform to the requirements of Standard Specification Item No. 340, "Hot Mix Asphalt Concrete Pavement" with the following exception.

ASB for confined or isolated areas or for a single day's production of 500 square yards (400 square meters) or less may be spread with a maintainer or a rubber-tired front-end loader. The Contractor shall exercise caution to assure that the use of a maintainer or a loader does not produce segregation of the aggregate in the ASB.

206S.6 Storage, Proportioning and Mixing

All storage, proportioning and mixing shall conform to the requirements of Standard Specification Item No. 340S, "Hot Mix Asphaltic Concrete Pavement".

206S.7 Construction Methods

A. General:

The Contractor shall produce, transport, place and compact a paving mixture conforming to these specifications and provide a safe environment to enable inspection forces to inspect the work, acquire samples and inspect/monitor the plant.

When the ASB is placed directly on the subgrade, the subgrade shall be proof rolled prior to placing the ASB in accordance with Standard Specification Item No. 236S. Soft spots shall be repaired and area proof rolled again until entire subgrade is free of soft spots.

When a spreading and finishing machine is used, the ASB shall not be placed when the air temperature is 40°F (4°C) and is rising. When a motor grader is used, the ASB shall not be placed when the air temperature is below 60°F (16°C) and is falling, but it may be placed when the air temperature is 50°F (10°C) and is rising. The air temperature shall be taken in the shade away from any artificial heat.

It is further provided that the ASB shall be placed only when the humidity, general weather conditions, temperature and moisture conditions of the subgrade and subbase, in the opinion of the Engineer or designated representative, are suitable.

If, after being discharged from mixer and prior to placing, the temperature of the asphalt mixture is 50°F (10°C) or more below the selected discharge temperature established by the Contractor in the submitted mix design, all or any part of load may be rejected and payment will not be made for rejected material. Any material placed which is too cool to compact properly shall be removed and replaced with material, which meets these specifications.

Thickness of the compacted lift shall not exceed 8 inches (200 mm) and shall not be less than twice the size of the maximum nominal size aggregate.

During placement of tack coat, care shall be taken to prevent splattering of adjacent pavement, curb and gutters or structures. Contractor shall clean any splattered areas.

B. Tack Coat:

The tack coat shall be applied conforming to Standard Specification Item No. 307S, "Tack Coat". Before ASB mixture is placed, the surface upon which the tack coat is

to be placed shall be thoroughly cleaned to satisfaction of Engineer or designated representative. The surface shall be given a uniform application of tack coat in accordance with Standard Specification Item No. 307S. The tack coat shall be applied as directed by Engineer or designated representative but in no case more than 0.10 gallons per square yard (0.45 liters per square meter).

Where the ASB mixture will adhere to the surface without the use of a tack coat, the tack coat application may be eliminated, if approved by the Engineer or designated representative. Contact surfaces of curbs, structures and all joints shall be painted with a thin uniform coat of asphalt material meeting requirements for tack coat (Standard Specification Item No. 307S). The tack coat shall be rolled with a light pneumatic tire roller when directed by Engineer or designated representative.

C. Compaction:

The ASB mixture shall be compacted thoroughly and uniformly with the necessary rollers to obtain the required density (as determined by TxDOT Test Method Tex-126-E) and cross-section of the finished pavement in accordance with the requirements of the Drawings and Specifications.

The Contractor shall be responsible for determining the numbers and type of rollers to be used to obtain the required density. The rollers shall be operated in accordance with the requirements of this specification, Standard Specification Item Nos. 230S and 232S, and as approved by the Engineer or designated representative. The rolling patterns shall be established by the Contractor as outlined in TxDOT Test Method Tex-207-F, Part IV, to achieve the maximum compaction, unless otherwise directed by the Engineer or designated representative. When changes develop in the mixture or placement conditions, a new rolling pattern shall be established.

Static, vibratory, and flat steel wheel rolling shall be terminated before the ASB surface temperature cools below 175°F (80°C). Pneumatic tire rolling may be undertaken on the ASB layer at temperatures below 175°F (80°C). The surface of the ASB, after compaction, shall be smooth and true to established line, grade and cross-section.

The motion of rollers shall be slow enough to avoid other than normal initial displacement of the mixture. If any displacement occurs, it shall be corrected to the satisfaction of the Engineer or designated representative. The roller shall not be allowed to stand on a pavement, which has not been fully compacted. In order to prevent adhesion of the surface mixture to the steel wheel rollers, the wheels shall be kept thoroughly moistened with water, but an excess of water will not be permitted. The Contractor shall take necessary precautions to prevent the dropping of diesel, gasoline, oil, grease or other foreign matter on the ASB, either when the rollers are in operation or when standing.

D. Density Control.

For the purpose of determining the density, the "project" shall be defined to be the total quantity of ASB to be placed. Portions of the 'project' may designated by the Engineer or designated representative as separate 'paving sections' created by: (a) staging of paving operations due to traffic considerations, (b) changes in the Job Mix Formula, (c) phasing of large projects or (d) other factors affecting the consistency in the production,

lay-down compaction and/or use of completed portions. Acceptability of the completed work will be based on the average of tests per paving section as defined above.

The Engineer or designated representative will secure, in accordance with TxDOT Test Method Tex-222-F, a minimum of three 6 inch (150 mm) diameter core samples or sections of completed ASB lifts, for every 1,500 square yards (1250 square meters) or portions thereof, of ASB placed. The in place densities of the sampled locations shall be determined in accordance with TxDOT Test Method Tex-126-E, unless directed otherwise by the Engineer or designated representative. The nuclear-density gauge or other methods of determining in-place compaction, which correlate satisfactorily with those results obtained through the use of TxDOT Test Method Tex-126-E, may be used. In-place density at the sampled locations shall be determined by the following equation:

$$\text{Percent in place Density} = [G_A / G_T] \times 100$$

where G_A = Bulk specific gravity of core (tested in conformance with Tex-207-F)
and

G_T = Maximum theoretical specific gravity of each core (tested in conformance with Tex-227-F).

If the in-place density falls 0.1 to 1.0 percentage points below the minimum density from TxDOT Test Method Tex-126-E, the Contractor shall investigate the causes and make the necessary corrections. Production may proceed for no more than one full day while corrections to the construction operations or mixture are being made to obtain the minimum density. If the minimum density is not obtained after one day, production shall cease. The Contractor will then be required to place a test strip in accordance with Item 345.6 of TxDOT Standard Specification Item 345, "Asphalt Stabilized Base (Plant Mixed)" to demonstrate that the minimum density is produced.

If the in-place density is more than 1.0 percent below the minimum density, production shall cease immediately and a test strip shall be required. Full production may only resume when it is demonstrated in a test strip that a satisfactory density can be obtained.

Increasing the asphalt content of the ASB mixture in order to increase density shall not be allowed.

The Contractor is encouraged to perform supplemental nuclear density compaction testing to aid in developing rolling patterns.

The Contractor shall patch the area where samples are taken with no extra payment being made for this work. Laboratory technician will remove the ASB specimen on the day following placement or as soon as practicable thereafter.

Initial sampling and testing of the in place ASB will be at no cost to Contractor, except for the cost of material and work involved in the restoration of damage caused by the sampling procedures. Retesting expense shall conform to Standard Contract Document Section 00700, "General Conditions", Article 13.3.2.

E. Opening to Traffic:

Pavement may be opened to local traffic as soon as possible after required temporary pavement markings are in place and after approval from Engineer or designated representative.

Contractor's attention is directed to the fact that all construction traffic allowed on any pavement open to public will be subject to City Ordinances and State Laws governing traffic on streets and highways.

Surface raveling, cracking, segregation and other defects resulting from traffic shall be corrected at Contractor's expense as directed by Engineer or designated representative. The Contractor shall provide traffic control and other expenses, if any, necessitated by required repairs.

206S.8 Measurement

Measurement for this item shall be by either Method A or Method B as described below and as established in Bid Documents.

Method A: Work and material shall be measured by the ton of 2000 pounds (megagrams: 1 megagram equals 1.1 tons) of composite "Asphalt Stabilized Base" of the grade actually used in the completed and accepted in accordance with the Drawings and Specifications for the project. The material weight (mass) shall be calculated using the average densities of the designated 'paving sections' and the specified ASB layer thickness.

Method B: Work and materials shall be measured by the square yard (square meter: 1 square meter equals 1.196 square yards) of surface area in the each designated 'paving sections' to the specified thickness, complete in accordance with the Drawings and Specifications for the project.

206S.9 Payment

The work performed and materials furnished in accordance with this item and measured as provided under "Measurement" will be paid at unit bid price for "Asphalt Stabilized Base," of the grade specified. The unit bid price shall represent full compensation for a) quarrying, furnishing all materials and additives, b) all heating mixing, and hauling, c) cleaning the existing sub base, base or surface course, d) tack coat, e) placing, rolling and finishing, temporary pavement markings and f) all manipulations, labor, tools, equipment, freight involved; and incidentals necessary to complete the work. Correction of defective work and subsequent retesting shall be included in the unit price bid for "Asphalt Stabilized Base".

The contract unit price for Asphalt Stabilized Base shall be adjusted in accordance with the following for all work that fails to meet density requirements:

DENSITY ACCEPTANCE SCHEDULE (TEX-207-F/TEX-227-F)

Percent Density	Percent Contract Unit Price Reduction
Above 97	100, Remove and Replace
91.0 to 97.0	0
90.9 to 87.0	0.625% per 0.10% Deficiency in Density

Less than 87.0	100, Remove and Replace
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Templates, straightedges, scales and other weighing and measuring devices necessary for proper construction, measuring and checking work shall be furnished, operated and maintained by Contractor at its own expense.

Saw cutting as indicated or as directed by Engineer or designated representative will not be measured or paid for directly, but shall be included in the unit price bid for the item of construction in which this item is used,, unless included as a separate pay item in the Bid Document.

Payment for work meeting specifications will be made under one of the following:

Pay Item No. 206S-A: Asphalt Stabilized Base PerTon.

Pay Item No. 206S-B: Asphalt Stabilized Base _____In. Per Square Yard.

End

<i>SPECIFIC</i> CROSS REFERENCE MATERIALS
Specification 206S, "ASPHALT STABILIZED BASE"

City of Austin Contract Documents

<u>Designation</u>	<u>Description</u>
Section 00700	General Conditions

City of Austin Standard Specifications

<u>Designation</u>	<u>Description</u>
Item No. 230S	Rolling (Flat Wheel)
Item No. 232S	Rolling (Pneumatic Tire)
Item No. 236S	Proof Rolling
Item No. 301S	Asphalts, Oils and Emulsions
Item No. 307S	Tack Coat
Item No. 340S	Hot Mix Asphaltic Concrete Pavement

Texas Department of Transportation: Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges

<u>Designation</u>	<u>Description</u>
Item No. 301	Asphalt Anti-stripping Agents
Item No. 345	Asphalt Stabilized Base (Plant Mixed)

Texas Department of Transportation: Manual of Testing Procedures

<u>Designation</u>	<u>Description</u>
Tex-126-E	Molding, Testing and Evaluation of Bituminous Black Base Materials
Tex-207-F	Determination of Density of Compacted Bituminous Mixtures
Tex-210-F	Determination of Asphalt Content of Bituminous Mixtures by Extraction
Tex-222-F	Method of Sampling Bituminous Mixtures
Tex-227-F	Theoretical Maximum Specific Gravity of Bituminous Mixtures
Tex-228-F	Determination of Asphalt Content of Bituminous Mixtures By The Nuclear Method

Tex-229-F Combined HMAC Cold-Belt Sampling and Testing Procedures
 Tex-460-A Determination of Crushed Face Particle Count

<u>RELATED CROSS REFERENCE MATERIALS</u>
Specification 206S, "ASPHALT STABILIZED BASE"

City of Austin Standard Details

<u>Designation</u>	<u>Description</u>
1000S-10	Local Street Sections
1000S-11(1)	Residential and City of Austin Neighborhood Collector Street Sections
1000S-11(2)	Industrial and Commercial Collector Street Sections
1000S-12(1)	Primary Collector Street Sections
1000S-12(2)	Primary Arterial Street Sections
1000S-13(1)	Minor Arterial Street Sections (4 Lanes)
1000S-13(2)	Minor Arterial Street Sections-(4 Lanes divided)
1000S-14	Major Arterial Street Sections

Texas Department of Transportation: Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges

<u>Designation</u>	<u>Description</u>
Item No. 210	Rolling (Flat Wheel)
Item No. 211	Rolling (Tamping)
Item No. 213	Rolling (Pneumatic Tire)
Item No. 300	Asphalts, Oils and Emulsions

City of Austin Standard Specifications

<u>Designation</u>	<u>Description</u>
<i>Item No. 101S</i>	<i>Preparing Right of Way</i>
Item No. 102S	Clearing and Grubbing
Item No. 104S	Removing Portland Cement Concrete
Item No. 110S	Street Excavation
Item No. 111S	Excavation
Item No. 130S	Borrow
<i>Item No. 132S</i>	<i>Embankment</i>
Item No. 202S	Hydrated Lime and Lime Slurry
Item No. 203S	Lime Treatment for Materials in Place
Item No. 210S	Flexible Base
Item No. 310S	Emulsified Asphalt Treatment
Item No. 320S	Two Course Surface Treatment

Texas Department of Transportation: Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges

<u>Designation</u>	<u>Description</u>
Item No. 100	Preparing Right of Way
Item No. 110	Excavation
Item No. 112	Subgrade Widening
Item No. 132	Embankment
Item No. 150	Blading
Item No. 158	Specialized Excavation Work
Item No. 204	Sprinkling
Item No. 210	Rolling (Flat Wheel)
Item No. 211	Rolling (Tamping)

Item No. 213	Rolling (Pneumatic Tire)
Item No. 300	Asphalts, Oils and Emulsions
Item No. 301	Asphalt Anti-stripping Agents
Item No. 345	Asphalt Stabilized Base (Plant Mixed)

<i>RELATED</i> CROSS REFERENCE MATERIALS - Continued
Specification 206S, "ASPHALT STABILIZED BASE"

Texas Department of Transportation: Manual of Testing Procedures

<u>Designation</u>	<u>Description</u>
Tex-101-E	Surveying and Sampling Soils for Highways
Tex-103-E	Determination of Moisture Content of Soil Materials
Tex-104-E	Determination of Liquid Limit of Soils
Tex-105-E	Determination of Plastic limit of Soils
Tex-106-E	Method of Calculating the Plasticity Index of Soils
Tex-114-E	Laboratory Compaction Characteristics & Moisture Density Relationship of Subgrade & Embankment Soil
<i>Tex-115-E</i>	<i>Field Method for Determination of In-Place Density of Soils & Base Materials</i>
Tex-117-E	Triaxial Compression Tests for Disturbed Soils and Base Materials