RULE NO.: R161-24.14

NOTICE OF PROPOSED RULE **POSTING DATE: 10/24/2024**

The Director of the Department of Transportation and Public Works proposes to adopt the following rule after 11/26/2024.

EFFECTIVE DATE OF PROPOSED RULE

A rule proposed in this notice may not become effective before the effective date established by a separate notice of rule adoption. A notice of rule adoption may not be posted before 11/26/2024 (the 33rd day after the date of this notice) or not after 01/02/2025 (the 70th day after the date of this notice).

If a proposed rule is not adopted on or before 01/02/2025, it is automatically withdrawn and cannot be adopted without first posting a new notice of a proposed rule.

REQUEST FOR COMMENTS ON PROPOSED RULES

The City requests comments from the public with respect to the proposed rules included in this Notice. Comments must be received by writing to the contact person below no later than 11/25/2024 (the first business day following the 31st day after the date of this notice).

Contact Person:
Veena Prabhakar, Transportation and Public Works Department
4411-A Meinardus Dr.
Austin, Texas 78744

veena.prabhakar@austintexas.gov
512-974-8745

TEXT OF PROPOSED RULE

The text of the proposed rule, indicating changes from the current text, is attached to this notice. A copy of the complete text of the proposed rule is available for public inspection and copying at the following locations. Copies may be purchased at the locations at a cost of ten cents per page:

Transportation and Public Works, 4411-A Meinardus Drive, Austin, Texas
Office of the City Clerk, City Hall, 301 West 2nd Street, Austin, Texas.

BRIEF EXPLANATION OF PROPOSED RULE

Item No. 340 Asphaltic Concrete Pavement proposes revisions to the Standard Specification Manual. The proposed rule adopts policies relating to removing the S designation throughout the specification to align with current industry standard. Cross references to current standard have been updated. The mixed design with Texas Gyratory Compactor has been replaced by both the mix design with Superpave Gyratory Compactor and updated mix design criteria. WMA technology has been added, density acceptance schedule has been adjusted, outdated information has been cleaned up. Cross-reference material has been updated.

AUTHORITY FOR ADOPTION OF PROPOSED RULE

The authority and procedure for adoption of a rule to assist in the implementation, administration, or enforcement of a provision of the City Code is provided in Chapter 1-2 of the City Code. The authority to regulate construction requirements is established in Section 25-6-171 (*Standards for Design and Construction*) of the City Code.

CERTIFICATION BY CITY ATTORNEY

By signing this Notice of Proposed Rule (R161-24.14), the City Attorney certifies the City Attorney has reviewed the rule and finds that adoption of the rule is a valid exercise of the Director's administrative authority.

REVIEWED AND APPROVED

Richard Mendoza, Director
Transportation and Public
Works Department

Date: Oct. 21, 2024

Deborah Thomas
Interim City Attorney

Date: 10/22/2024

ITEM NO. 340 ASPHALTIC CONCRETE PAVEMENT 3-20-2024

340.1 Description

This item shall govern base, level up, and pavement surface courses composed of a compacted mixture of aggregate and asphaltic cement mixed hot in a mixing plant. The hot mix asphaltic (HMA) concrete pavement shall be constructed on a previously completed and approved subgrade, subbase material, base material, concrete slab, or existing pavement.

340.2 Submittals

The submittal requirements of this specification item may include:

A. A mix design submittal including the plant corrected Job Mix Formula (JMF) for the hot mix asphaltic concrete.

B. Certification that the aggregate materials meet appropriate quality requirements.

C. Particle-size gradation and specific gravity tests on all aggregate materials.

D. Certification that the asphalt cement for paving materials meet appropriate quality requirements.

E. Trial batch for the verification of JMF.

340.3 Materials

The Contractor shall furnish materials to meet the requirements specified herein and shall be solely responsible for the quality and consistency of the product delivered to the Project.

The contractor shall notify Engineer or designated City of Austin (COA) representative of all material sources and before changing any material source or formulation. The Engineer will verify that the specification requirements are met when the contractor or producer makes a source or formulation change and may require a new laboratory mixture design, trial batch, or both. The Engineer may obtain the test samples or may require the contractor to obtain the samples at any time during the project to verify compliance in accordance with the specification.

A. Aggregate: The aggregate shall be composed of coarse aggregate, a fine aggregate and, if required or allowed, mineral filler and reclaimed asphalt pavement (RAP).

   Aggregates shall meet the quality requirements of Table 1 and other requirements as specified herein. The aggregate contained in RAP will not be required to meet Table 1 requirements unless indicated otherwise on the Drawings. The contractor shall perform all aggregate quality tests listed in Table 1 and determine aggregate gradations for mix design based on the washed sieve analysis given in Tex-200-F, Part II. The contractor shall document all aggregate test results on the mix design submittal report.

   1. Coarse Aggregate: Coarse aggregate shall consist of clean, tough, durable fragments of crushed stone or crushed gravel of uniform quality throughout. Coarse aggregate stockpiles must have no more than 20% material passing the No. 8 sieve. Aggregates from sources listed in the TxDOT's Bituminous Rated Source Quality Catalog (BRSQC) are preapproved for use.

   2. Fine Aggregate: Fine aggregates consist of manufactured sands, screenings, and field sands. Fine aggregate stockpiles must meet the gradation requirements in Table 2. Fine aggregate shall be free from organic impurities and of uniform quality throughout. A maximum of 15 percent of the total aggregate may be field sand or other uncrushed fine aggregate.

Fine aggregate, with the exception of field sand shall be supplied from sources whose coarse aggregate meets the abrasion and magnesium sulfate soundness loss requirements shown in Table 1.

Test the stockpile if 10% or more of the stockpile is retained on the No. 4 sieve and verify that it meets the requirements in Table 1 for crushed face count (Tex-460-A) and flat and elongated particles (Tex-280-F).

Crushed gravel screenings may be used with, or in lieu of, stone screenings only when indicated on the Drawings. Crushed gravel screenings must be the product of crushing aggregate that was originally retained on the No. 4 sieve and must meet the gradation for fine aggregate shown below.

TABLE 1: Aggregate Quality Requirements[1]

Requirement		Test Method	Amount
	COARSE AGGREGATE		
Deleterious Material, percent, maximum		Tex-217-F, I	1.5
Decantation, percent, maximum		Tex-217-F, II	1.5
Los Angeles Abrasion, percent, maximum		Tex-410-A	40
Magnesium Sulfate Soundness Loss 5 cycle, percent, maximum		Tex-411-A	30
Crushed face count[2], %, Minimum		Tex-460-A, Part I	85
Flat and elongated particles @ 5:1, %, Maximum		Tex-280-F	10
	FINE AGGREGATE		
Linear Shrinkage, maximum		Tex-107-E, II	3
Sand Equivalent Value, minimum		Tex-203-F	45

1. Aggregates, without added mineral filler or additives, combined as used in the job-mix formula (Plant Corrected).
2. Only applies to crushed gravel.

TABLE 2: Gradation Requirements for Fine Aggregate

Sieve Size	Percent by Weight (Mass)
Passing ⅜ inch sieve	100
Passing No. 8 sieve	70—100
Passing No. 200 sieve	0—30

3. Mineral Filler: Mineral filler shall consist of thoroughly dried stone dust, Portland cement, fly ash, lime or other mineral dust approved by the Engineer or designated COA representative. The mineral filler shall be free from foreign matter.

   Fly ash obtained from a source using a process fueled by hazardous waste shall be considered as an approved product if the production facility is authorized to operate under regulation of the Texas Commission on Environmental Quality (TCEQ) and the U. S. Environmental Protection Agency (EPA). Supplier shall provide current TCEQ and EPA authorizations to operate the facility.

   The addition of baghouse fines or other collected fines will be permitted if the mixture quality is not adversely affected in the opinion of the Engineer or designated COA representative. In no case shall the amount of material passing the No. 200 sieve exceed the tolerances of the job-mix formula or the master gradation limits.

   When tested by TEX-200-F (Part I or Part III, as applicable), the mineral filler shall meet the following gradation requirements. Baghouse fines are not required to meet the gradation requirements.

TABLE 3: Gradation Requirements for Mineral Filler

Sieve Size	% Passing by Wt. or Volume
#8	100
#200	55–100

B. Asphaltic Material:

1. Asphalt Binder: Asphalt binder for the paving mixture shall conform to the requirements of Standard Specification Item No. 301S, "Asphalts, Oils and Emulsions", unless otherwise shown on the plans. The selection of binder grade shall be based on the road classification as shown in Table 4.

TABLE 4: Binder Grade Based on Roadway Classification

Street Classification	Asphalt Binder Grade	
	Surface Course	Base Course
Arterials	PG76-22	PG64-22
Collectors with Bus		
Collector without Bus	PG64-22	
Residentials		

2. Tack Coat: Tack Coat shall conform to Standard Specification Item No. 307S, "Tack Coat".

C. Additives: Additives to facilitate mixing and/or improve the quality of the asphaltic mixture or tack coat may be used with the authorization of the Engineer or designated COA representative. The Contractor may choose to use either lime or a liquid anti-stripping agent to reduce moisture susceptibility of the aggregate.

D. Warm Mix Asphalt (WMA). Warm Mix Asphalt (WMA) is defined as HMA that is produced within a target temperature discharge range of 215°F and 275°F using approved WMA additives or processes from Tx DOT'S MPL. WMA is allowed for use when shown on the plans. When WMA is required, the maximum placement or target discharge temperature for WMA will be set at a value below 275°F.

TxDOT-approved WMA additives or processes may be used to facilitate mixing and compaction of HMA produced at target discharge temperatures above 275°F; however, such mixtures will not be defined as WMA.

E. Compaction Aid. Compaction Aid is defined as a chemical warm mix additive that is used to produce an asphalt mixture at a discharge temperature greater than 275°F.

Compaction Aid is allowed for use on all projects and is required when shown on the plans.

F. Reclaimed Asphalt Pavement (RAP): RAP is defined as a salvaged, milled, pulverized, broken, or crushed asphaltic pavement. The RAP to be used in the mix shall be crushed or broken to the extent that 100 percent will pass the 2-inch sieve. Fractionated RAP is defined as a stockpile that contains RAP material with a minimum of 95.0% passing the 3/8-in. or 1/2-in. sieve, before burning in the ignition oven, unless otherwise approved. The Engineer may allow the Contractor to use an alternate to the 3/8-in. or 1/2-in. screen to fractionate the RAP.

The RAP shall be stockpiled in such a manner that assures that it will not become contaminated by dirt or other objectionable materials. Unless indicated otherwise on the Drawings, stockpiled, crushed RAP must not exhibit a decantation more than 5 percent or a plasticity index more than 8, when tested in accordance with TxDOT Test Method Tex-406-A, Part I, or Test Method Tex-106-E, respectively.

The maximum allowable RAP percentages are shown in Table 5. Surface and base courses referenced in Tables 4 and 5 are defined as follows:

- Surface. The final HMA lift placed at the top of the pavement structure.
- Base. Layer between surface and subgrade. Unless otherwise shown on the plans, mixtures used for bond breaker are defined as base mixtures.

The asphalt binder content and the gradation of the RAP stockpiles is determined for mixture design purposes in accordance with Tex-236-F, Part I. The Engineer may verify the asphalt binder content of the stockpiles at any time during production. Asphalt binder from RAP is designated as recycled asphalt binder. The ratio of the recycled asphalt binder to total binder shall not exceed the percentage shown in Table 5 during mixture design and HMA production when RAP is used. A separate cold feed bin for each stockpile shall be used for each stockpile of RAP during HMA production.

TABLE 5: Maximum Allowable Amounts of RAP and Maximum Recycled Binder Ratios[1]

Maximum Allowable Fractionated RAP (%)		Maximum Ratio of Recycled Binder to Total Binder (%)	
Surface Course	**Base Course**	**Surface Course**	**Base Course**
20	35	15	30

1. All mixes must also meet the recycled binder to total binder ratio shown in Table 5.

340.4 Paving Mixtures Design

An asphalt mixture design is developed by a laboratory process, which includes the determination of the quality and quantity of the asphalt cement and the individual aggregates, and the testing of the combined mixture (Laboratory Design). The Laboratory Design is subsequently revised to produce an appropriate job mix formula (JMF). The Contractor may submit a new asphalt mixture design at any time during the project.

The performance of the mix design shall remain the responsibility of the Contractor.

A. Mixture Design Requirement: The mix shall be designed in accordance withTex-204-F to conform with the requirements herein. The mixture shall meet the requirements listed in Table 1, 2 3, 4, 5, 6, 7 and 8. The master grading limits of the appropriate type and the JMF will be plotted on a graduated chart with sieve sizes raised to the 0.45 power and will be submitted to the Engineer or designated COA representative with the asphalt mixture design. The Contractor shall design the mixture using a Superpave Gyratory Compactor (SGC) unless otherwise shown on the plans.

   The blend of coarse aggregate, fine aggregate, and mineral filler, if allowed, that is established by TxDOT Test Method Tex-200-F, Dry Sieve Analysis, shall conform to the master gradation shown in Table 6 for the type of specified mixture. The voids in the mineral aggregate (VMA) will be determined as a mixture design requirement only, in accordance with TxDOT Test Method Tex-207-F and shall not be less than the value indicated in Table 6.

B. Design Number of Gyration (N_{design}): The mixture shall be designed at 50 gyrations targeting laboratory-molded density to 96.0%. However, adjustment can be made to the N_{design} value within a range of 35-100 gyrations when shown on the plans or specification or when mutually agreed between the Engineer and Contractor. The N_{design} level may be reduced to at least 35 gyrations at the Contractor's discretion.

C. Performance testing: The contractor shall use an approved laboratory to perform the Hamburg Wheel test and Indirect Tensile Strength test and provide results with the laboratory mixture design.

TABLE 6: Master Grading - Percent Passing by Weight (Mass) or Volume and VMA Requirements

Sieve Size US	Type B Fine Base	Type C Coarse Surface	Type D Fine Surface	Type F Fine Mixture
2"	-	-	-	-
1½"	100[1]	-	-	-
1"	98 – 100	100[1]	-	-
¾"	84 – 98	95 - 100	100[1]	
½"	-	-	98 – 100	100[1]
⅜"	60—80	70—85	85—100	98 – 100
No. 4	40—60	43—63	50—70	70 – 90
No. 8	29 – 43	32 – 44	35 – 46	38 – 48
No. 30	13 – 28	14 – 28	15 – 29	12 – 27
No. 50	6 - 20	7 – 21	7 – 20	6 – 19
No. 200	2- 7	2- 7	2- 7	2- 7
Design VMA, % Minimum	13	14	15	16
Production (Plant-Produced) VMA, % Minimum	12.5	13.5	14.5	15.5
Min. Allowable lift thickness	3"	2"	1.25"	¾"
Max. Allowable lift thickness	6"	4"	3"	1.5"

1. Defined as maximum sieve size. No tolerance allowed.
2. Variance from these minimums and maximums will only be allowed with permission from the Office of the City Engineer.

Table 7: Laboratory Mixture Design Properties

Mixture Property	Test Method	Requirement
Target laboratory-molded density, % (SGC)	Tex-207-F	96.0
Design gyrations (N_{design} for SGC)	Tex-241-F	50[1]
Indirect tensile strength (dry), psi	Tex-226-F	85–200[2]

3. Adjust within a range of 35–100 gyrations when shown on the plans or specification or mutually agreed between the Engineer and Contractor.
4. The Engineer may allow the IDT strength to exceed 200 psi if the corresponding Hamburg Wheel rut depth is greater than 3.0 mm and less than 12.5 mm.

Table 8: Hamburg Wheel Test Requirements

High-Temperature Binder Grade	Test Method	Minimum # of Passes @ 12.5 mm[1] Rut Depth, Tested @ 50°C
PG 64 or lower	Tex-242-F	10,000[2]
PG 70		15,000[3]
PG 76 or higher		20,000

1. When the rut depth at the required minimum number of passes is less than 3 mm, the Engineer may require the Contractor to lower the N_{design} level to at least 35 gyrations.
2. May be decreased to at least 5,000 passes when shown on the plans.
3. May be decreased to at least 10,000 passes when shown on the plans.

D. Job Mix Formula (JMF) Submittal: The job-mix formula (JMF) is the combined aggregate gradation, target laboratory-molded density (N_{design}), and target asphalt percentage used to establish target values for hot-mix

production. $JMF_{Initial}$ is the original laboratory mixture design used to produce the trial batch. The Contractor will verify laboratory design JMF ($JMF_{Initial}$) based on plant-produced mixture from the trial batch. The Engineer may accept an existing mixture design previously used on a city project and may waive the trial batch to verify $JMF_{Initial}$.

The laboratory design JMF ($JMF_{initial}$) may subsequently be revised to produce an appropriate job-mix formula (JMF1). When WMA is used, $JMF_{Initial}$ may be designed and submitted to the Engineer without including the WMA additive. When WMA is used, document the additive or process used and recommended rate on the mix design submittal.

The Contractor shall submit to the Engineer on forms provided by the Engineer or designated COA representative, an asphalt mixture design reviewed, signed, and sealed by a Registered Professional Engineer licensed in the State of Texas or certified by a TxDOT Level II Certified Asphalt Technician. An asphalt mixture design shall be submitted for a comprehensive review every two (2) years. Mix designs older than one year will not be accepted without a review of current test data of the proposed materials and current mix design to ensure that the materials meet specification requirements.

The contractor shall provide the Engineer with an asphalt mixture design submittal which includes the following items:

- a unique identification number for the mixture design.
- the date the mixture design was performed.
- the combined aggregate gradation, source, specific gravity, and percent of each material used.
- asphalt binder content and aggregate gradation of RAP stockpiles.
- the target laboratory-molded density (or N_{design} level).
- results of all applicable tests.
- the mixing and molding temperatures and
- the signature of the Level 2 person or persons that performed the design.

The JMF shall be submitted to the Engineer or designated COA representative on a form provided by the Engineer through the Construction Inspector or Project Manager of the Project for review, for each individual Project, a minimum of three (3) working days before the mixture is to be placed. Under no circumstances will a mixture be placed before its use is reviewed and approved by the Engineer or designated COA representative.

E. Trial batch Submittal: The contractor shall provide the plant-produced trial batch for verification of $JMF_{Initial}$. The contractor shall produce trial batches as necessary to obtain the mixtures that meets the specification requirements in Table 5, Table 6 and Table 7. The contractor shall obtain a representative sample of the trial batch in accordance with TEX-222-F and test the trial batch to ensure the mixture produced using $JMF_{Initial}$ meets the mixture requirements in Table 9 and in compliance with the Indirect Tensile Strength requirement in Table 7 and Hamburg Wheel requirement in Table 8. The engineer may also require the contractor to deliver samples to the accredited laboratory as directed. The contractor shall use only equipment and materials proposed for use on the project to produce the trial batch.

The contractor shall submit a copy of trial batch test results to the Engineer or designated COA representative.

F. Ignition Oven Correction Factor: Determine the aggregate and asphalt correction factors from the ignition oven in accordance with Tex-236-F, Part II. Provide correction factors that are not more than 12 months old. Correction factors established from a previously approved mixture design may be used for the current mixture design if the mixture design and ignition oven are the same as previously used, unless otherwise directed.

G. Development of JMF1: The Engineer will approve $JMF_{Initial}$ if the mixture meets the requirements in Table 5 and the gradation meets the master gradation limits shown in Table 6. The Engineer will notify the Contractor that additional trial batch is required if the trial batch does not meet these requirements. The laboratory design JMF ($JMF_{Initial}$) may be revised to produce an appropriate job-mix formula (JMF1).

H. Job Mix Formula Field Adjustments: If it is determined by the City of Austin that adjustments to the JMF are necessary to achieve the specified requirements, the Engineer or designated COA representative may allow adjustments of the JMF within the limits specified in Table 9 without a laboratory redesign of the mixture. The adjusted JMF1 (JMF2) shall not exceed the master grading criteria for the type of mixture specified in Table 6.

When the proposed adjustments exceed the tolerance requirement shown in Table 9, and the Engineer or designated COA representative determines that the impact of these changes may adversely affect pavement performance, a new laboratory mixture design will be required.

Table 9. Tolerances Limit

Description	Test Method	Allowable Difference Between Trial Batch and $JMF_{Initial}$ target	Allowable Difference from Approved JMF1[2]
Individual % retained for #8 sieve and larger	Tex-200-F or Tex-236-F	±5.0[1]	±5.0[1]
Individual % retained for sieves smaller than #8 and larger than #200		±3.0[1]	±3.0[1]
% Passing the #200 sieve		±2.0[1]	±1.6[1]
Asphalt binder content, %	Tex-236-F	±0.5	±0.3
Laboratory-molded density, %	Tex-207-F	±1.0	±1.0

1- Must be Within Master Grading Limits in Table 9
2- Only applies to field adjusted JMF

340.5 Equipment

The trucks that deliver the hot mix asphalt concrete material to the project shall be of sufficient number to insure a continuous paving operation. All equipment used for the production, placement and compaction of the mixture shall be maintained in good repair and operating conditions to the satisfaction of the Engineer or designated COA representative. All equipment shall be made available for inspection. If the Engineer or designated COA representative expresses concern about the condition of any equipment, it shall not be used until it is repaired to the satisfaction of the Engineer or designated COA representative.

A. Mixing Plants: Plants may be of the weigh-batch type, the modified weigh-batch type or drum-mix type equipped with suitable material conveyers, power units, mixing equipment, aggregate proportioning devices, dryers, bins, dust collectors and sensing and recording devices as appropriate for the mixing plant type. The mixing plants shall meet the requirements specified in Section 320.2.1, 'Production Equipment' of TxDOT Specification Item No. 320, "Equipment for Asphalt Concrete Pavement".

B. Spreading and Finishing Paving Machine: The paving machine shall be self-propelled and equipped with a heated compacting screed capable of producing a finish surface meeting the requirements of the street cross-section indicated on the Drawings and all surface criteria. Extensions to the screed shall have the same heating and compacting capabilities as the primary unit, except for use on variable depth tapered areas and/or as approved by the Engineer or designated COA representative.

The paving machine shall be equipped with an approved automatic dual longitudinal screed control system and an automatic transverse screed control system. The longitudinal controls shall be capable of operating from any longitudinal grade reference including a string line, ski, mobile string line or matching shoe. Unless indicated otherwise on the Drawings, the Contractor may use any one of these grade references. The selected grade reference equipment shall be maintained in good operating condition by personnel trained in the use of the specific type of equipment.

The Contractor shall furnish all labor and equipment required for establishing and maintaining appropriate grade reference.

C. Rollers: The Contractor shall select rollers conforming to Item 230S, "Rolling (Flat Wheel)" and Item 232S, "Rolling (Pneumatic Tire)". Rollers that do not conform to these requirements shall be immediately removed from the Project.

D. Motor Grader: A self-propelled power motor grader may only be used when its use is approved by the Engineer or designated COA representative. It shall have a blade of not less than 12 feet (3.66 meters) and a wheelbase of not less than 16 feet. Smaller graders may be used for small irregular areas when approved by the Engineer or designated COA representative.

E. Material Transfer Equipment: Equipment for transferring the HMA mixture from the hauling units or the roadbed to the spreading and finishing machine will be allowed unless indicated otherwise on the Drawings.

Windrow pick-up equipment, if permitted by the Engineer or designated COA representative, shall be constructed in such a manner that substantially all of the HMA mixture deposited on the roadbed is picked up and loaded into the spreading and finishing machine. The HMA mixture shall not be contaminated with foreign material. The loading equipment shall be designed so that it does not interfere with the spreading and finishing machine in obtaining the required line, grade, and surface without resorting to hand finishing.

F. Straightedges and Templates: The Contractor shall provide a ten-foot (3.05 meter) straightedge acceptable to the Engineer or designated COA representative for surface testing. Satisfactory templates shall be provided as required by the Engineer or designated COA representative.

340.6 Stockpiling Aggregates

Aggregates shall be stockpiled to facilitate blending. When the aggregate is not stockpiled on a hard, non-contaminant base, the bottom six-inch (150 mm) depth of the stockpiles shall not be used in asphaltic mixtures. Where space is limited at the plant site, the aggregate stockpiles shall be separated by walls or other appropriate barriers.

Aggregates shall be stockpiled and handled in a manner that will insure minimization of segregation and contamination. Aggregate and RAP stockpiles shall only contain material from a single source.

340.7 Mixture Temperature

The Contractor shall select a target temperature for discharge of the HMA mixture from the mixer between 250°F (120°C) and 350°F (176°C) that is suitable to weather and Project conditions. The target temperature shall be reported to the Engineer or designated COA representative daily and recorded in the Daily Progress Report. The HMA mixture temperature shall not vary by more than 25°F (14°C) from the target temperature for discharge from the mixer. HMA mixtures that are discharged from the mixer at a temperature exceeding 360°F (182°C) or a temperature more than 50°F (28°C) below the target temperature shall not be accepted and shall not be placed on the Project.

340.8 Mixture Storage

A surge-storage system may be used to minimize production interruptions during a normal day of operation. When approved by the Engineer or designated COA representative, overnight storage of HMA mixture in insulated storage bins may be used provided that material temperature and physical properties of the HMA mixture are not adversely affected. HMA mixtures that include hardened lumps shall not be used. Stored HMA mixtures shall not be exempt from any requirements provided in this specification.

When a surge-storage system is used, it shall be equipped with a device such as a gob hopper or other device approved by the Engineer or designated COA representative to prevent segregation in the surge-storage bin.

340.9 Mixture Moisture Content

Hot mix asphalt (HMA) mixtures produced from any plant shall not have a moisture content in excess of 1 percent by weight (mass) when discharged from the mixer. The moisture content shall be determined in accordance with TxDOT Test Method Tex-212-F, Part II, except that the sample shall be left in the oven a total of not less than four (4) hours.

340.10 Construction Methods

A. General: The Contractor shall be responsible for the production, transportation, placement, and compaction of the specified HMA paving mixture to the requirements of this specification. The Contractor shall also be responsible for providing a safe environment for inspection personnel to inspect the equipment and to acquire samples.

All hot mix asphalt concrete pavement surface courses shall be placed with a spreading and finishing (lay-down) machine only. All hot mix asphalt concrete pavement base layers with the possible exception of the first lift of the base layer shall also be placed with a spreading and finishing (lay-down) machine. Longitudinal pavement joints shall be located under the proposed lane lines. Density tests shall be taken prior to opening to traffic.

The first lift of a base layer may be placed with a motor grader if approved in advance by the Engineer or designated COA representative. The loose measure thickness of this first lift shall not exceed 6 inches (150 mm). If placed with a motor grader, the first lift shall achieve a minimum in-place relative density of 89% as determined by TxDOT test procedures TEX-207-F and TEX-227-F. All subsequent lifts should be placed with a spreading and finishing (lay-down) machine and shall be subject to the requirements of Section 340S.12, "Acceptance Plan". Density tests will be taken randomly to confirm compliance with the specification requirements.

For hot mix asphalt overlays, an automatic screed shall be used with outriggers.

Any material delivered to the Project that by visual inspection can reasonably be expected not to meet specification requirements (i.e., segregated or burned material, deficient or excess asphalt, low mixing temperature, visible contaminants, etc.), as determined by the Engineer or designated COA representative, shall not be used, or left in place.

Equipment shall be inspected prior to use and, if found to be defective or in an operating condition that could potentially affect the quality of the finished pavement, as determined by the Engineer or designated COA representative, its use shall not be allowed. Leakage of fuels, oils, grease, hydraulic or brake fluids or other contaminants onto the prepared surface or newly laid HMA layer will not be allowed and may require replacement of the affected pavement area.

The HMA paving mixture, when placed with a spreading and finishing machine, shall not be placed when the air temperature is below 50°F (10°C) and is falling, but it may be placed when the air temperature is above 40°F (4°C) and is rising.

The paving mixture, when used as a level-up course or when spread with a motor grader, shall not be placed when the air temperature is below 60°F (15°C) and is falling, but it may be placed when the air temperature is 50°F (10°C) and is rising. An HMA layer with a thickness of 1½ inches (37.5 mm) and less shall not be placed when the temperature of the surface on which the layer is to be placed is below 50°F (10°C). The temperature shall be taken in a shaded area away from artificial heat.

Additional surface temperature requirements may be included in the Contract Documents or indicated on the Drawings.

Surfaces to be paved shall be finished, primed, cured, broomed and tacked, as appropriate, to the satisfaction of the Engineer or designated COA representative. If the surface on which the first course of the paving mixture is to be placed is a flexible base course, and a cut-back asphalt is to be used as a prime coat, the flexible base shall have been primed and cured a minimum of 24 hours before the paving mixture may be placed. The 24-hour restriction will not apply to a flexible base that has been primed with material other than a cutback. However, the surface on which the tack coat and/or paving mixture are to be placed shall be in a dry condition.

Pavement shall be opened to traffic as soon as possible after temporary pavement markings or permanent markings are in place as indicated on the Drawings) or as directed by the Engineer or designated COA representative. Construction traffic allowed on pavements open to the public will be subject to all laws governing traffic on streets and highways.

B. Tack Coat: The surface upon which the tack is to be placed shall be cleaned thoroughly to the satisfaction of the Engineer or designated COA representative. The surface shall be given a uniform application of tack coat as governed by Standard Specification Item No. 307S, "Tack Coat". The tack coat shall be applied, as directed by the Engineer or designated COA representative, with an approved sprayer at a rate not to exceed 0.05 gallons per square yard. (0.225 liters per square meter) of surface area. Where the paving 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 when approved by the Engineer or designated COA representative. All contact surfaces of curbs, castings and all structures and all joints shall be painted with a thin uniform application of tack coat.

   During the application of tack coat, care shall be taken to prevent splattering of adjacent pavement, curb and gutter and structures. Before the Work can be accepted, all splatter shall be removed by the Contractor at the Contractor's expense.

C. Transporting Hot Mix Asphaltic (HMA) Concrete: The HMA mixture shall be hauled to the Work site in tight vehicles that were previously cleaned of all foreign material. Dispatching of the vehicles shall normally be arranged so that all material delivered is placed and all rolling completed during daylight hours. Nighttime paving may be allowed, when approved in advance by the Engineer or designated COA representative.

   In cool weather or for long hauls, truck bodies containing the HMA mixture shall be covered.

   If necessary, to prevent the HMA mixture from adhering to the truck body, the inside of the truck may be given a light coating of a release agent satisfactory to the Engineer or designated COA representative.

D. HMA Placement: The HMA mixture shall be dumped and spread on the approved prepared surface with the spreading and finishing machine. When properly compacted, the finished pavement shall be smooth, of uniform texture and density and shall meet the requirements of the typical cross sections and the surface tests. In addition, the placement of the HMA mixture shall be done without tearing, shoving, gouging or segregating the mixture and without producing streaks in the HMA layer.

Discharge of the HMA mixture into the finishing machine shall be controlled so that the spreading and finishing machine is not bounced or jarred and the required lines and grades shall be obtained without resorting to hand finishing except as permitted below in this Section.

Unless indicated otherwise on the Drawings, dumping of the HMA material in a windrow and then placing the HMA mixture in the finishing machine with windrow pick-up equipment will be permitted provided the temperature of the HMA mixture does not drop more than 50°F (28°C) below the target temperature before being placed by the finishing machine.

Under no circumstances will the HMA material be permitted to be dumped on or near the job site and then reloaded for hauling to the site of placement. Exceptions may be allowed if approved by the Engineer or designated COA representative.

The windrow pick-up equipment shall be operated in such a manner that substantially all the mixture deposited on the roadbed or prepared surface is picked up and loaded into the finishing machine without contamination by foreign material. The windrow pick-up equipment will also be so operated that the finishing machine will obtain the required line, grade and surface without resorting to hand finishing. Any operation of the windrow pick-up equipment resulting in accumulation and subsequent shedding of accumulated material into the HMA mixture will not be permitted.

When approved by the Engineer or designated COA representative, level-up courses may be spread with a motor grader that meets the requirements of this specification item.

The spreading and finishing machine shall be operated at a uniform forward speed consistent with the plant production rate, hauling capability and roller train capacity to result in a continuous operation. Stopping of the spreading and finishing machine between trucks is to be held to a minimum. If, in the opinion of the Engineer or designated COA representative, delivery of material is adversely affecting the condition of the HMA layer (excessive stopping of the spreading and finishing machine, loss of mixture temperature, etc.), the Engineer or designated COA representative may require paving operations to cease until acceptable methods are provided to minimize starting and stopping of the spreading and finishing machine.

The hopper gates of the spreading and finishing machine shall be adjusted to provide an adequate and consistent flow of material. This shall result in enough material being delivered to the augers so that they are operating approximately 85 percent of the time or more. The augers shall provide means to supply adequate flow of material to the center of the paver. Augers shall supply an adequate flow of material for the full width of the mat being placed, as approved by the Engineer or designated COA representative. Augers should be kept approximately one-half to three-quarters full of HMA mixture at all times during the paving operation.

When the HMA mixture is placed in a narrow strip along the edge of an existing pavement, or is used to level up small areas of an existing pavement or is placed in small irregular areas where the use of a finishing machine is not practical, the finishing machine may be eliminated when permitted by the Engineer or designated COA representative.

The paving material adjacent to castings and flush curb and gutter and structures shall be finished uniformly high so that when compacted, it will be slightly above but not more than 1/8 inch (3 mm) above the edge of the casting or gutter lip.

Construction joints of successive courses of HMA material shall be offset at least 6 inches (150 mm). Longitudinal joints in the layer shall be placed to coincide with lane lines as directed the Engineer or designated COA representative. Transverse joints shall be offset a minimum of 5 feet (1.5 meters).

E. Compaction: The pavement layers/lifts shall be compacted thoroughly and uniformly to obtain the compaction and cross section meeting the requirements indicated on the Drawings and this specification item.

Regardless of the method used for compaction, all rolling to achieve specified density shall cease before the temperature of the HMA mixture drops below 175°F (80°C).

Rolling with a pneumatic tire roller shall be used to seal the surface. Rolling with a tandem or other steel-wheel roller shall be provided if required to iron out any roller marks. Surface sealing and removal of roller marks may be accomplished at HMA temperatures below 175°F (80°C).

Vibratory rollers shall not be allowed in the vibrating mode on layers with a plan thickness less than 1½ inches (37.5 mm).

The motion of the rollers shall be slow enough to avoid other than usual initial displacement. If any displacement occurs, it shall be corrected to the satisfaction of the Engineer or designated COA representative.

The roller shall not be allowed to stand on pavement, which has not been compacted to minimum density requirements. In order to prevent adhesion of the surface mixture to the steel-wheel rollers, the wheels shall be thoroughly moistened with water; however an excess of water will not be allowed. Necessary precautions shall be taken to prevent the dropping of diesel, gasoline, oil, grease or other foreign matter on the pavement, either when the rollers are in operation or when standing.

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

Rolling with a trench roller will be required on widened areas, in trenches and other limited areas where satisfactory density cannot be obtained with the approved rollers.

340.11 Sampling and Testing

The HMA mixture shall be tested daily at the Project site for conformance to specification requirements. The Engineer or designated COA representative may request contractor to provide the daily quality control report. The Engineer or designated COA representative shall utilize a random selection method to determine sample locations based on the Contractor's anticipated production. Each day's anticipated production shall be divided into three (3) essentially equal single-pass, sub-area lots. Each day's sample locations shall be equally distributed over the three (3) sub-areas. If, due to the weather or plant malfunctions, the Contractor's daily-anticipated production is not attained, the random locations will not be recalculated. Also, no more than one location of the three (3) sub-areas shall be located in an irregular shaped area such as a cul-de-sac.

Unless directed otherwise by the Engineer or designated COA representative, a minimum of three bag samples and three correlating 6-inch cores will be obtained from each day's production.

Bag samples shall be taken during lay-down operations. The primary sampling point for the bag samples shall be from the windrow if a windrow elevator is used. If a windrow elevator is not used, the sample shall be taken from the middle of the paving machine hopper. This sampling location will require a stoppage in the paving operation in order for the Inspector to safely secure a sample from the hopper. One core shall be taken for every 2,000 single-pass square yards with a minimum of three (3) cores for all projects. One core shall be taken at the same station and pass sampled for each of the bag samples. Cores shall be taken by the City's laboratory within 48 hours of pavement laydown unless otherwise directed by the Engineer or designated representative.

For total areas of less than 500 square yards (420 square meters), a total of only two bag samples and two correlating cores will be obtained. If the Contractor desires additional testing, it shall be at its own entire expense.

The Engineer or designated COA representative may alter, increase or waive the testing schedule to ensure that the Work performed and the material used meet specification requirements. Acceptability of the completed pavement shall be based on the average of test results for the Project as defined in Section 340S.12, "Acceptance Plan" of this item.

Gradation (Tex-200-F), asphalt content (Tex-210-F) and indirect tensile strength (Tex-226-F) value of the HMA mixture shall be reported for each of the bag samples. The indirect tensile strength value reported for each of the bag samples shall be the average of four (4) tests per bag.

Pavement thickness and density shall be determined from 6-inch field cores. For each day's placement, density of cores for which no corresponding bag samples were taken shall be determined by using the average Maximum Theoretical Density of the day's three (3) bag samples or as may otherwise be determined by the Engineer or designated COA representative.

When, in the opinion of the Engineer or designated COA representative, test results appear unrepresentative, additional testing may be authorized. The retesting will be at the expense of the Contractor and the results of the retesting shall be averaged with the results of the original testing. If the results of retesting indicate that the original test results were erroneous, the original test results will be discarded. In the instance of erroneous original test results the subsequent first set of retests will be at the expense of the City of Austin.

Pavements with low-density results may be recorded; but the pavement shall not receive any additional compactive effort.

Pavements that will not or cannot be cored within 48 hours shall be closed to both public and construction traffic.

340.12 Acceptance Plan

For the purpose of the Acceptance Plan only, the "Paving Project" of each of the specified mixture types shall be defined by the Engineer or designated COA representative before the paving operation begins.

Considerations for defining the Paving Project shall include paving operations staged due to traffic considerations, pavement structural section (i.e. with varying layer thicknesses), time required for paving, changes to the Job Mix Formula, phasing of large projects, or other factors affecting the consistency in the production, lay-down/compaction, use of completed portions, and/or aging of in-place material.

Acceptability of the completed pavement structure for a Paving Project shall be based on all daily averages of three test results and when approved by the Engineer or designated COA representative the overall average of all test results for each of the mixture/layer types specified on the Drawings.

Pay adjustments for two or more acceptance factors shall be accumulative. Pay adjustments of 100% unit price reduction shall require removal and replacement of the Work. Replacement materials shall be subject to all requirements of this specification. Alternatively, the Engineer or designated COA representative may allow the Work to remain in place without payment provided that the Work is warranted for an extended period under conditions as determined by the Engineer or designated COA representative. The decision of the Engineer or designated COA representative related to the removal and replacement of the Work shall be the final authority.

A. Non-Pay-Adjustment Acceptance Factors:

1. Surface Characteristics: Unless otherwise directed by the Engineer or designated COA representative, all pavements shall be tested for smoothness. Surfaces shall be tested with a 10-foot (3.05 meter) straightedge parallel to the roadway centerline and perpendicular to the centerline on flat, cross-slope sections. Maximum allowable deviation in 10 feet shall be 1/8 inch (1-mm per meter) parallel to the centerline and 1/4 inch (2-mm per meter) perpendicular to the centerline. Sections exceeding these maximums shall be corrected to the satisfaction of the Engineer or designated COA representative. The completed surface must meet the approval of the Engineer or designated COA representative for surface smoothness, finish and appearance.

   If the surface ravels, ruts or deteriorates in any manner prior to the end of the warranty period, it will be the Contractor's responsibility to correct this condition at its own entire expense to the satisfaction

of the Engineer or designated COA representative in conformance with the requirements of this specification.

For HMAC rehabilitation and overlay projects, if cracks develop in the pavement surface within the one-year warranty period, the Contractor shall seal the cracks in accordance with Standard Specification Item No. 313S, "Cleaning and/or Sealing Joints and Cracks (Asphaltic Concrete)".

For new HMAC roadways constructed in accordance with the Drawings and specifications, if cracks less than 1/4 inch (6 mm) in width develop in the pavement surface within the one year warranty period the Contractor shall seal the cracks in accordance with Standard Specification Item No. 313S, "Cleaning and/or Sealing Joints and Cracks (Asphaltic Concrete)".

If cracks equal to or greater than 1/4 inch (6 mm) in width develop in the pavement surface within the one-year warranty period, the cracking shall be reviewed and evaluated by the Engineer or designated COA representative before corrective action is taken.

2. Laboratory Density: Laboratory density results as determined by TxDOT Test Method Tex-207-F shall be used as indicators of potential problems. Where laboratory density test results are less than 94.5% or more than 97.5% of mix design maximum density, additional tests shall be taken as directed by the Engineer or designated COA representative for further evaluation and monitoring of the paving mixture. This additional laboratory density testing will be at the expense of the Contractor. When, in the opinion of the Engineer or designated COA representative, the laboratory density is deemed unacceptable for the intended use of the pavement, the paving mixture shall be removed and replaced to the limits indicated by test results.

   The removal and replacement of the paving mixture shall be at the sole expense of the Contractor.

3. Limited Areas: Irrespective of an acceptable overall Paving Project average for any or all of the Pay-Adjustment Acceptance Factors, limited substandard portions of the Work, as determined by the Engineer or designated COA representative, shall be remedied or removed and replaced to the satisfaction of the Engineer or designated COA representative at the sole expense of the Contractor.

B. Pay-Adjustment Acceptance Factors: Contract unit prices shall be adjusted for paving mixtures that fail to meet acceptance criteria for gradation, asphalt content, density and mat thickness in accordance with the following:

Gradation Acceptance Schedule (TEX-200-F)

Sieve	Deviation From Job Mix Formula		Percent Contract Unit Price Reduction
	Daily Average	Overall Average	
Individual % retained for #8 sieve and larger	±6.5 6.6±	±5.0 5.1±	0 10
Individual % retained for sieves smaller than #8 and larger than #200	±3.9 4.0±	±3.0 3.1±	0 5

Asphalt Content Acceptance Schedule (TEX-210-F, Part II)

Deviation from the Job Mix Formula		Percent Contract Unit Price Reduction	
Daily Average	**Overall Average**	**Local Streets***	**All Others**
±0.5	±0.4	0	0
±0.51 to ±0.60	±0.41 to ±0.50	15	25
+0.61 to +0.70	+0.51 to +0.60	25**	100; Remove and Replace
-0.61 to -0.70	-0.51 to -0.60	100: Remove and Replace	100; Remove and Replace
Over ±0.70	Over ±0.60	100: Remove and Replace	100; Remove and Replace
*A local or residential street that serves as access to residence or other abutting property.			
**If the street has an ADT of 500, or less, with 1%, or less, of truck traffic, plus a 2 years warranty; otherwise, Remove and Replace			

Density Acceptance Schedule (TEX-207-F/TEX-227-F)

*Percent Density		Percent Contract Unit Price Reduction	
Daily Average	**Overall Average**	**1½" Thickness or Greater**	**Less than 1½" Thickness**
Above 96.5	Above 96	100; Remove and Replace	100; Remove and Replace
90.5 to 96.5	91 to 96	0	0
90.4 to 89.5	90.9 to 90	0.625 per 0.10% deficiency in density[1]	0.50 per 0.10% deficiency in density
Less than 89.5	Less than 90	100: Remove and Replace	100; Remove and Replace
*Core bulk density divided by max. theoretical density			

1- Example for Percentage reduction for density of 90.3==0.625*10*(90.5 -90.3) =1.3

Thickness Acceptance Schedule

Variance Percent of Thickness		Percent Contract Unit Price Reduction
Daily Average	**Overall Average**	
0—15.0	0—10	0
15.1—20.0	10.1—16	20
20.1—30.0	16.1—25	50
Over 30.0	Over 25	100; Remove and Replace or mill/overlay 1" (25 mm) minimum

The Density Acceptance Schedule for Irregularly Shaped Areas; Hike And Bike Trails And Utility Trenches (see following table) will apply to utility trenches of widths less than 4 feet and to irregular shaped areas and hike and bike trails in which an appropriate rolling pattern cannot be established making it difficult to achieve compaction.

Density Acceptance Schedule for Irregularly Shaped Areas; Hike and Bike Trails and Utility Trenches (TEX-207-F/TEX-227-F)

*Percent Density	Percent Contract Unit Price Reduction	
Daily Average	**1½" Thickness or Greater**	**Less than 1½" Thickness**
Above 96.5	100; Remove and Replace	100; Remove and Replace
96.5 to 89.0	0	0
89.0 to 86.1	0.625 per 0.10% deficiency in density	0.50 per 0.10% deficiency in density
Less than 86.1	100: Remove and Replace	100; Remove and Replace
*Core bulk density divided by maximum theoretical density		

The Density Acceptance Schedule will apply to utility trenches 4 feet or wider.

Core thicknesses greater than Drawing requirements shall be factored into the average thickness calculation as the Drawing required thickness. If total thickness of lift(s) proves to be less than required, the Contractor may remove and replace the overlay deficient areas as agreed to by the Engineer or designated COA representative. Overlays to correct thickness deficiencies shall be not less than one (1) inch thick. Overlays shall require milling of the asphalt in order to prevent a "featheredge" of the overlaying pavement.

The extent of the area to be overlaid or removed and replaced shall be determined by additional cores with thicknesses greater than or equal to the required thickness. All additional coring that is necessary to determine the area shall be paid for by the Contractor.

340.13 Measurement

Work performed and material placed shall be measured under one of the following methods. When Drawing quantity measurement is specified, adjustment of quantity may be made as follows. If the quantity measured as outlined vary from those shown on the Drawings by more than 5%, either party to the Contract may request in writing and adjustment of the quantity by each separate bid item. The party to the Contract which requests the adjustment shall present to the other party one copy of measurements and calculations showing the revised quantity in question. This revised quantity, when approved by the Engineer or designated COA representative, shall constitute the final quantity for which payment will be made. However, no adjustment will be made for any quantity, which exceeds the Drawing required thickness.

A. Method A: Asphaltic concrete pavement shall be measured by the ton (2,000 pounds) of the type actually used in completed and accepted Work in accordance with the Drawings and specifications.

   The measurement shall be made on approved truck scales that meet the requirements of the National Institute of Standards and Technology Handbooks 44 and 112 except that the required accuracy shall be 0.4 percent of the load being weighed. The Contractor shall furnish a report of calibration from a scale mechanic licensed by the Texas Department of Agriculture certifying that the scales meet this requirement.

B. Method B: Asphaltic concrete pavement shall be measured by the square yard of specified total thickness of the type of paving mixture actually used in completed and accepted Work in accordance with Drawings and specifications. Multiple lifts of the same type shall be considered as one for square yard measurement purposes.

C. Method C: Asphaltic concrete pavement shall be measured by the lineal foot of specified total thickness of the type of paving mixture actually used in completed and accepted Work in accordance with Drawings and specifications. Multiple lifts of the same type shall be considered as one for linear foot measurement purposes.

340.14 Payment

Work performed and materials furnished as prescribed by this item and measured as provided under "Measurement" will be paid for at the unit bid prices or pay adjusted unit price for Hot Mix Asphaltic Concrete Pavement, of the types and thicknesses specified. The unit bid prices shall include full compensation for furnishing all labor, equipment, time, materials and incidentals necessary to complete the Work.

Removal of existing hot mix asphalt concrete transition areas prior to overlay, tack coat, saw cutting and temporary pavement markings will not be measured or paid for directly but shall be included in the unit price bid for Standard Specification Item No. 340, "Asphaltic Concrete Pavement."

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

Pay Item No. 340-A:	Hot Mix Asphaltic Concrete Pavement, Type ___,	Per Ton
Pay Item No. 340-B:	Hot Mix Asphaltic Concrete Pavement, ___ inches, Type ___.	Per Square Yard.
Pay Item No. 340-C:	Hot Mix Asphaltic Concrete Pavement, ___ Inches, Type ___.	Per Lineal Foot.
Pay Item No. 340-PQ:	Hot Mix Asphaltic Concrete Pavement, ___ Inches, Type ___, Plan Quantity	Per Ton.
Pay Item No. 340-L:	Hot Mix Asphaltic Concrete Pavement, ___ in., Type ___, Level-up Course.	Lump Sum
Pay Item No. 340-M:	Crack Sealing Mobilization,	Lump Sum
Pay Item No. 340-S:	Crack Sealing,	per Lineal Foot

End

SPECIFIC CROSS REFERENCE MATERIALS	
Item 340, "Hot Mix Asphaltic Concrete Pavement"	
City of Austin Standard Specifications	
Designation	Description
Item No. 230S	Rolling (Flat Wheel)
Item No. 232S	Rolling (Pneumatic Tire)
Item No. 301S	Asphalts, Oils and Emulsions
Item No. 307S	Tack Coat
Item No. 313S	Cleaning and/or Sealing Joints and Cracks (Asphaltic Concrete)
Texas Department of Transportation: Manual of Testing Procedures	
Designation	Description
Tex-106E	Method of Calculating the Plasticity Index of Soils
Tex-107E	Determination of Bar Linear Shrinkage of Soils
Tex-200-F	Sieve Analysis of Fine and Coarse Aggregates
Tex-203-F	Sand Equivalent Test
Tex-204-F	Design of Bituminous Mixtures
Tex-207-F	Determination of Density of Compacted Bituminous Mixtures
Tex-208-F	Test for Stabilometer Value of Bituminous Mixtures
Tex-210-F	Determination of Asphalt Content of Bituminous Mixtures by Extraction
Tex-212-F, Part II	Determination of Moisture Content of Bituminous Mixtures (by oven drying)
Tex-217-F	Determination of Deleterious Material and Decantation Test For Coarse Aggregates
Tex-227-F	Theoretical Maximum Specific Gravity of Bituminous Mixtures

TEX-236-F	Determining Asphalt Content from Asphalt Paving Mixtures by the Ignition Method
Tex-410-A	Abrasion of Coarse Aggregate Using the Los Angeles Machine
Tex-460-A	Determination of Crushed Face Particle
Texas Department of Transportation: Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges	
Designation	Description
Item 341	Dense-Graded Hot-Mix Asphalt

RELATED CROSS REFERENCE MATERIALS	
Item 340, "Asphaltic Concrete Pavement"	
City of Austin Standard Specifications	
Designation	Description
Item No. 206S	Asphalt Stabilized Base
Item No. 210S	Flexible Base
Item No. 306S	Prime Coat
Item No. 310S	Emulsified Asphalt Treatment
Item No. 311S	Emulsified Asphalt Repaving
Item No. 320S	Two Course Surface Treatment
Texas Department of Transportation: Manual of Testing Procedures	
Designation	Description
Tex-224-F	Determination of Flakiness
Tex-400-A	Method of Sampling Stone, Gravel, Sand and Mineral Aggregates
Tex-411-A	Soundness of Aggregate by Use of Sodium Sulfate or magnesium Sulfate
Tex-438-A	Accelerated Polish Test for Aggregate