Subsection 4.17
Dense-Graded Hot-Mix Asphaltic Overlay

I. Scope: The contractor will construct a pavement layer composed of a compacted, dense-graded mixture of aggregate and asphalt binder mixed hot in a mixing plant.

II. Material: Materials for this subsection shall conform to Section 4.16.II "Materials."

III. Equipment: The Contractor will provide the required or necessary equipment in accordance with Subsection 4.25 "Equipment for Asphalt Concrete Pavement" and Subsection 4.26 "Weighing and Measuring Equipment."

IV. Construction: The Contractor shall design, produce, store, transport, place, and compact the specified paving mixture in accordance with the requirements of this Subsection. The Contractor will perform quality assurance (QA) testing at the scope and frequency outlined in the Quality Assurance section below. QA sampling and testing conducted by the Contractor will be reviewed by the ODR to determine payment and make acceptance decisions. The Contractor may perform quality control (QC) testing to additionally monitor production operations. Contractor is allowed to submit Q/C testing to ODR.

A. Quality Assurance: The Contractor shall provide QA test results immediately to the ODR via email or hard copy.

1. **Production Acceptance:** The Contractor shall control the production process within the operational tolerances listed in Table 1. When more than 3 sieves are outside production tolerances of Table 1, the mix will be removed and replaced. When asphalt content is outside operational tolerances the mix will be removed and replaced. Q/A testing will be performed at the frequency shown in Table 1.

2. **Placement Acceptance:** The City will establish an average density every 1,500 square yards of existing paving or a maximum of 10 nuclear density tests on each street. A street may be segmented for this determination if the total length is greater than 1 mile or as determined by the ODR. The locations and aveage density will be identified to the contractor prior to overlay placement. At a minimum, the City will perform nuclear density testing at the originally tested locations after the installation of the proposed overlay for QA purposes. The average density of the proposed material must achieve a density equal to or greater than the average density of the existing hot mix. In the event the new overlay average density is less than the existing average density, the area represented by the failing test must be removed and replaced. The area represented by a failing individual test is considered to be the area up to the adjacent passing test. Procedures and methods outlined in ASTM D2950 and this subsection shall be used for QA purposes.

Table 1

Quality Assurance

Production	Test Method	Tolerances	Testing Frequencies
Individual % retained for #8 sieve and larger	Tex-200-F or Tex-236-F	±5.0[1]	1 per 5000 SY or fraction thereof
Individual % retained for sieves smaller than #8 and larger than #200		±3.0[1]	1 per 5000 SY or fraction thereof
% passing the #200 sieve		±2.0[1]	1 per 5000 SY or fraction thereof
Asphalt content, %	Tex-236-F	±0.5[1]	1 per 5000 SY or fraction thereof

[1] Allowable differences from design and/or JMF target.

B. Production Operations: The contractor will perform a new trial batch when the plant or plant location is changed. The ODR may suspend production for noncompliance with this Item. The contractor will take corrective action and obtain approval to proceed after any production suspension for noncompliance.

1. **Storage and Heating of Materials:** Do not heat the asphalt binder above the temperatures specified in Subsection 4.23, "Asphalts, Oils, and Emulsions" or outside the manufacturer's recommended values. On a daily basis, provide the ODR with the records of asphalt binder and hot-mix asphalt discharge temperatures in accordance with Subsection 4.25, "Equipment for Asphalt Concrete Pavement". Unless otherwise approved, does not store mixture for a period long enough to affect the quality of the mixture.

2. **Mixing and Discharge of Materials:** Notify the ODR of the target discharge temperature and produce the mixture within 25°F of the target. The contractor will monitor the temperature of the material in the truck before shipping to ensure that it does not exceed 350°F. The City will not pay for or allow placement of any mixture produced at more than 350°F. Control the mixing time and temperature so that substantially all moisture is removed from the mixture before discharging from the plant.

C. Hauling Operations: Before use, clean all truck beds to ensure mixture is not contaminated. When a release agent is necessary to coat truck beds, use a release agent on the approved list maintained by the TxDOT Construction Division.

D. Placement Operations: Prepare the surface by removing raised pavement markers and objectionable material such as moisture, dirt, sand, leaves, and other loose impediments from the surface before placing mixture. Remove vegetation from pavement edges. Place the mixture to meet the typical section requirements and produce a smooth, finished surface with a uniform appearance and texture. Offset longitudinal joints of successive courses of hot mix by at least 6 inches. Place mixture so longitudinal joints on the surface course coincide with lane lines, or as directed. Ensure that all finished surfaces will drain properly.

1. **Weather Conditions:** Hot mix open season is shown in Subsection 4.23 "Asphalt, Oils and Emulsions."

The contractor may place mixture when the air temperature is above 40°F and rising and the roadway surface temperature is 60°F or higher unless otherwise approved. If the temperature is 50°F and falling, paving operations will cease. Measure the roadway surface temperature with a handheld infrared thermometer. Unless otherwise shown on the plans, place mixtures only when weather conditions and moisture conditions of the roadway surface are suitable in the opinion of the ODR, or Engineer.

2. **Tack Coat:** Clean the surface before placing the tack coat. Unless otherwise approved, apply tack coat uniformly at the rate directed by the ODR. The ODR will set the rate between 0.04 and 0.10 gallons of residual asphalt per square yard of surface area. Apply a thin, uniform tack coat to all pavement surfaces, contact surfaces of curbs, structures, and all joints. Prevent splattering of tack coat when placed adjacent to curb, gutter, and structures. The ODR may use Tex-243-F to verify that the tack coat has adequate adhesive properties. The ODR may suspend paving operations until there is adequate adhesion.

E. Lay-Down Operations

1. Placement requirements

a) At no time will a street be completely closed.

b) Only 2 streets can be milled at any given time including the one being overlaid.

c) Before paving begins on a street, the Contractor's Superintendent and the City Engineering Project Representative shall review the street for conflicts with access routes to and from emergency services, buildings and parking garages. The Contractor may be required to distribute information concerning closings of driveways and alternative access routes before beginning work on any one street.

d) The Contractor shall maintain access to all facilities during construction. Streets that serve restaurants may receive special scheduling to reduce traffic conflicts during high volume periods such as, but not limited to, lunch periods.

e) No work shall be allowed within school zones while school is in session.

2. **Minimum Mixture Placement Temperatures:** Use Table 2 for suggested minimum mixture placement temperatures.

3. **Windrow Operations:** When hot mix is placed in windrows, operate windrow pickup equipment so that substantially all the mixture deposited on the roadbed is picked up and loaded into the paver.

4. **Placement against Structures:** When placed adjacent to curb and gutter or other structures the surface shall be finished uniformly high so that when completed it will be ¼ inch above the curb and gutter or other concrete structures.

Table 2
Suggested Minimum Mixture Placement Temperature

High-Temperature Binder Grade	Minimum Placement Temperature (Before Entering Paver)
PG 64[1]or lower	260°F
PG 70	270°F
PG 76	280°F
PG 82 or higher	290°F

[1]If AC is used, it must meet the requirements of PG 64.

F. Compaction: The Contractor will set a rolling pattern to reach maximum compaction. Rolling pattern with be determined by qualified personnel for each new paving operation. Avoid displacement of the mixture. If displacement occurs, correct to the satisfaction of the ODR. Ensure pavement is fully compacted before allowing rollers to stand on the pavement. Unless otherwise directed, use only water or an approved release agent on rollers, tamps, and other compaction equipment. Keep diesel, gasoline, oil, grease, and other foreign matter off the mixture. Furnish the type, size, and number or rollers required for compaction. Use a pneumatic-tire roller to seal the surface, unless otherwise shown on the plans. Use additional rollers as required to remove any roller marks. Unless otherwise directed, operate vibratory rollers in static mode when not compacting, when changing directions. Allow the compacted pavement to cool to 160°F or lower before opening to traffic unless otherwise directed. When directed, sprinkle the finished mat with water or limewater to expedite opening the roadway to traffic.

Use tamps to thoroughly compact the edges of the pavement along curbs, headers, and similar structures and in locations that will not allow thorough compaction with the rollers. The ODR may require rolling with a trench roller on widened areas, and in other limited areas.

G. Irregularities: The contractor will immediately take corrective action if surface irregularities, including but not limited to segregation, rutting, raveling, flushing, fat spots, mat slippage, color, texture, roller marks, tears, gouges, streaks, or uncoated aggregate particles, are detected. The ODR may suspend production or placement operations until the problem is corrected.

At the expense of the Contractor and to the satisfaction of the ODR, remove and replace any mixture that does not bond to the existing pavement or that has other surface irregularities identified above.

H. Temporary Markings: The Contractor shall place removable temporary pavement markings that meet the requirements of TxDOT's DMS-8242 "Temporary Flexible, Reflective Roadway Marker Tabs" before opening roadway to traffic.

I. Crack Sealing: During the one year warranty period the cracks in the overlaid areas will be sealed. Crack sealing will be in accordance to Subsection 4.29 "Cleaning and Sealing Joints and Cracks."

V. Measurement: Hot mix will be measured by the square yard.

VI. Payment: Work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Dense-Graded Hot-Mix Asphalt" of the type, surface aggregate classification, and binder specified. These prices are full compensation for surface preparation, materials including temporary tabs, tack coat, placement, equipment, labor, tools, testing, crack sealing and incidentals. Trial batches will not be paid for unless they are incorporated into pavement work approved by the City.

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