ITEM 263

LIME TREATMENT (PLANT-MIXED)

263.1. Description. Construct a base course composed of a mixture of flexible base, hydrated lime, and water, mixed in an approved plant.

263.2. Materials. Furnish uncontaminated materials of uniform quality that meet the requirements of the plans and specifications. Notify the Engineer of proposed sources of materials and of changes to material sources. The Engineer will verify that the requirements of this Item are met before the sources can be used. The Engineer may sample and test project materials at any time before compaction. Use Tex-100-E for material definitions.

A. Lime. Furnish hydrated lime that meets the requirements of DMS-6350, "Lime and Lime Slurry," and DMS-6330, "Lime Sources Prequalification of Hydrated Lime and Quicklime."

B. Flexible Base. Furnish base material that meets the requirements of Item 247, "Flexible Base," for the type and grade shown on the plans, before the addition of lime.

C. Water. Furnish water free of industrial wastes and other objectionable material.

D. Asphalt. When permitted for curing purposes, furnish asphalt or emulsion that meets the requirements of Item 300, "Asphalts, Oils, and Emulsions," as shown on the plans or as directed.

E. Mix Design. Using the materials proposed for the project, the Engineer will determine the target lime content and optimum moisture content necessary to produce the required stabilized mixture. The mix will be designed in accordance with Tex-121-E. The Contractor may propose a mix design developed in accordance with Tex-121-E. The Engineer will use Tex-121-E to verify the Contractor's proposed mix design before acceptance. Reimburse the Department for subsequent mix designs or partial designs necessitated by changes in the material or requests by the Contractor. When treating existing materials, limit the amount of asphalt concrete pavement to no more than 50% of the mix unless otherwise shown on the plans or directed.

263.3. Equipment. Provide machinery, tools, and equipment necessary for proper execution of the work. Provide rollers in accordance with Item 210, "Rolling." Provide proof rollers in accordance with Item 216, "Proof Rolling," when required.

A. Storage Facility. Store hydrated lime in closed weatherproof containers.

B. Mixing Plant. Provide a stationary pugmill that uniformly mixes lime, water, and base material in the specified proportions. Obtain approval before providing weigh-batch or continuous mixers. Equip plants with automatic proportioning and metering devices.

C. Spreader Equipment. When shown on the plans, provide equipment that will spread the lime-treated mixture in a uniform layer in 1 pass. When shown on the plans, equip spreaders with electronic grade controls.

263.4. Construction. Construct each layer uniformly, free of loose or segregated areas, and with the required density and moisture content. Provide a smooth surface that conforms to the typical sections, lines, and grades shown on the plans or as directed. Complete placing, compacting, and finishing within 72 hr. after the lime is added to the base material.

Start lime operations only when the air temperature is at least 35°F and rising or is at least 40°F. The temperature will be taken in the shade and away from artificial heat. Suspend operations when the Engineer determines that weather conditions are unsuitable.

A. Mixing. Thoroughly mix materials in the proportions designated on the mix design, in a plant that meets the requirements of Section 263.3.B, "Mixing Plant." Mix at optimum moisture content, unless otherwise directed, until a homogeneous mixture is obtained.

B. Placing. Place lime-treated base on a subgrade or base prepared in accordance with details shown on the plans. Bring the prepared roadway to the moisture content directed. Haul lime-treated base to the

roadway in clean trucks and begin placement immediately. Spread and shape in a uniform layer with an approved spreader. Construct individual layers to the thickness shown on the plans, the same day as delivered, unless otherwise approved. Do not place lifts exceeding a compacted depth of 8 in. unless otherwise shown on the plans. Maintain the shape of the course by blading. Correct or replace segregated areas as directed, at no additional expense to the Department.

Construct vertical joints between segmented areas of lime-treated base. The vertical face may be created by using a header or by cutting back the face to approximately vertical. Place successive base courses using the same methods as the first course. Offset construction joints by at least 6 in.

C. Compaction. Immediately after placing, compact the mixture using density control, unless otherwise shown on the plans. Multiple lifts are permitted when shown on the plans or approved. Bring each layer to the moisture content directed. When necessary, sprinkle the treated material in accordance with Item 204, "Sprinkling." Determine the moisture content of the mixture at the beginning and during compaction in accordance with Tex-103-E.

Begin rolling longitudinally at the sides and proceed towards the center, overlapping on successive trips by at least 1/2 the width of the roller unit. On superelevated curves, begin rolling at the low side and progress toward the high side. Offset alternate trips of the roller. Operate rollers at a speed between 2 and 6 MPH, as directed.

Rework, recompact, and refinish material that fails to meet or that loses required moisture, density, stability, or finish before the next course is placed or the project is accepted. Continue work until specification requirements are met. Rework in accordance with Section 263.4.D, "Reworking a Section." Perform the work at no additional expense to the Department.

1. **Ordinary Compaction.** Roll with approved compaction equipment as directed. Correct irregularities, depressions, and weak spots immediately by scarifying the areas affected, adding or removing treated material as required, reshaping, and recompacting.
2. **Density Control.** Compact the bottom course to at least 95% of the maximum density determined in accordance with Tex-121-E, unless otherwise shown on the plans. Compact subsequent courses treated under this Item to at least 98% of the maximum density determined in accordance with Tex-121-E, unless otherwise shown on the plans.

   The Engineer will determine roadway density of completed sections in accordance with Tex-115-E. The Engineer may accept the section if no more than 1 of the 5 most recent density tests is below the specified density and the failing test is no more than 3 pcf below the specified density.

D. Reworking a Section. When a section is reworked within 72 hr. after completion of compaction, rework the section, without adding additional lime, to provide the required density. When a section is reworked more than 72 hr. after completion of compaction, add additional lime at the rate of 25% of the percentage determined in Section 263.2.E, "Mix Design." Reworking includes loosening, adding material or removing unacceptable material if necessary, road-mixing as directed, compacting, and finishing. When density control is specified, determine the new maximum density of the reworked material in accordance with Tex-121-E, and compact to at least 95% of this density. The Contractor has the option of removing the failing material and replacing it with acceptable lime-treated mix.

E. Finishing. Immediately after completing compaction of the final course, clip, skin, or tight-blade the surface of the lime-treated material with a maintainer to a depth of approximately 1/4 in. Remove loosened material and dispose of it at an approved location. Seal the clipped surface immediately by rolling with a pneumatic-tire roller until a smooth surface is attained. Add small increments of water as needed during rolling. Shape and maintain the course and surface in conformity with the typical sections, lines, and grades shown on the plans or as directed.

In areas where surfacing is to be placed, trim grade deviations greater than 1/4 in. in 16 ft. measured longitudinally or greater than 1/4 in. over the entire width of the cross-section. Remove excess material, reshape, and roll with a pneumatic-tire roller. If material is more than 1/4 in. low, correct as directed. Do not surface patch. The 72-hr. time limit required for completion of placement, compaction, and finishing does not apply to finishing required just before applying the surface course.

F. Curing. Cure for at least 7 days, unless otherwise approved, by sprinkling in accordance with Item 204, "Sprinkling," or by applying an asphalt material at a rate of 0.05 to 0.20 gal. per square yard as directed. Maintain moisture during curing. Continue curing until placing another course or opening to traffic. Open to traffic as directed. Do not allow equipment on the finished course during curing except as required for sprinkling, unless otherwise approved. Apply seals or additional courses within 14 days of final compaction.

263.5. Measurement. Lime-treated base will be measured by the cubic yard, square yard, or ton, as a composite mixture of lime, flexible base, and recycled materials.

Measurement by the cubic yard in final position and by the square yard is plans quantity measurement. The quantity to be paid for is the quantity shown in the proposal unless modified by Article 9.2, "Plans Quantity Measurement." Additional measurements or calculations will be made if adjustments of quantities are required.

Measurement is further defined for payment as follows:

A. Cubic Yard in Vehicles. Lime-treated base will be measured by the cubic yard in vehicles as delivered on the road.

B. Cubic Yard in Final Position. Lime-treated base will be measured by the cubic yard in its final position. The volume of each course will be computed in-place between the original subgrade surfaces and the lines, grades, and slopes of the accepted base course as shown on the plans and calculated by the method of average end areas.

C. Square Yard. Lime-treated base will be measured by the square yard of surface area. The dimensions for determining the surface area are established by the dimensions shown on the plans.

D. Ton. Lime-treated base will be measured by the ton (dry weight) in vehicles as delivered on the road. The dry weight is determined by deducting the weight of the moisture in the material at the time of weighing from the gross weight of the material. The Engineer will determine the moisture content in the material in accordance with Tex-103-E, from samples taken at the time of weighing.

When material is measured in trucks, the weight of the material will be determined on certified scales, or the Contractor must provide a set of standard platform truck scales at a location approved by the Engineer. Scales must conform to the requirements of Item 520, "Weighing and Measuring Equipment."

263.6. Payment. The 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 "Lime Treatment (Plant Mixed)," of the flexible base type, grade, and thickness (for square yard measurement) specified. For cubic yard measurement, "In Vehicle" or "Final Position" will be specified. This price is full compensation for furnishing and disposing of materials (including lime and base); storing, mixing, hauling, placing, sprinkling, compacting, finishing, curing, and maintaining and reworking of treated base; and equipment, labor, tools, and incidentals.

Sprinkling and rolling, except proof rolling, will not be paid for directly but will be subsidiary to this Item, unless otherwise shown on the plans. When proof rolling is shown on the plans or directed by the Engineer, it will be paid for in accordance with Item 216, "Proof Rolling."

Where subgrade or base courses are constructed under this Contract, correction of soft spots will be at the Contractor's expense. Where subgrade or base is not constructed under this Contract, correction of soft spots will be in accordance with pertinent Items or Article 4.2, "Changes in the Work."

Asphalt used solely for curing will not be paid for directly, but will be subsidiary to this Item. Asphalt placed for curing and priming will be paid for under Item 310, "Prime Coat."

Removal and disposal of existing asphalt concrete pavement will be paid for in accordance with pertinent Items or Article 4.2, "Changes in the Work."

A. Thickness Measurement for Cubic Yard In Final Position and Square Yard Payment Adjustment. Before final acceptance, the Engineer will select the locations of tests within each unit and measure the treated base depths in accordance with Tex-140-E.

1. Units for Payment Adjustment.

a. **Roadways and Shoulders.** Units for applying a payment adjustment for thickness to roadways and shoulders are defined as 1,000 linear feet of treated base in each placement width. The last unit in each placement width will be 1,000 ft. plus the fractional part of 1,000 ft. remaining. Placement width is the width between longitudinal construction joints. For widening, the placement width is the average width placed of the widened section that is deficient in thickness.

b. **Ramps and Other Areas.** Units are defined as 2,000 sq. yd. or fraction thereof for establishing an adjusted unit price for ramps, intersections, irregular sections, crossovers, entrances, partially completed units, transitions to ramps, and other areas designated by the Engineer.

2. **Price Adjustments of Deficient Areas.**

a. **Thickness Deficiency ≤ 1.0 in.** Table 1 will govern the price adjustment for each unit with deficient areas ≤ 1.0 in.

Table 1
Measurements and Price Adjustment for Each Unit

Thickness Deficiency	Minimum Number of Additional Measurements	Average Thickness Deficiency of 3 Measurements	Price Adjustment
≤ 0.5 in.	None	N/A	Full Payment
> 0.5 in.	2	≤ 0.5 in.	Full Payment
		> 0.5 in. and ≤ 0.8 in.	75% Payment
		> 0.8 in. and ≤ 1.0 in.	50% Payment
		> 1.0 in.	In accordance with Section 263.6.A.2.b.

b. **Thickness Deficiency > 1.0 in.** Remove and replace areas of treated base found deficient in thickness by more than 1.0 in., unless otherwise approved. Take exploratory measurements at 50-ft. intervals parallel to the centerline in each direction from the deficient measurement until a measurement is not deficient by more than 1.0 in. If, in the judgment of the Engineer, the area of deficient thickness should not be reworked, there will be no payment for the area left in place. The minimum limit of non-pay will be 100 ft.

B. **Excess Thickness and Width.** For cubic yard in final position and square yard measurement, no additional payment will be made for thickness or width exceeding that shown on the plans.