

Special Specification 4139

Lean Concrete Base (LCB)



1. DESCRIPTION

Construct a base course of lean concrete base (LCB).

2. MATERIALS

- 2.1. **Lean Concrete Base (LCB).** Provide LCB with a maximum w/c ratio of 0.60 and a minimum 28-day compressive strength of 1000 psi. Determine the strength by testing the LCB in accordance with Tex-418-A.
- 2.2. **Cement.** Furnish cement conforming to DMS-4600, "Hydraulic Cement."
- 2.3. **Supplementary Cementing Materials (SCM).**
- **Fly Ash.** Furnish fly ash conforming to DMS-4610, "Fly Ash."
 - **Slag Cement.** Furnish Slag Cement conforming to DMS-4620, "Slag Cement."
- 2.4. **Chemical Admixtures.** Furnish admixtures conforming to DMS-4640, "Chemical Admixtures for Concrete."
- 2.5. **Water.** Furnish water in accordance to Item 421.2.5, "Water."
- 2.6. **Aggregates.** Provide aggregates in accordance with Item 421.2.6, "Aggregates," unless otherwise stated in this specification.
- 2.6.1. **Coarse Aggregate.** Provide coarse aggregate or combination of aggregates conforming to the gradation requirements of either Grade 2 or Grade 3 as shown in Table 1 when tested in accordance with Tex-401-A unless otherwise specified.

Table 1
Coarse Aggregate Gradation Chart

Aggregate Grade No.	Maximum nominal Size	Percent Passing on Each Sieve								
		2-1/2"	2"	1-1/2"	1"	3/4"	1/2"	3/8"	#4	#8
2	1-1/2"		100	95-100		35-70		10-30	0-10	
3	1-1/2"		100	95-100		60-90	25-60			0-10

- 2.7. **Storage of Materials.** Store materials in accordance to Item 421.2.8, "Storage of Materials."

3. EQUIPMENT

Furnish equipment necessary for mixing, delivering, placing, consolidating, curing and testing LCB. Maintain all equipment in good working condition. Use mixing, measuring, and delivery equipment conforming to Item 421, Hydraulic Cement Concrete."

4. CONSTRUCTION

Provide an even surface that conforms to the typical sections, lines, and grades shown on the plans or as directed.

- 4.1. **Mix Design and Trial Batches.** Prior to placement of LCB, furnish mix design proportions and trial batch data in accordance to Item 421.4.3, "Concrete Trial Batches."

- 4.2. **Delivery.** Clean delivery equipment as necessary to prevent accumulation of old material before loading fresh LCB. Use agitated delivery equipment for LCB designed to have a slump of more than 5 in. Segregated LCB is subject to rejection.

Begin the discharge of LCB delivered in agitated delivery equipment conforming to the requirements of Section 421.3.1.3, "Agitators and Truck and Stationary Mixers." Place non-agitated LCB within 45 min. after batching. Reduce times as directed when hot weather or other conditions cause quick setting of the LCB.

- 4.3. **Placing.** Place LCB on a subgrade or base prepared in accordance with details shown on the plans. Construct individual layers to the thickness shown on the plans, unless otherwise approved. Do not place lifts exceeding a consolidated depth of 6 in. unless otherwise shown on the plans.

- 4.4. **Consolidation.** Use immersion-type vibrators that to consolidate the LCB placement. Use hand-operated vibrators to consolidate LCB along forms and in areas not accessible when machine-mounted vibrators are used. When using machine mounted vibrators, do not operate machine-mounted vibrators while the equipment is stationary.

- 4.5. **Temperature Restrictions.** Place LCB that is between 40°F and 95°F when measured in accordance with Tex-422-A at the time of discharge, except that concrete may be used if it was already in transit when the temperature was found to exceed the allowable maximum. Take immediate corrective action or cease LCB production when the LCB temperature exceeds 95°F.

Do not place LCB when the ambient temperature in the shade is below 40°F and falling unless approved. LCB may be placed when the ambient temperature in the shade is above 35°F and rising or above 40°F. Protect the LCB with an approved insulating material capable of protecting the LCB for the specified curing period when temperatures warrant protection against freezing. Submit for approval proposed measures to protect the LCB from anticipated freezing weather for the first 72 hr. after placement. Repair or replace all LCB damaged by freezing.

- 4.6. **Finishing.** Provide an even surface within $\pm \frac{1}{4}$ in of the design profile grade. Texturing is not required.

- 4.7. **Curing.** Keep the LCB surface from drying until the curing material has been applied. Maintain curing until LCB achieves minimum compressive strength. Curing begins when the concrete curing system has been applied. Stop concrete placement if curing compound is not being applied promptly and maintained adequately. Other methods of curing in accordance with Item 422, "Concrete Superstructures," may be used when specified or approved.

- 4.7.1. **Membrane Curing.** Spray the concrete surface uniformly with 2 coats of membrane curing compound at an individual application rate of no more than 180 sq. ft. per gallon. Apply the curing compound before allowing the concrete surface to dry.

Manage finishing operations to ensure placement of curing compound on a moist concrete surface, relatively free of bleed water, to prevent any plastic shrinkage cracking. Time the application of curing compound to prevent plastic shrinkage cracking.

Maintain curing compounds in a uniformly agitated condition, free of settlement before and during application. Do not thin or dilute the curing compound.

Apply additional compound at the same rate of coverage to correct damage where the coating shows discontinuities or other defects or if rain falls on the newly coated surface before the film has dried enough to resist damage.

- 4.7.2. **Asphalt Curing.** Apply a uniform coating of asphalt curing at a rate of 90 to 180 sq. ft. per gallon when an asphaltic concrete layer is required. Apply curing once the free moisture (sheen) had disappeared. Obtain approval to add water to the emulsion to improve spray distribution. Maintain the asphalt application rate when using diluted emulsions. Maintain the emulsion in a mixed condition during application.

- 4.8. **Opening to Construction Equipment.** Unless otherwise shown on the plans, LCB may be opened to paving equipment and related delivery equipment after the LCB has achieved minimum compressive strength of 500 psi. Keep delivery equipment at least 2 ft. from the edge of the LCB. Keep tracks of the paving equipment at least 1 ft. from the LCB edge.
- 4.8.1. **Strength Testing.** The Engineer will sample LCB and mold test specimens for compressive strength testing at least once day. Compressive strength testing will be in accordance with Tex-418-A.
- 4.9. **Thickness.** The Engineer will check the LCB thickness in accordance with Tex-423-A unless other methods are shown on the plans. The Engineer will perform 1 thickness test consisting of 1 reading at approximately the center of the placement every 500 ft. or fraction thereof. Core where directed, in accordance with Tex-424-A, to verify deficiencies of more than 0.5 in. from plan thickness and to determine the limits of deficiencies of more than 1.0 in. from plan thickness. Fill core holes using an approved concrete mixture and method.
- 4.9.1. **Thickness Deficiencies > 0.5 in.** Take one 4-in. diameter cores within 50 ft. of the deficient measurement to verify the thickness when any depth test measured in accordance with Tex-423-A is deficient by more than 0.5 in. from the plan thickness.
- Take 2 additional cores from the unit, as defined in Section 4139.4.9.3, "LCB units for Payment Adjustment," at intervals of at least 150 ft. and at selected locations if the core is deficient by more than 0.5 in., but not by more than 1.0 in. from the plan thickness, and determine the thickness of the unit for payment purposes by averaging the length of the 3 cores. In calculations of the average thickness of this unit of LCB, measurements in excess of the specified thickness by more than 0.5 in. will be considered as specified thickness plus 0.5 in.
- 4.9.2. **Thickness Deficiencies > 1.0 in.** Take additional cores at 50-ft. intervals in each direction parallel to the centerline to determine the boundary of the deficient area if a core is deficient by more than 1.0 in. Remove and replace areas of LCB found deficient in thickness by more than 1.0 in. without additional compensation, unless otherwise approved.
- 4.9.3. **LCB Units for Payment Adjustment.** Limits for applying a payment adjustment for deficient LCB thickness from 0.5 in. to not more than 1.0 in. are 1,000 ft. or fraction thereof.

The minimum limit of non-pay for deficient LCB thickness greater than 1.0 in. will be 100 ft.

5. MEASUREMENT

LCB will be measured by the cubic yard in final position.

6. PAYMENT

The work performed and the materials furnished in accordance with this Item and measured as specified under "Measurement" will be paid for at the adjusted unit price bid for "Lean Concrete Base" for the depth specified as adjusted in accordance with Section 4139.6.1., "Deficient Thickness Adjustment." This price is full compensation for removal, stockpiling and disposal of waste material and for equipment, materials, labor, tools, and incidentals.

Asphalt used solely for curing will not be paid for directly but will be subsidiary to this Item.

6.1. Deficient Thickness Adjustment.

- 6.1.1. **Thickness Deficiency \leq 1.0 in.** Table 2 will govern the price adjustment for each unit with deficient areas \leq 1.0 in.

Table 2
Measurements and Price Adjustment for Each Unit

Tex-423-A Thickness Deficiency	Cores Taken	Average Thickness Deficiency of 3 Cores		Price Adjustment
≤ 0.5 in.	None	N/A		Full Payment
> 0.5 in.	3	≤ 0.5 in.		Full Payment
		> 0.5 in.	≤ 0.8 in.	75% Payment
		> 0.8 in.	≤ 1.0 in.	50% Payment

- 6.2. **Excess Thickness.** For cubic yard in final position measurement, no additional payment will be made for thickness exceeding that shown on the plans or as directed by the Engineer.