

**200-4 LEAN CONCRETE BASE.**

**200-4.1 General.** Lean concrete base shall consist of a mixture of:

- a) Portland cement,
- b) Aggregate,
- c) Water and,
- d) At the option of the Contractor, water reducing and/or air-entraining admixtures.

The proportions of portland cement, water and other materials shall be determined by the Contractor so as to meet the specification herein.

The Contractor shall submit a mix design with laboratory results in conformance with 2-5.3.4. The mix design shall show the amount, and type of portland cement, and the amount of water, the gradation of aggregate, and the type and manufacturer of any admixtures it proposes to use. The amount of portland cement shall not to exceed 300 pounds per cubic yard (178 kilograms per cubic meter). The compressive strength when tested in conformance with California Test 548 shall be not less than 700 psi (4826 kPa) at 7 days.

**200-4.2 Materials.**

**200-4.2.1 Portland Cement.** Portland cement shall be Type II/V conforming to 201-1.2.1, added at a rate of 270 lbs/yd<sup>3</sup> (160 kg/m<sup>3</sup>) or be as specified in the Special Provisions. Supplementary cementitious material shall not be substituted for portland cement.

**200-4.2.2 Aggregate.** Aggregate shall conform to 200-2 or be as specified in the Special Provisions. The Contractor shall notify the Engineer, of the source and grading of the aggregate to be used in the lean concrete base in conformance with 2-5.3. Should the Contractor change the source of supply, the Contractor shall notify the Engineer, in writing, of the new source and grading. The Contractor shall make the material available for sampling and testing at least 45 days prior to intended use.

At the option of the Contractor, the grading for the 1-1/2 inch (38 mm) maximum or the 1 inch (25 mm) maximum shall be used, except that once a grading is selected, the grading shall not be changed without the Engineer's written approval.

**200-4.2.2.1 Gradation.** The composition by weight of aggregate for the grading selected shall conform to Table 200-4.2.2.1(A). The percentage composition shall be determined by California Test 202, modified by California Test 105 when there is a difference in specific gravity of 0.2 or more between the coarse and fine portion of the aggregate or between blends of different aggregates.

**TABLE 200-4.2.2.1(A)**

Sieve Sizes	Percentage Passing <sup>1</sup>			
	1½" (37.5 mm) Maximum		1" (25.0mm) Maximum	
	Moving Average <sup>2</sup>	Individual Test Results	Moving Average <sup>2</sup>	Individual Test Results
2" (50.0 mm)	100	100	---	---
1½" (37.5 mm)	90 - 100	87 - 100	100	100
1" (25.0 mm)	—	—	90 – 100	87 – 100
¾" (19.0 mm)	50 - 85	45 – 90	50 – 100	45 – 100
⅜" (9.5 mm)	40 - 75	35 – 80	40 – 75	35 – 80
No. 4 (4.75 mm)	25 - 60	20 – 65	35 – 60	30 – 65
No. 30	10 - 30	6 – 34	10 – 30	6 – 34
No. 200	0 - 12	0 – 15	0 – 12	0 – 15

1. Coarse aggregate is material retained on the No. 4 (4.75 mm) sieve and fine aggregate is material passing the No. 4 (4.75 mm) sieve.
2. Statistical testing shall conform to 400-1.1.3 as modified in 301-4.6.2.

**200-4.2.2.2 Sand Equivalent.** Aggregate for lean concrete base shall not be treated with lime, portland cement or other chemicals before being tested for Sand Equivalent value. Aggregate shall have a Sand Equivalent value of not less than that shown in Table 200-4.2.2.2(A).

**TABLE 200-4.2.2.2(A)**

Moving Average <sup>1</sup>	30
Individual Test Results	27

1. Statistical testing shall conform to 400-1.1.3 as modified in 301-4.6.2.

**200-4.2.3 Water.** Water shall conform to 201-1.2.3.

**200-4.2.4 Chemical Admixtures.** Chemical admixtures for reducing water shall be Type A or Type F conforming to 201-1.2.4

The air content of lean concrete base shall not exceed 4 percent. An admixture to reduce air entrainment shall be used when the aggregate for the lean concrete base is produced from reclaimed material containing asphalt or other material which would cause the air content in the lean concrete base to exceed 4 percent. Air-entraining admixtures shall conform to 201-1.2.4.

**200-4.3 Proportioning, Mixing and Transporting.** Proportioning for lean concrete base shall conform to the provisions for proportioning concrete pavement in 201-1.3.1, except that the dividing of aggregate into sizes will not be required.

Mixing and transporting lean concrete base shall conform to the provisions for mixing and transporting concrete in 201-1.4 and 201-1.5. the slump for lean concrete base shall not exceed 3 inches (75mm).

**301-4 Lean Concrete Base.**

**301-4.1 General.** This subsection specifies the methods used to place lean concrete base that conforms to 200-4.

**301-4.2 Subgrade.** Immediately prior to placing the lean concrete base, the subgrade shall conform to 301-1. The subgrade shall be free of loose or extraneous material, and shall be uniformly moist.

Areas of the subgrade that are lower than the grade established on the Plans shall be filled with lean concrete base. The amount of lean concrete base so placed will not be included in the payment.

**301-4.3 Placement.** Placing of lean concrete base shall conform to the provisions for placing concrete pavement in Section 302-6.3.

Unless otherwise required by the Plans or the Special Provisions, lean concrete base shall be placed in not less than 12 foot (4m) widths separated by construction joints. Lean concrete base placed monolithically in widths greater than 26 feet (8m) shall be placed with a longitudinal weakened plane joint offset not more than 3 feet (1m) from the centerline of the width being constructed.

Longitudinal weakened plane joints in lean concrete base shall conform to 302-6.5.4.

When portland cement concrete pavement is to be placed over lean concrete base, longitudinal construction joints and longitudinal weakened plane joints in the lean concrete base shall not be within 1 foot (300mm) of planned longitudinal weakened plane joints nor longitudinal construction joints in the concrete pavement.

Lean concrete base shall not be mixed nor placed while the atmospheric temperature is below 35° F (2° C), and shall not be placed on frozen ground.

**301-4.4 Spreading, Compacting and Shaping.** This work shall consist of placing lean concrete base to the lines, grades, and dimensions shown on the Plans and as specified in the Special Provisions.

Lean concrete base shall be spread, compacted and shaped in conformance with Section 301-3.3.

In advance of curing operations, lean concrete base to be surfaced with asphalt concrete shall be textured with a drag strip of burlap, a broom or a spring steel tine device which will produce scoring in the finished surface. The scoring shall be parallel with the centerline or transverse thereto. The operation shall be performed at a time and in a manner to produce the coarsest texture practical for the method used.

Lean concrete base to be surfaced with portland cement concrete pavement shall not be textured and shall be finished to a smooth surface, free of mortar ridges and other projections, before curing compound is applied.

The finished surface of lean concrete base shall be free from porous areas. It shall not vary at any point more than 5/8 inch (16mm) above or below the grade shown on the Plans.

**301-4.5 Curing.** Lean concrete base shall be cured with pigmented curing compound in conformance with 201-4. Curing compound shall be applied in 2 separate applications to the area to be surfaced with portland cement concrete pavement. Each application of curing compound shall be applied at the approximate rate of 1 gal per 150 ft<sup>2</sup> (1 L per 3.68 m<sup>2</sup>).

Curing compound shall be applied to the surface of the lean concrete base before the atmospheric temperature falls below 40° F (4° C).

Any portion of lean concrete base to be covered with portland cement concrete pavement that is not covered with pavement by the fourth day after the curing compound is applied, shall be given a subsequent application (or applications, if necessary) of curing compound so that curing compound application occurs no more than 4 days in advance of placing the overlying concrete pavement. The surface of the lean concrete base shall be cleaned of all foreign material and then the curing compound applied at a rate of approximately 1 gal per 200 ft<sup>2</sup> (1 L per 4.91 m<sup>2</sup>) per subsequent application.

Damage to the curing compound or the lean concrete base shall be promptly repaired by the Contractor at the Contractor's expense, as directed by the Engineer.

**301-4.6 Acceptance.**

**301-4.6.1 General.** Lean concrete base will be tested for acceptance in conformance with 201-1.1.5.

**301-4.6.2 Aggregate.** Aggregate will be tested in conformance with 200-4.2.2 and as specified herein. If the results of the tests for either or both the aggregate grading and Sand Equivalent tests do not meet the requirements specified for the "Moving Average" but meet the "Individual Test" specifications, placement of the lean concrete base may be continued for the remainder of that day. However, another day's work may not be started until tests, indicate to the satisfaction of the Engineer that the next material to be used in the Work will comply with the requirements specified for "Moving Average."

If the results of either or both the aggregate grading and Sand Equivalent tests do not meet the requirements specified for "Individual Test Results," the lean concrete base which is represented by these tests shall be removed. However, if requested by the Contractor and approved by the Engineer, the lean concrete base may remain in place, and the Contractor shall pay to the Agency \$2.50/yd<sup>3</sup> (\$3.30/m<sup>3</sup>) for the lean concrete base represented by these tests and left in place. The Agency may deduct this amount from any moneys due, or that may become due, the Contractor under the contract. If both the aggregate grading and Sand Equivalent value do not conform to the Individual Test Results, only one adjustment shall apply.

No single aggregate grading or Sand Equivalent test shall represent more than 500 yd<sup>3</sup> (400 m<sup>3</sup>) or one day's production, whichever is smaller.

**301-4.6.3 Surfaces Not Within Tolerance.** Hardened lean concrete base with a surface lower than 5/8 inch (16mm) below the grade shown on the Plans shall be removed and replaced with lean concrete base, or if permitted by the Engineer, the low areas shall be filled with paving material as follows:

1. When the paving material is portland cement concrete, the low areas shall be filled with portland cement concrete at the time and in the same operation that the pavement is placed.
2. When paving material is asphalt concrete, the low areas shall be filled with asphalt concrete conforming to the requirements for the lowest layer of asphalt concrete to be placed as pavement and in the same operation that asphalt pavement is placed.

Hardened lean concrete base with a surface higher than 5/8 inch (16mm) above the grade shown on the Plans shall be removed and replaced with lean concrete, or if permitted by the

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Engineer, high areas may be ground until the surface of lean concrete base conforms to the tolerances specified in the Special Provisions. Grinding shall be performed with diamond blade or with carborundum blade grinding equipment. The ground area of lean concrete base that is to be covered with portland cement concrete pavement shall be cleaned of all foreign material and grinding residue as soon as any free water has left the surface and curing compound conforming to 301-4.5 shall be applied at the rate of approximately 1 gal per 150 feet<sup>2</sup> (1L/4 m<sup>2</sup>).

Full compensation for bringing the surface of the lean concrete base within tolerance will be considered as included in the contract price paid per cubic yard for lean concrete base and no additional compensation will be allowed therefore.

**301-4.7 Measurement.** The quantity of lean concrete base will be measured by the cubic yard (cubic meter). The volume will be calculated on the basis of the dimensions shown on the Plans adjusted by the amount of any change ordered by the Engineer. No allowance will be made for lean concrete base placed outside those dimensions unless otherwise ordered by the Engineer.

**301-4.8 Payment.** The contract price paid shall be for cubic yard (cubic meter) of lean concrete base. No additional adjustment of compensation will be made for variations in the cost of any work resulting from a change in the quantity of portland cement.