OKLAHOMA DEPARTMENT OF TRANSPORTATION
SPECIAL PROVISION
FOR
CEMENT TREATED BASE

These Special Provisions revise, amend, and where in conflict, supersede applicable sections of the 2009 Standard Specifications for Highway Construction, English and Metric.

(Replace with the following:)

317.01 DESCRIPTION

This work consists of constructing a cement treated base (CTB) using a soil, aggregate, and cement mixture.

317.02 MATERIALS

Provide material in accordance with the following subsections:

Material:	Subsection:
Portland Cement	701.02
Water	701.04
Fly Ash	702.01
Curing Agents	701.07.C
Aggregates	703.02

Provide aggregates that conform to the requirements of Subsection 703.02, except ensure that the aggregate has an Aggregate Durability Index of at least 30, tested in accordance with AASHTO T 210.

Provide a separator fabric in accordance with Section 712.05, "Geotextiles for Bases," except ensure the fabric meets the requirements of AASHTO M288, Class 1 and weighs at least 15 oz/yd² [500 g/m²].

317.03 EQUIPMENT

Use equipment for producing and placing the CTB in accordance with Subsection 301.03, "Equipment," except only use stationary plants and equipment that combines placement and initial compaction.

317.04 CONSTRUCTION METHODS

A. Mix Design and Proportioning

Design CTB mixtures in accordance with OHD L-53. Ensure Portland cement is at least 75% of the total cementitious materials in the mix. Submit a CTB mix design to the Engineer at least seven (7) days prior to the beginning of paving.

At a minimum, include the following information with each CTB mix design:

- Project identification
- Name and address of the Contractor and producer
- A unique mix design name
- Aggregate sources
- Gradations for each aggregate source. Sieve sizes shall include the 1 ½ in [37.5 mm], 1 in [25 mm], ½ in [12.5 mm], No. 4 [4.75 mm], No. 40 [150 µm], and the No. 200 [75 µm]
- Hydraulic cement type and source
- Types of cement replacement, if used, and sources
- Types of admixtures and sources, if used
- Material proportions
- Combined gradation charts
- Unit weight
- Compressive strength at 7 days

B. Mixing

Handle and measure materials, batching, and mixing in accordance with Subsection 414.04.C, "Mixing Concrete," except only use a central mix plant which has been approved by the Engineer.

C. Placement

Before spreading the CTB, moisten the surface of the compacted subgrade unless the subgrade has been primed. Finish and compact the CTB to produce a smooth, dense surface that is free of surface compaction planes, cracks, ridges, or loose material.

Compact the CTB within two (2) hours of adding water to the aggregate and cement. Follow the recommendations of the mix design. Compact the CTB to at least 95% of the maximum density and test in accordance with OHD L-54. Place the CTB in a single layer. Ensure the compacted thickness is in accordance with the dimensions shown on the plans and in compliance with Subsection 301.04.A, "Tolerances." After strike off and consolidation, finish the CTB to meet the required elevation and cross section, and to create a smooth surface. Use equipment that automatically controls both grade and line to trim the surface of the CTB.

Keep the CTB surface moist during finishing operations, and until the application of the curing agent. Apply a curing agent on the finished CTB surface at the rate of at least 1 gal per 150 ft^2 [2 L per 7 m^2].

Use butt or sawed longitudinal construction joints; those between the driving lanes shall match the longitudinal joint of overlying pavement. Place other longitudinal joints within 3 ft [1 m] of the longitudinal joint of the overlying pavement and construct transverse joints as butt joints. Before placing the separator fabric, sweep the CTB surface. Place and secure the separator fabric onto the surface of the CTB in such a manner that the fabric remains free of wrinkles and cracks. Secure the separator fabric with asphalt binder, mechanical fasteners, or other method approved by the Engineer. Overlap the fabric 8 in [20 cm] both longitudinally and transversely.

Limit construction traffic on the CTB to that necessary to apply the separator fabric and overlying pavement. Do not use the CTB layer as a haul road. Allow only concrete delivery trucks necessary to deposit fresh concrete directly in front of the paver. Place overlying pavement on the base after compressive strengths reach at least 600 psi [4,150 kPa] in accordance with OHD L-54. Repair damage to the CTB at no additional cost to the Department.

D. Weather Limitations

Do not mix CTB if the aggregate or subgrade is frozen. Mix and place CTB when the ambient air temperature is at least 40 °F [5 °C] and rising. Protect CTB from freezing for seven (7) days after placement.

E. Tolerances

Finish the CTB in accordance with Subsection 301.04.A, "Tolerances."

F. Acceptance

The Engineer will base pay adjustments for strength on a lot by lot basis. A lot will normally be defined as 10,000 yd² [10,000 m^2] (four sublots of 2,500 yd² [2,500 m^2] each).

The Contractor will be responsible for making test cylinders and determining compressive strength of the CTB in accordance with OHD L-54. At least one cylinder will be made for testing from a random location in each sublot in accordance with OHD L-54. Strength of plant mix CTB shall be between 600 psi [4,150 kPa] and 2,000 psi [13,800 kPa].

The Engineer is responsible for performing compaction tests during placement of the CTB using a nuclear density gauge in accordance with OHD L-54. At least one (1) test will be performed from a random location in each sublot in accordance with OHD L-54.

The Engineer will reject any load of mixture that is visually unacceptable for reasons of being too wet, excessively segregated, or otherwise obviously deficient.

Replace rejected CTB at no additional cost to the Department. When replacing rejected CTB, remove a width of at least one lane and a length of at least 15 ft [4.5 m]. If the removal is within 15 ft [4.5 m] of any transverse joint, remove to the joint.

317.05 METHOD OF MEASUREMENT

The Engineer will measure the surface area of the completed *Cement Treated Base* placed at the thickness shown on the Plans.

317.06 BASIS OF PAYMENT

The Department will pay for each pay item at the contract unit price per the specified pay unit as follows:

Pay Item:	**Pay Unit:**
CEMENT TREATED BASE	Square Yard [Square Meter]

The Department will consider the cost of separator fabric and method of fastening to be included in the contract unit price for *Cement Treated Base*.

The Department will utilize Table 317:1 to calculate the strength pay factor for CTB extents with strengths less than or greater than the specified requirements:

Table 317:1
Acceptance Pay Factors

Strength	**Pay Factor**
< 600 psi	Remove & Replace
600 psi - 2,000 psi	1.00
2,000 psi - 4,000 psi	$1.00 - ((\text{Actual Strength} - 2{,}000) \div 2{,}000)^2$
> 4,000 psi	Remove & Replace

Multiply the contract price by the Strength Pay Factor for the represented CTB extent. Check any outlying concrete cylinder breaks in accordance with ASTM E 178 Table 1, "Upper 10% Significance Level."