

## SECTION 308 - PORTLAND CEMENT TREATED BASE

**308.01 Description.** This work includes furnishing and placing one (1) or more courses of mixture of aggregate and portland cement on a prepared surface according to the contract. \*

**308.02 Materials.** Materials shall conform to the following:

Portland Cement	701.01
Liquid Asphalt (MC-30)	702.03
Aggregate (3/4 inch or 1-1/2 inch)	703.06
Water	712.01

**308.03 Construction Requirements.**

**(A) Mixing and Spreading.** The Contractor shall mix the cement treated base (CTB) in a central plant. \*

The prepared surface that is to receive the CTB shall support equipment required to construct the base. The Contractor shall correct the soft or yielding areas before mixing. \*

The quantity of portland cement that the Contractor uses shall be five (5) percent of the dry weight of aggregate. \*

The Engineer may determine the cement content by weight, by the cement titration test specified in Subsection 106.09 - Special Test Methods or by other methods. In using other methods, the mixture shall not have a variation above or below the designated cement content of more than 0.6 of a percentage point. The Engineer will base the percentage point on the weight of dry aggregate. \*

The percentage of moisture in the completed mixture shall be between optimum moisture plus five (5) percentage points. The Engineer will determine the optimum moisture by AASHTO T 134. \*

Where the required thickness is six (6) inches or less, the Contractor may spread and compact the mixture in one (1) layer. Where the required thickness is more than six (6) inches, the Contractor shall spread and compact the mixture in two (2) or more layers of approximately equal thickness and the maximum compacted thickness of one (1) layer shall not exceed six (6) inches. The Contractor shall work on each layer in a similar manner. The Contractor shall keep or prevent the surface of the compacted material moist from drying by some method acceptable until covered by the next layer. If not more than three (3) hours have elapsed between the time the Contractor added water to the aggregate and cement in the layer being covered and the time of completion of spreading of the material of the layer being constructed, the Contractor may cover a completed layer by the next layer. \*

If the Contractor uses a vibratory roller weighing nine (9) tons or more, the Contractor may increase the lift thickness to seven (7) inches. \*

The Contractor may spread the CTB placed on areas inaccessible to spreading equipment by methods acceptable by the Engineer in one (1) layer. After spreading, the Contractor shall compact the material thoroughly to the required lines, grades and cross-section by means of pneumatic tampers or with other compacting equipment which consistently gets equal or better compaction than that provided in Subsection 308.03(B) - Compacting and Finishing. \*

The supplier shall equip the central plant with feeding and metering devices which shall accurately proportion the cement to within one (1) percent of the required quantity. The Contractor shall provide adequate and suitable means for checking the proportion of each material delivered to the mixer. \*

In continuous type plants, the supplier shall provide a direct interlock between the feeding and metering devices for cement and aggregate such that the correct proportion of each material is fed into the mixer. \*

The supplier shall blend the aggregate and cement adequately before the addition of water. Mixing of cement, aggregate and water shall continue until the supplier gets a uniform and intimate mixture. The Engineer will determine the time of mixing necessary to obtain a mixture according to the contract. \*

Weighing devices shall be accurate within 0.5 percent throughout the range of use. The supplier shall inspect, test and seal the weighing device as often as deemed necessary to assure their continued accuracy. The Contractor shall have on hand not less than ten (10) fifty (50) pound weights for testing the scales. \*

The Contractor shall transport the mixed material to the roadway in suitable vehicles and spread on a moistened surface in a uniform layer by a spreader acceptable by the Engineer to the required cross-section. The Contractor shall protect the mixed material by covers against moisture loss while being transported to the spreading site. The Engineer will not permit dumping of the mixture on the prepared surface. \*

Immediately before spreading, the Contractor shall moisten and keep moist the area to be covered but not excessively wet. \*

**(B) Compacting and Finishing.** After the Contractor spreads the cement treated mixture, the Contractor shall compact the mixture to at least ninety-five (95) percent of the maximum dry density according to AASHTO T 134. The Engineer will make field density determination according to Hawaii Test Method HWY-TC 1. The Contractor shall not leave the uncompacted mixtures of aggregate, cement and water undisturbed for more than thirty (30) minutes. The Contractor shall complete the initial compaction within two (2) hours of the time water is added to the \*

mixture. Not more than three (3) hours shall elapse between the time water is added to the aggregate and cement and the time of completion of final compaction after trimming.

The Contractor shall initiate the rolling with steel-rollers. The Contractor shall use pneumatic-tired roller conforming to Subsection 401.03(B)(4) - Rollers, following completion of the initial rolling.

The finished surface of CTB shall not vary by more than 0.04 foot above or below the theoretical grade. However, if the specified surface tolerances of the finished pavement dictate closer tolerances on the surface of the CTB, such closer tolerances shall apply.

If, during compacting operations, the finished surface exceeds the above tolerances, the Contractor shall trim the excess material with the least possible disturbance to the material that is to remain in place. The Contractor shall remove and dispose of the excess material immediately after trimming. The Contractor shall not leave loose material on the base. The Contractor shall then roll the area again. The Engineer will not permit filling low spots in the CTB.

The Contractor shall equip the equipment that is supported on the new surface, except for steel-wheeled rollers and track-type pavers, with rubber-tired wheels. The Contractor shall offset the equipment to run a sufficient distance in from the edge of the new surface to avoid breaking the edges.

The Contractor shall compact the areas inaccessible to rollers to the required degree by other acceptable means.

**(C) Construction Joints.** At the end of each day's work, when CTB operations are delayed or stopped for more than two (2) hours, the Contractor shall make a construction joint with a vertical face normal to the centerline of the roadbed in thoroughly compacted material. The Contractor shall not place additional mixture until the Engineer accepts the construction joint.

When more than thirty (30) minutes have elapsed between the time of placing CTB in adjacent lanes, the Contractor shall make a longitudinal construction joint. The Contractor shall moisten the face of the cut joints ahead of placing the adjacent base.

Longitudinal joints shall fall on lane lines. The Contractor shall construct the longitudinal joints by cutting back into the existing unsupported edge for a distance of three (3) inches. The Contractor shall dispose of the material ahead of placing the adjacent base.

**(D) Protection and Curing.** After the Contractor finishes the CTB, the Contractor shall apply the bituminous curing seal to provide a continuous protective film over the treated base. The Contractor shall keep the finished surface of the CTB continuously moist until the curing seal is applied.

The Contractor shall apply the curing seal at a rate of between 0.15 \*  
 to 0.25 gallon per square yard of surface. The Engineer will determine \*  
 the exact rate. The Contractor shall apply the curing seal as soon as \*  
 possible, but not later than eight (8) hours after the completion of \*  
 final rolling. \*

The Engineer will require curing seal only for the top layer of CTB. \*

The Engineer may not permit equipment or traffic on the CTB during \*  
 the first three (3) days after applying the curing seal except when the \*  
 Engineer grants the Contractor's request in writing. \*

When equipment or traffic is permitted on the CTB, the Contractor \*  
 shall protect the curing seal with a sand cover at no cost to the State. \*  
 Sand shall be free from clay or organic matter and shall be of such size \*  
 that ninety (90) to one hundred (100) percent shall pass a No. 4 sieve \*  
 and not more than five (5) percent shall pass a No. 200 sieve. The \*  
 Contractor shall spread the sand uniformly over the surface at the rate \*  
 determined. The Contractor shall remove the loose sand completely from \*  
 the treated surface before placing pavement material thereon. The \*  
 furnishing, placing and removing of the sand shall be at no cost to the \*  
 State. The Engineer will not make compensation. \*

**308.04 Method of Measurement.** The Engineer will measure the portland CTB by \*  
 the cubic yard complete in place as ordered in the accepted work and \*  
 calculated from dimensions shown in the contract or ordered. |

The Engineer will measure the bituminous curing material by the gallon \*  
 complete in place, correct for temperature according to Subsection 109.01 - \*  
 - Measurement of Quantities, and used as ordered in the accepted work. |

**308.05 Basis of Payment.** The Engineer will pay for the accepted quantities \*  
 of portland CTB at the contract unit price per cubic yard. The Engineer will \*  
 pay for the accepted quantities of bituminous curing material at the contract \*  
 unit price per gallon. The unit prices paid shall be full compensation for \*  
 the completed portland CTB, including materials, equipment, tools, labor, and \*  
 incidentals necessary to complete the work.

The Engineer will make payment under: \*

Pay Item	Pay Unit
_____ - Inch Portland Cement Treated Base	Cubic Yard
MC-30 Liquid Asphalt Curing Seal for Cement Treated Base	Gallon

SECTION 309 - (Unassigned)