



SECTION 310 - RECLAIMED STABILIZED BASE

310.01, DESCRIPTION. This work shall consist of pulverizing the existing pavement together with underlying base course material to the depth and width specified on the plans or in the contract, adding aggregate materials as required or as ordered by the Engineer, adding the stabilizing agent indicated on the plans, mixing the components thoroughly and shaping and compacting the stabilized material to the desired grade and density.

310.02, MATERIALS. The pulverized material shall consist of the existing pavement blended with underlying subbase material and/or additional aggregate material and shall conform to the following gradation:

<u>Sieve Size</u>	<u>Percent by Mass Passing Square Mass Sieves</u>
75 mm	100
37.5 mm	80 - 100
4.75 mm	30 - 60
300 μ m	8 - 35
75 μ m	0 - 6

Crushed Aggregate for Stabilization shall be additional aggregate material added to make up grading deficiencies and/or to correct roadway geometry, shall consist of clean, hard crushed stone or crushed gravel or a blend thereof, shall meet the requirements of 704.10(b), (c), & (d), shall have no particles passing the 150 μ m sieve and shall be of the size(s) directed by the Engineer.

Stabilization Asphalt shall be a high float emulsion. The grade and application rate shall be recommended by the Contractor and approved by the Agency's Materials & Research Engineer.

Liquid Calcium Chloride shall be supplied and applied as a solution at a strength of 35 $\square\square\square$ 1% for roadway stabilization.

Water for Stabilization shall conform to the requirements of 745.01.

310.03, EQUIPMENT. Pulverization shall be accomplished with a machine having positive depth control adjustments and capable of reducing the pavement material to the specified size. The pulverizing equipment shall meet the approval of the Engineer.

The mixer shall be a self-propelled mixer. The mixing rotor, or rotors, shall have positive depth control to insure a uniform depth of mixing. When Stabilization Asphalt is designated as the stabilizing agent, the mixer shall also be a combined mixer and liquid distributor. The mixer shall meet the approval of the Engineer.

The equipment for distributing the designated stabilizing agent shall be uniformly adjustable and shall be equipped to accurately verify the rate of application of the stabilizing agent, (whether asphalt, calcium chloride or other designated material) at any time.

The roller used to compact the reclaimed stabilized base material shall have a minimum gross mass of 9 t and shall be capable of providing a minimum compactive effort of 4.5 kN/m of width of the drive roll.

310.04, CONSTRUCTION . The moisture content of the pulverized materials shall be uniform and within the range approved by the Agency's Materials and Research Engineer prior to the addition of the stabilizing agent. If necessary, the materials shall be manipulated with equipment approved by the Engineer to decrease the moisture content or moisture shall be added to increase the moisture content to bring it into approved range.

The pulverized reclaimed base material shall be stabilized by thoroughly mixing the stabilizing agent with the pulverized material and regrading and compacting the resulting mixture.

Liquid Calcium Chloride shall be applied with delivery equipment capable of applying the liquid calcium chloride at the specified rate of **3.5 L/m²** on the uncompacted recycled base and **1 L/m²** on the fine graded and compacted surface.

Stabilization Asphalt shall be blended with the pulverized material so that the mixture has a uniform composition. Such blending shall be carried out with a mixing unit which is capable of mixing the pulverized materials as the emulsion is applied. The application rate shall be such that the residual asphalt in the final composition will be between 0.0% and 5.0% by **mass** of pulverized material.

Stabilization using Stabilization Asphalt shall only be performed during the period June 1 to September 1. Stabilization Asphalt shall not be applied when rain is threatening, during rain storms, or when the ambient air temperature is below **10 °C**. Stabilization with Liquid Calcium Chloride or with Water for Stabilization shall not be performed during rain storms nor when the ambient air temperature is below **4 °C**. The Contractor shall pulverize only that area of pavement that can be stabilized during the same working day.

310.05, TESTING. The Contractor shall perform all process control and quality control sampling and testing.

Process control sampling and testing shall involve taking a set of four (4) representative excavated samples from the test section after the test section has been pulverized. The four (4) samples shall be taken at random thus, representing the four quarter segments of the test section. The four (4) samples shall be sieved to determine if the process can produce the required gradation, or if additional materials must be added. Following the completion of the sieve analysis, using the AASHTO T 27 procedure modified to include air drying of the material only, the materials shall be physically combined to produce a representative sample.

A moisture/density curve, representing the combined sample, shall be generated in accordance with AASHTO T 180, Method C, using a minimum of five (5) different moisture contents to determine the maximum density and optimum moisture.

Ninety-five percent (95%) of the maximum density obtained from these tests shall be used as the minimum target density during construction upon approval by the Engineer.

The Contractor shall perform quality control tests for density using a nuclear gauge in accordance with AASHTO T 238, Method B (full depth of pulverized material). A minimum of **six (6) nuclear gauge tests per kilometer of lane** of compacted reclaimed base material shall be performed. Additional tests shall be performed as necessary or as directed by the Engineer. The Contractor shall verify that the minimum target density is maintained prior to resurfacing. The Contractor shall also perform quality control tests for uniform gradation of the pulverized material at a minimum rate of one (1) test **one (1) per kilometer of lane**. The Contractor shall provide the Engineer with written copies of all process control and

quality control results, including test locations. These test results will not be used to determine acceptance of the reclaimed base material.

Acceptance testing will be performed by Agency personnel.

310.06, TEST SECTION. The Contractor shall construct a test section to assure the Engineer that the Contractor's equipment and procedure(s) are suitable for the work specified and capable of achieving the Engineer approved minimum target density.

The test section shall be approximately **150 m** to **300 m** long, full roadway width, and no further recycling shall be performed until all aspects of the test section and the target density are approved by the Engineer. The Contractor shall use the same equipment for building both the accepted test section(s) and performing the Reclaimed Stabilized Base work on the highway unless equipment substitution is approved by the Engineer. The Engineer may require an additional test section and additional process control sampling to investigate the suitability of substituted or changed equipment. The costs of such additional testing will not be paid for directly, but will be considered subsidiary to the item of Reclaimed Stabilized Base.

If the test section does not meet the requirements of this specification, or the density achieved does not meet the minimum target density, then the Contractor shall modify the procedure and either construct another test section or reconstruct the original test section until suitable results are obtained.

310.07, SHAPING AND COMPACTING. Shaping and compacting shall be done immediately after pulverizing. The base material shall be finished within a grade tolerance of **+/- 15 mm**, provided that this deviation is not maintained for a distance longer than **15 m**, and provided that the required crown or superelevation is maintained. The Contractor shall maintain the centerline location of the roadway.

The reclaimed stabilized base shall be compacted to achieve at least the minimum target density approved by the Engineer.

310.08, CURING AND STABILITY. The completed and cured Reclaimed Stabilized Base may be opened to traffic as approved by the Engineer. Required density and moisture content of the finished base shall be maintained until it is paved over. Any imperfections discovered shall be repaired by the Contractor as directed by the Engineer, at no additional cost to the Agency.

When the pulverized material has been stabilized with asphalt, the stabilized material shall be allowed to cure to a condition such that the free moisture content is reduced to 1.0% or less before bituminous concrete pavement is placed on it.

310.09, METHOD OF MEASUREMENT. The quantity of Reclaimed Stabilized Base to be measured for payment will be the number of **square meters** constructed to the depth specified, complete in place. No allowance will be made for overlapping areas.

The quantity of Stabilization Asphalt to be measured for payment will be the number of **kilograms** actually used in the accepted work.

The quantity of Liquid Calcium Chloride to be measured for payment will be the number of **kilograms** actually used in the accepted work.

The quantity of Crushed Aggregate for Stabilization to be measured for payment will be the

number of tons of crushed aggregate complete in place in the accepted work as determined by weight tickets.

In the event that the depth of base to be stabilized has to be adjusted in the field, the first **50 mm** of additional or decreased depth will not be paid for directly, but will be considered subsidiary to the item of Reclaimed Stabilized Base. If the change in depth is greater than **50 mm**, the number of **square meters** pulverized at the revised depth will be multiplied by the result of dividing the total depth actually pulverized by the original depth designated on the plans to create an equivalent number of **square meters** for which payment will then be made.

310.10, BASIS OF PAYMENT. The accepted quantity of Reclaimed Stabilized Base will be paid for at the Contract unit price per **square meter**, which price shall be full compensation for furnishing, handling, transporting and placing necessary materials; pulverizing, adding or removing moisture; shaping, placing and compacting the designated materials; constructing test strips; conducting tests; maintaining the finished base until it is paved over and for furnishing all labor, tools, equipment and incidentals necessary to complete the work.

Except for the item of Water for Stabilization, necessary water to adjust the moisture content of the pulverized material to be stabilized will not be paid for directly, but will be considered subsidiary to the item of Reclaimed Stabilized Base.

The accepted quantity of Crushed Aggregate for Stabilization will be paid for at the contract unit price per ton, which price shall be full compensation for furnishing, transporting, handling and placing the materials specified, and for furnishing all necessary labor, tools, equipment and incidentals to complete the work.

The accepted quantity of the designated stabilizing agent will be paid for at the contract unit price, which price shall be full compensation for furnishing, transporting and placing the material, and for furnishing all necessary labor, tools, equipment, and incidentals necessary to complete the work.

The item of Water for Stabilization will be paid only for the water used during the stabilization and compaction operations when the designated stabilizing agent is Water for Stabilization. Water used to adjust the moisture content of the pulverized material prior to the stabilization and compaction operation will not be paid for directly, but will be considered subsidiary to the item of Reclaimed Stabilized Base. After the stabilization and compaction operation is complete, any necessary water used to maintain the density and moisture content of the stabilized base (until the bituminous concrete pavement has been placed) will be paid for as Dust Control with Water, if item 609.10 is in the contract, otherwise the costs of the water used will not be paid for directly, but will be considered subsidiary to the item of Reclaimed Stabilized Base.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
310.20 Reclaimed Stabilized Base	Square Meter
310.21 Stabilization Asphalt	Kilogram
310.22 Liquid Calcium Chloride	Kilogram
310.23 Water for Stabilization	Cubic Meter
310.24 Crushed Aggregate for Stabilization	Ton