

Roadbond Service Company

SPECIFICATION - ROADBOND EN 1 TREATMENT (BLADE MIXED, DENSITY CONTROLLED)

LIQUID STABILIZER TREATMENT FOR CRUSHED STONE SOILS

1. **DESCRIPTION:** This item shall govern for treatment of new and/or existing crushed stone material by scarification, adding the liquid stabilizer (Roadbond EN 1), and blade mixing and compacting the mixed material to the required density as specified herein and in conformity with the typical sections, lines and grades as shown on the plans or as established by the Engineer.
2. **MATERIALS:**
 - A. **The liquid stabilizer treatment:** Roadbond EN 1 is applied to crushed stone material for reduction of permeability, moisture susceptibility and to improve strength and stiffness. When applied within the manufacturer's parameters for application, dilution, moisture control, processing, compaction and curing the stabilizer shall improve the shear and bearing strength as well as reduce the moisture susceptibility of soil and aggregate materials.
 - B. **Water.** Water shall meet the requirements of Item 2.2.4 Standard Specification for Public Works Construction (NCTCOG)
 - C. **Water Truck:** Water truck or tanker truck may or may not be equipped with an agitator, but shall be capable of even water flow and uniform distribution over the area to be mixed.
 - D. **Product Delivery:** Roadbond EN 1 shall be delivered, stored and handled in closed, weatherproof containers until immediate distribution on the road. Materials must be stored in covered storage that is well ventilated with adequate protection from theft, flooding or damage. If storage bins are used, they are to be completely enclosed. Insure that the manufacturer's safe handling and mixing instructions are followed without exception.
3. **CONSTRUCTION METHODS:**
 - A. **Preparation of Crushed Stone Material.** Prior to treating existing material and/or placing any new material, the existing material shall be shaped to conform to the typical sections, as shown on the plans or as established by the Engineer. This work shall be done in accordance with the applicable bid items. Soft and/or wet spots shall be corrected as directed by the Engineer.
 - B. **Scarification:** Prior to treatment, the new and/or existing crushed stone material shall be scarified to prevent run-off and to facilitate even distribution of the diluted Roadbond EN 1. The liquid stabilizer shall be applied to the crushed stone material at a plan depth per lift and rate of application as recommended by the manufacturer, provided the equipment used in preparation, mixing and compaction adequately completes each phase of construction.
 - C. **Moisture Tolerances:** Unless otherwise approved by the Engineer, the Roadbond EN 1

- D. shall not be installed when soil moisture content measures in excess of optimum moisture content (ASTM D 698) as measured by Test Method ASTM D2216 or ASTM D 3017. If the soil moisture content is above the maximum accepted limit, the soil shall be pre-mixed and air-dried (aerate) to reduce the moisture content to within tolerances.
- E. **Application Method:** The Roadbond EN 1 shall be applied to the crushed stone material as shown on the plans. Should the plans require a depth greater than a maximum lift of eight (8") inches, the contractor shall be required to work the crushed stone material in multiple lifts.
- F. **Application Preparation:** Clean existing base material of all foreign (i.e. loose dirt, organic material) objectionable material by means of blading, sweeping and/or other approved methods prior to scarifying. The diluted Roadbond EN 1 may be applied directly on the existing material after scarification is complete and accepted by the Engineer.
- G. **Dilution Ratio and Distribution:** The Roadbond EN 1 concentrate shall be diluted with water in the water truck at a ratio of not less than 100 to 1 or more than 400 to 1. The dilution ratio is solely determined by the amount of moisture present in the crushed stone material prior to the application of the Roadbond EN 1. If the crushed stone material is very dry, then the area to be treated may be pre-watered prior to placement of the Roadbond EN 1 solution.

The Roadbond EN 1 solution shall then be evenly distributed over the intended area to be mixed in such a manner as to assure even, uniform coverage. (The dilution ratio shall be adjusted to control the moisture content in the mixed material and is not to be confused with the application rate. The application rate is the correct amount of concentrated Roadbond EN 1, properly diluted, added to the base and/or crushed stone material. The dilution ratio is the amount of water used to evenly distribute the correct amount of Roadbond EN 1 over the area to be mixed.) Once diluted, the stabilizer solution shall be applied to project materials the same day. Overnight storage will not be permitted.

Multiple passes by the water truck laden with the Roadbond EN 1 solution is required to insure the proper amount of stabilizer is applied to the area to be mixed. (Refer to manufacturer's application rate).

The material shall be scarified to the plan depth after each pass of the water truck in order to expose dry material to the Roadbond EN 1 solution. The Roadbond EN 1 shall be applied only on the area where installation operations can be completed during the same working day.

The Contractor shall take precautions when application occurs on uneven or sloping terrain to avoid excess runoff of the Roadbond EN 1 down slopes and/or through the channels in the soil created by the equipment.

Mixing: The crushed stone material and the liquid stabilizer shall be thoroughly mixed by a motor grader capable of wind-rowing the treated material to the plan depth. Mixing shall begin when the required diluted Roadbond EN 1 has been evenly placed on the section to be treated and thoroughly scarified.

The treated material shall be wind-rowed in uniform strips to the plan depth and this process shall be

repeated until the material is completely mixed and it is uniform in moisture content and consistency.

- H. **Compaction:** Compaction of the mixture shall begin immediately after mixing. At all times the shape and grade shall be maintained by blading and the surface, upon completion shall be smooth and shall conform to the lines and grades as shown on the plans or as established by the Engineer.

The material shall be sprinkled as necessary to provide the required optimum moisture content. Compaction shall begin at the bottom and shall continue until the entire depth or mixture is uniformly compacted to the density required by the plans or the methods provided to the governing specifications.

All other subsequent courses treated under this item shall be compacted to a minimum of 95 percent of compaction ratio density at a moisture content between -1 and + 2% of OMC. The testing will be outlined in Test Method ASTM D698 or other approved methods. In addition to the requirements specific for density, the full depth of the material shown on the plans shall be compacted to the extent necessary to remain firm and stable under construction equipment. After each section is completed tests as necessary will be requested by the Contractor. If the material fails to meet the density requirements, it shall be reworked as necessary to meet these requirements. Throughout this entire operation the shape of the course shall be maintained by blading, and the surface upon completion shall be smooth and in conformity with the typical section shown on the plans and to the established lines and grades. Should the material, due to any reason or cause, lose the required stability, density and finish before the next course is placed or the work is accepted, it shall be reprocessed and refinished at the expense of the Contractor to include retesting of all failures.

- I. **Reworking a Section:** When a section is reworked within forty-eight (48) hours after completion, the Contractor shall at its own expense purchase more Roadbond EN 1 and reapply at the rate of one-half (1/2) of the original application rate to the effected area. However, the dilution ratio shall not exceed 200 to 1 and the Contractor shall mix and compact the material according to the specifications of the original application.

If the plans provide for the treated material to be sealed or covered by other courses of material such seal or course shall be applied within 3 days after compaction and testing by side lab unless otherwise directed by the Engineer.

4. **JOB CONTROL AND TOLERANCES:**

- A. **Density Control:** The Roadbond EN 1 applied to the base and/or crushed stone material shall follow the standard density test methods ASTM or ASTM as directed by the Engineer.

If the material fails to meet the density requirements or should the material loose the required stability, density or finish before the next course is placed or the project is accepted, it shall be reworked as set forth in Section 3. J of this specification.

- B. **Density Tolerances:** The Engineer may accept the work providing that not more than one (1) of the most recent five (5) consecutive density test performed is below the specified density and provided that the falling test is no more than 80.74 lbs/CY below the specified density

Thickness Tolerance of Treated Crushed stone: At no time during the mixing process shall the Contractor increase or decrease the depth of the crushed stone section as detailed on the plans without the approval of the Engineer. If any deviation should occur, that section shall be reworked according to construction operations and testing described in **Section 3 J**

4. **MEASUREMENT:**

This item will be measured as follows:

Liquid Stabilizer Products will be measured by the gallon

Liquid Stabilizer Treatment will be measured by the square yard of the depth specified to the lines and grades shown on the typical sections.

ROADBOND EN 1 APPLICATION RATES

REQUIREMENTS: Roadbond EN 1 shall be stored and handled in closed, five (5) gallon weatherproof containers until immediate distribution on the road. Roadbond EN 1 materials must be stored in covered storage and well ventilated with adequate protection from flooding or damage. For mixing ease and safety round up to the nearest 5 gallon increments (i.e. 72 gallons up to 75 gallons). Follow strict application instructions.

Depth of Treatment	SY / Gallon	Gallons / 1/10 th Mile
4 inches	270 SY	4 gallons
6 inches	180 SY	6 gallons

Roadbond Service Company offers on-site technical assistance to facilitate installation of Roadbond EN 1. There is no charge for this service, but prior notification is necessary to schedule a representative to be at the location at the required time.

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