



SoilBinder® Soil Stabilizer

Introduction

SoilBinder® Soil Stabilizer

SoilBinder® is a liquid concentrated soil stabilizer which treats and stabilizes all 17 AASHTO soil classifications except A-8 Peat. SoilBinder® is Non-Toxic, Non-Allergenic, Non-Flammable, and Non-Corrosive. It reduces the Liquid Limit and Plasticity Index on stabilized soil, increasing UCS and making it impervious to water. Conventional AASHTO and ASTM standards are used to evaluate effectiveness.

Benefits

The use of SoilBinder® Soil Stabilizer offers the following benefits:

- Stabilization with SoilBinder® allows the elimination of the subgrade layer on conventional designs (see Fig. 1).
- The use of selected aggregates is not necessary.
- SoilBinder® eliminates the shortcomings of soil-cement’s shrink cracking and leaching and decreases the % of cement needed. It allows for the use of inexpensive materials such as Lime, Lime Kiln Dust (LKD), or Cement Kiln Dust (CKD).
- SoilBinder® allows for a wider range of soils that may be treated such as expansive clay, beach sand, silty sands, vertisols, etc.
- When laid above SoilBinder® stabilized soil, thin wearing surfaces have greater longevity, and no primers are needed when installing HMA.

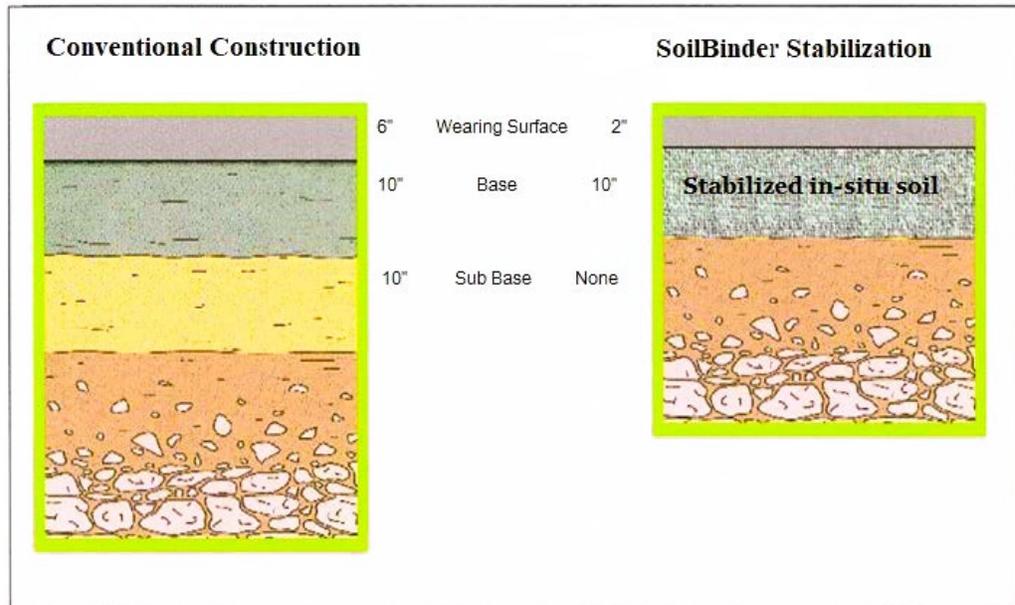


Fig. 1: Soil Stabilization using SoilBinder® vs Conventional Soil Stabilization methods.

Suggested SoilBinder® stabilized soil layer thickness:

- 8" – For light traffic
- 8" to 12" – For medium traffic
- 12+" – For heavy traffic



Technical Data Sheet

SoilBinder® Soil Stabilizer – Working Mechanism

SoilBinder® is a proprietary blend of buffered, inorganic chemicals, formulated to produce cohesive gels when a chemical action occurs after contact with the positive and negative ion charges in soils and pozzolans, particularly calcium materials. In hydrated form, the alkali in the dissolved solids kicks off the reaction mechanisms, which continue to polymerize with age, and the mixture becomes progressively more viscous until the whole solution solidifies or gels. This combination of materials fills the voids in soil particles and additives. Cohesiveness takes place when the chemicals, soil particles, and additives adhere to themselves to form a more flexible and impermeable bond.

Essentially, SoilBinder® acts by binding the soil particles together, adding cohesive shear strength, and reducing swelling by resisting the tendency of particles to move apart. The particles may be bound together by SoilBinder®, or they may be cemented by the chemical reaction between the soil and SoilBinder®. Additional improvement can also arise from chemical and physical reactions that affect the soil fabric (typically by hydration and flocculation), or the soil chemistry (typically by cation exchange).

Materials and SoilBinder® Treatment Guidelines

SoilBinder® Treatment

SoilBinder® liquid soil stabilizer is applied to subgrade soils for reduction of permeability, moisture susceptibility, and swell, 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 the soil and aggregate materials.

- *One (1) drum SoilBinder® (55 gallons) will treat four hundred eighty-five (485) cubic yards volume.*
 - *Treatment for light traffic. The depth of treatment of 8 inches will cover an area of 1,940 SY.*
 - *Treatment for medium traffic. The depth of treatment of 10 inches will cover an area of 1,697 SY.*
 - *Treatment for heavy traffic. The depth of treatment of 12 inches will cover an area of 1,455 SY.*

Water

Water shall meet the requirements of Item 303.2.7 - Standard Specification for Public Works Construction (NCTCOG).

Dry Additive

Portland Cement (Type I and Type 2) shall be in compliance with ASTM C-150 Standards. LKD, type 2, shall contain at least 40% Calcium Oxide (CaO). CKD and Fly Ash can also be considered, however, the SDS must be reviewed to make sure the CaO content is higher than 40%.

Example Treatment of four (4) % by weight of Cement, LKD, or CKD

Each SY of soil to be treated, at 10 inches, will be covered by 27-30 lbs of LKD, Cement, or CKD. Pneumatic spreaders are recommended to achieve an even distribution.

A Note on Soil Stabilization Equipment

Dry additive and liquid SoilBinder® soil stabilizer may be applied with any appropriate machinery or combination of machines and auxiliary equipment that produce the results meeting the requirements for soil pulverization, cement application, mixing, water solution application, compaction, finishing, and curing. The mixer/stabilizer shall have a cutting width of 8 feet and be capable of mixing to a depth of 14 inches, in order to produce a uniform mixture.

Water Truck

Water 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.



Technical Data Sheet

Construction Methods

A separate “Construction Methods and Application” document was put together for SoilBinder® Soil Stabilizer. The information in that document provides detailed construction and application guidelines for treatment of new and or existing subgrade material by pulverizing, adding SoilBinder® liquid soil stabilizer, addition of the dry additive containing CaO, and mixing and compacting the mixed material to the required density as specified. Below is a snippet of the guidelines contained in the SoilBinder® Construction Methods and Application document.

Application Method

SoilBinder® Soil Stabilizer shall be applied to the pulverized subgrade materials according to recommended guidelines. Should the plans require a depth greater than a maximum lift of fourteen (14”) inches, the contractor shall be required to work the subgrade material in multiple lifts.

Application Preparation

Clean existing base material and pavement surface of all foreign material (i.e., loose dirt, organic material, etc.), as well as unstable and objectionable material by means of blading, sweeping, and/or other approved methods prior to scarifying and/or initial pulverization. Diluted SoilBinder® may be applied directly on the existing material after pulverization is complete and accepted by the Engineer.

Dilution Ratio and Distribution

SoilBinder® concentrate shall be diluted with water in the water truck at a ratio of 32-part water to 1-part SoilBinder® concentrate. SoilBinder® solution shall then be evenly distributed over the intended pulverized 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 SoilBinder® properly diluted and added to the subgrade material. The dilution ratio is the amount of water used to evenly distribute the correct amount of SoilBinder® and moisture over the area to be mixed. The diluted solution must be used the same day. Overnight storage will not be permitted.

Mixing

The subgrade material, the SoilBinder®, and the dry additive shall be thoroughly mixed by equipment approved by the Engineer. Mixing shall begin when no more than one-half (1/2) of the required diluted SoilBinder® has been uniformly placed on the section to be treated. After the approved mixer has made one pass over the section to be completed, the remaining diluted SoilBinder® shall be placed, and remixing shall continue until the treated material reaches a homogenous mixture, and the proper gradation is achieved as established by the engineer.

Opening to Traffic

The subgrade/base treated with SoilBinder® and Dry additive may be opened to local traffic as soon as the sealing with pneumatic tire roller has been finalized.

Health & Safety

SoilBinder® is not listed as carcinogenic by GHS, IRAC, NTP or OSHA. As with any chemical, prolonged dermal contact may cause skin irritation. This product is considered safe for shipping and handling.

Please refer to Safety Data Sheet (SDS) for additional and complete health and safety information.

All statements, information, and data given herein are believed to be accurate, but are presented without warranty, expressed, or implied. Statements concerning possible use are made without representation or warranty that any such use is free of patent infringement and is not a recommendation to infringe on any patent. The user should not assume that all safety measures are indicated or that other measures may not be required. Any determination of the suitability of a particular product for any use contemplated by the user is the sole responsibility of the user.