

Installation & Maintenance - Ecofill HD (Heavy Duty)

Ecofill HD is to be used as a Hydraulically Bound Mixture as detailed in the Standards for Highways: Manual of Contract Documents for Highways Works, Specification for Highways Works 800 series (Clause 830, 831, 832), BS EN 14227-5 and Design Manual for Roads and Bridges CD 225 - Design for new pavement foundations.

Full guidance on the storage, installation and maintenance is detailed in the above specifications, however, in particular please see below.

Storage

Stockpile Husbandry: If Ecofill HD is not to be used straight away, then stockpile and store the product. Ensure that the stockpile is protected from inclement weather. Ecofill HD must be used within its workability period and compacted within its Optimum Moisture Content Range. Care is needed to avoid surface or local drying and segregation when a mixture is stockpiled or double handled in any way.

Installation

Ecofill HD can be placed using a grader, a dozer or a paver. If pavement foundation layers are constructed in 2 lifts, the depth of the lower lift should be compatible with the strength of the subgrade. A thicker first lift is needed over a weak subgrade, to enable effective compaction of the first lift without damage to itself or the subgrade beneath it. The thicker first lift will also minimise movement during the construction of the second lift, particularly if the first is still workable. This helps to ensure proper compaction. It will also prevent degradation of the lower lift when the construction of the second lift takes place after the lower one has set.

A good bond can usually be encouraged by making sure that the lower lift is not allowed to dry out before the upper lift is placed. It may also be necessary to scarify the surface of the lower lift.

Laying shall be carried out in a way that avoids segregation and drying of the surface. The temporary intermediate surfaces within a multiple lift layer shall be sprayed with water to prevent surface drying.

The minimum compacted lift thickness in a multiple lift layer shall be 150 mm.

Compaction of Ecofill HD layers, including the intermediate lifts of multiple lift working, shall be completed without drying out and before setting of any part of the layer and shall meet the requirements for density in Clause 870 of the SHW 800 Series.

Compaction of Ecofill HD shall be carried out by vibrating roller and/or pneumatictyred roller (PTR). Where vibrating roller compaction is used on Ecofill HD, it shall be followed by at least 8 passes of a PTR with a wheel loading of not less than 30kN.

On completion of compaction the surface shall be closed, free from ridges, cracks, loose material, visible voids, ruts, shear planes and other defects. All defective areas shall be rectified within the time period specified in sub-Clause 813.2. If rectification is not completed within the specified time period, the defective area shall be removed to the full thickness of the layer, and new mixture laid and compacted.

For a subbase and/or base layer, the average in-situ wet density shall be not less than 95% of the wet density of the ECOFILL HD at its optimum moisture content, measured using the vibrating hammer method detailed in BS EN 13286-4.

Inclement Weather

During cold weather:

- the temperature of Ecofill HD shall not be less than 5°C at the time of laying;
- Ecofill HD shall not be laid on a frozen surface;
- laying of Ecofill HD shall cease when the air temperature falls below 3°C, and laying shall not be resumed until the rising air temperature reaches 3°C;
- the laying of Ecofill HD using binders containing less than 3% of CEM 1 cement, by dry mass of mixture, shall be restricted in use to the period from 1 May to 30 September, unless otherwise agreed by the Overseeing Organisation.

In the case of heavy or persistent rain, production shall cease and any laid material shall be compacted immediately.

No hydration is assumed at temperatures below 3°C. Although this is an established figure for cement it may be that other hydraulic binders have higher threshold temperatures and/or may have strength temperature development curves that cannot be approximated by a linear relationship. Where problems related to this factor are of concern (e.g. for a binder without local or independently documented performance data) laboratory trials should be carried out.

Maintenance

On completion of compaction the layer shall be cured to prevent loss of moisture by:

- Application of a bitumen emulsion spray complying with Class C40B4, as specified in the National Foreword to BS EN 13808 to produce an even and complete coverage of at least 0.2 kg/m² of residual bitumen. Before spraying commences, the surface shall be free of all loose material and standing water. The curing membrane shall be protected from any damage until the construction of the overlying layer;
- Application of a mist/fog/light spray of water, sufficient to keep the surface continuously wet until the specified strength of the ECOFILL HD has been developed or the layer is overlaid.

Trafficking of Ecofill HD layers Not restricted provided that the IBI requirement of sub-Clause 832.6 is satisfied. Should any ECOFILL HD layer exhibit signs of damage, trafficking shall cease immediately and shall only be resumed once the layer has gained sufficient stability to resist damage.

Induced Cracking of Ecofill HD

Where required by contract specific Appendix 7/1:

a) Transverse cracks shall be formed at the specified spacing with a tolerance of ± 150 mm. Where the pavement is made up of two or more layers of Ecofill HD with induced cracks, the cracks in the overlying Ecofill HD layer shall align with the induced cracks in the layer below with a tolerance of ± 100 mm.

b) Cracks shall be induced in fresh material after initial compaction. The transverse cracks shall be induced by grooving the fresh material to form straight vertical grooves not more than 20 mm wide, to a depth of between one half and two thirds of the layer thickness over the full width of the pavement. Bitumen emulsion shall be poured or sprayed into the grooves prior to final compaction, to form a crack inducing membrane. The bitumen emulsion shall comply with Class C40B4, as specified in the National Foreword to BS EN 13808. During final compaction of the mixture, the surface of the groove shall be fully closed throughout its full length. The bitumen in the groove shall be fully encased and remain continuous, with not less than 70% of the sides of the groove coated with bitumen.

c) Where required by contract specific Appendix 7/1, longitudinal cracks shall be induced using the procedure specified in sub-Clause 818.2.

