

PRODUCT FOR ASPHALTING OF ROADS

- **What is HARD ECOSOIL SYSTEM®?**

It is an innovative system of stabilization and waterproofing of lands nonpolluting. Once HARD ECOSOIL SYSTEM® has been applied to a floor; the state of compaction that it reaches is irreversible. Thanks to this property, **HARD ECOSOIL SYSTEM®** is added as permanent land stabilizer for the construction of bases / sub-bases of roads, highways, airports, landfills, reservoirs, shoulders, slopes, railways, soccer fields, golf courses, parking's and even used for the manufacture of bricks in civil constructions (buildings up to 3 stories high).

With the use of **HARD ECOSOIL SYSTEM®** any earth undergoes an improvement of at least 3 times its natural and initial CBR.

- **¿ How does HARD ECOSOIL SYSTEM® work?**

In general, layers of soil between 25 to 30 cm deep are treated. In 95% of the cases, the soils treated with **HARD ECOSOIL SYSTEM®** are used at 25 cm. of depth.

1. Analysis of earth to be compacted

An analysis of the composition of the land will be made, as well as a granulometric study of the same. As well, as studies of its capillarity and compaction in the laboratory. For the product to be effective it is necessary that 60% of the composition of the lands are arid and 30% approximately clay, of which 10% must be at least clay of size 0.016mm.

| IDEAL GRANULOMETRIC COMPOSITION OF LANDS TO COMPACT | | | |
|---|-------------------|------------|----------------|
| TAMIZ/ SIEVE mm | CRIBA % (pass) | Variable % | TYPES OF LANDS |
| 40 | 100 | 90-100 | Arid |
| 30 | 80 | 75-95 | Arid |
| 10 | 70 | 65-75 | Arid |
| 3 | 55 | 50-60 | Arid |
| 0,5 | 30 | 25-35 | Clays |
| 0,016 | 12 | 10-14 | Fine clays |

The tests that will be carried out with the sample of the land to be treated will be:

- Identification and classification of the soil.
- Definition of: the limits of Atterberg, the optimal Proctor, the curve of granulometry, the study of inflation.
- The capillary tests of the soil will be effected through the placement of a probe of the soil to be evaluated in a bucket with water at a height of 2 cm for 4 days.
- Calculation of the CBR after the drying of the test piece used for the capillary study.



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2. Product HARD ECOSOIL SYSTEM®

- **HES (HARD ECOSOIL SYSTEM®):** Ready-to-use mixture consisting of four components (Water ($\pm 72\%$), Cationic surfactant ($\pm 10\%$), **EcoHardinil®** - non-toxic hardener polymer (10%) and Catalyst ($\pm 8\%$)).

HES has a dosage of 1.00 to 1.25 liters per m².

3. Application of the products of HARD ECOSOIL SYSTEM®

- Land preparation (at this stage it may be necessary to add aggregates or clays to the ground)



- Application de HES



- Mixing HARD ECOSOIL SYSTEM® with the earth.





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- **Compaction (Pressure of 40Kg / cm²)**



4. Advantages of HARD ECOSOIL SYSTEM®

a. Resistance - Effectiveness

- Increase of the load bearing force or soil load (CBR) a minimum of 3 times the original value of the soil before the application of **HARD ECOSOIL SYSTEM®**.
- Stability, impermeability, firmness and compaction for a minimum of 25 years.
- Activación de las fuerzas cohesivas del suelo.
- Reduction of the rolling layers (from 60mm to 20 / 25mm).
- Quick application: no curing time.

b. Economy

- Use of a minimum of 75% of the available land, with the contribution of aggregates / clays when necessary to improve the compaction.
- Stability, firmness and compaction for a minimum of 25 years.
- 30% cheaper than the usual use of products.
- Savings of 60% of the quantity of asphalt for high impact roads.
- Reduction of the rolling layers (from 60mm to 20 / 25mm).
- Simplicity of machinery in its application.
- Rapidity in the use of the land because there is no time to cure.
- Ability to treat 10,000 m² per day.

c. Ecology

- Impermeability: stable and permanent barrier against contaminant infiltration.
- NON-TOXIC product for the environment.

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