Road-Pothole-Repair-Material

Application - Processing - Production for civil contractors and clay material producers with Alphasoil®-06 catalyst for modern soil stabilization / soil consolidation

Alphasoil®-06-Additive for Roof Tile-, Brick- & Tile-Production pro Quality Improvement and Reject Rate Reducing
Alphasoil®-06 Pothole-Repair-Material

Alphasoil®-06 is a liquid, water-soluble catalyst.

Alphasoil®-06 works as a catalyst on cohesive soils. It changes the physical properties of the surface in such a way that the ground attains a better strength and density than would be possible from its nature alone.

This comes about by continuously changing the water-binding power of soil particles (or 'colloids') and the change of electrically charged soil particles (ions). As a result, capillary action is almost completely broken down.

Soil stabilization after Alphasoil®-06 is based on an electro-physical- process. The adhesive water film will be broken and the soil material will be prepared for the ion exchange.

With the adequate compaction of the material, the pore water is expelled out of the colloids, is irreversible agglomerated and thus forms a very stable and sustainable base.

That means, that there is no more pore-water and capillary-water existing in the soil material.
Alphasoil®-06 Pothole-Repair-Material

Alphasoil®-06 is eliminating the shrinking and swelling behavior of cohesive (loam, clay) soils and promotes the water-drainage of those soils.

The soil stabilization with Alphasoil®-06 is no gluing or mortaring.

Alphasoil®-06 prepares cohesive soil material to a optimal agglomeration after compaction.

Even by later traffic and load, the material gets more stability by the time, in contrast to pothole filling with cold asphalt, which is only slightly water-impermeable and sustainable.
1. Chemical water bound within the crystalline structure of the soil

2. Absorbed water which is held on the surfaces of the soil particles

3. Water which is bound by surface tension to the points of contact of the soil particles.

4. Capillary water in the pores between soil particles

Except for molecular water (point 1), which is chemically combined, all of the above water categories are involved in the Alphasoil®-06 reaction process.

The main purpose of Alphasoil®-06 is to reduce the amount of water held in the soil, which forms voids in the soil.

These voids can then be closed during compaction, thus enabling optimum compaction. The water reduction also decreases the swelling capacity of the individual soil particles.
Alphasoil®-06 is not an aggregate or binding material like cement or lime, asphalt or acryl. Instead, it needed only be present in the soil to provide a more compact bedding and almost entirely prevent subsequent swelling. Moisture and frost have no effect on this.

Alphasoil®-06 works as a catalyst, it also cannot be washed out. The capillary action of the soil is largely interrupted and is thus resistant against hard weather conditions. Damage from freezing or drying is therefore not possible.

The correct treated soil with Alphasoil®-06, is agglomerated and will remain in this state. Moreover, the treated soil got a water permeability value of $K_f > 10^{-10}$ and is therefore largely fluid impermeable.

The phenomenon on the with Alphasoil®-06 treated soil is, that the material is getting stronger day by day. By the time the material get under load and traffic even more stable.

(further information on the mode of action, see "Alphasoil®-06 presentation")
Alphasoil®-06 is nonpolluting!

Alphasoil®-06: The determination of the biodegradability of the product sample “Alphasoil®-06” was named after the directive OECD Guidelines for Testing of Chemicals “Inherent Biodegradability: Zahn-Wellens/EMPA Test 302 B”. Adopted 17th July 1992 and after German unification procedures for water, wastewater and sludge investigation, testing procedures with aquatic organisms (Group L), determination of the biodegradability, static test according to DIN EN 29888 (L25).
A pothole (outbreak) is a road damage that shows the poor state of the road fixture accordingly the sustainable roadbed.

The causes of these road damages are mainly to lead back due to the collapse of gravel teeth of the roadbed, which results from water, moisture, frost, mud pockets and heavy traffic and the resulting sediment displacement.
Cross section of a road after traditional "macadam" - construction with collapsed and sedimented gravel-bed by point load of the gravel grain by heavy traffic and water washout.

Ruts, cracks and potholes in the asphalt and gravel surface are the results.
Through punctual load of heavy goods traffic to the non-cohesive gravel (unbonded macadam base course), single gravel stones are pressed in the wet soggy subsoil and the pulpy fines are pressed upwards. Tooothing of the formerly compact gravel bed is no longer given, mud & water pockets arise.
Alphasoil®-06 Pothole-Repair-Material

Damaged road surface (pothole) by collapse of unbonded gravel substructure

Through punctual vehicle-load and erosion damaged "macadam" gravel bed / Frost protection of unbonded incohesive soil
Since a long time, various types of cold asphalt mixtures for pothole fillings are offered and applied. This cold asphalts are typically very expensive and only contingently useful for a sustainable and stable pothole complete backfilling. This filling material is not high compactable and shows only in versions with chemical binder components, for a relatively short time, a temporary permeability interruption.

The capillary action is not interrupted and the permeability of the material is further given.
Cold asphalt is very good suitable as a final wearing course in a thickness of 1 - 3 cm on a stable water-resistant filling material as completion.
The problem with cold asphalt as a complete filling of relatively deep potholes is, that the base can not be protect sufficient and sustainably from moisture, water, frost and heavy loads in an such high thickness of the asphalt-emulsion. The partly destroyed gravel base will be expanded through the sediment displacements of the roadbed by water erosion, mud pockets, frost and heavy traffic. With this renewed damages accordingly re-repair of the breakups at relatively short intervals are preprogrammed.

Moreover, such filling with cold asphalt alone shows no particularly large lasting stability in relatively deep breakups.
Alphasoil®-06 Pothole-Repair-Material

Looking after alternatives, is the consequence, to find alternatives, the solution!

One application according Alphasoil®-06 is the very sustainable core-filling of potholes compared to other options and products.

As an alternative to costly- and time-intensive renewals, this refurbishment and repair provides a number of advantages. It can thus eliminate damages immediately and protect from further decay.

In addition, the repairing with the produced according Alphasoil®-06 cohesive fill material is high water and moisture insensitive, by an at same time very high stability.

The penetration of water into the damaged base course and icing in freezing can be effectively prevented.

In connection with a small amount of asphalt-emulsion, the road surface can be completed.
Alphasoil®-06 Pothole-Repair-Material

Alphasoil®-06 opportunity for pothole filling

Alphasoil®-06 catalyst is a environment friendly product for stabilizing cohesive soils. One of the application for this innovative product is to fill potholes in a very successful way, compared to other opportunities and technologies.
Alphasoil®-06 Pothole-Repair-Material

Procedure:

1. Have the **Alphasoil®-06** liquid concentrate mixed along with minimum 20% to maximum 30% pure clay, 50% sand, 20 to 30% small gravel-stones (broken grain gravel size 4/11) and water as prescribed by the Alphasoil®-06 description by an compulsory mixing plant.

2. Have the potholes completely filled up by a little spilling over with the **Alphasoil®-06** soil mixture.

3. Have a compactor go over the filled pothole a few times, until the mixture has been compacted very well.

4. Remove the little leftover rest from around the pothole…

5. …so that the wear layer can connect to the existing wear layer, bring a little Asphalt / Bitumen or of what is always the existing wearing layer is made from.
application:

Remove the excess and residues of Alphasoil®-06-Soil-Mix, compact and add bitumen or asphalt to an unit for the top layer.
Product advantages:

Cost saving

The pothole has now been filled with a water resistant Alphasoil®-06-Soil-Mixture, whereby the lifetime of the pothole filling is increased in comparison to other materials.

No anti-capillary layer or any additional layer needed.

Maintenance work for that particular pothole shall no longer be required because the filling cannot be washed out or damaged by meteor-water (rain).

Time saving

No curing period necessary.

Stabilization and immobilization possible in one procedure.
Alphasoil®-06 Pothole-Repair-Material

Pothole filler production

it is required:

- a minimum of 20% to 30% pure clay (grain size <0.002 mm *)
- 50% Sand (grain size >0.063mm to 2mm *)
- 20% to 30% small gravel-stones (grain size 4/11)
- 0,120 liter/m³ Alphasoil®-06-Concentrate on...

...that amount of water, which according to the difference of the NMC (moisture content of the above mentioned clay + sand + 4/11er gravel mixture) to the...

...OMC (moisture content for optimum compaction after Proctor test of the above mentioned clay + sand + 4/11er gravel mixture) to the required Alphasoil®-06-Working-Solution (please refer „Alphasoil®-06 mix explanation“).

Mix the above mentioned material with a compulsory mixer.

(* The particle size distribution of clay + sand, can be done by the "finger test". This method allows a soil-determination without additional aids by coarse accuracy. For an accurate determination of soil-determination, a sieve-hydrometer-analyse is required.)
Alphasoil®-06 Pothole-Repair-Material

Pothole filler production

Recommended Equipment for Self Producing:

- Clay/Loam Mining
  - if necessary add Sand
  - add 4/11mm Gravel-Grain

Suitable mixer for the clayey material:
- a.) compulsory mixer with integrated sieve
- b.) twin-Shaft Mixer

Grain optimizing of the clay/loam-soil:
- a.) manually: sieve
- b.) mechanical: crusher mill

For soil moisture determination of the material:
- c.) moisture measurement – set, according carbide method
- d.) proctor-test to determine the OMC
Alphasoil®-06 Pothole-Repair-Material

Pothole filler production

for professional clay material producers, for marketing as a finished product in bags and buckets.

Brick manufacturers, tiles manufacturers, quarry companies, clay-pit companies ... ...are be able to ennoble their cohesive material with Alphasoil®-06 in its own plant, to an high quality and frost-proof pothole-filler. Producing, filling and offer "ready for use" for marketing. Alternatively, also a building material for road construction after Alphasoil®-06, can be produced in own mixing plants ("Mixed in Plant") for "ready to use" by the own marketing.
By adding **Alphasoil®-06** additive to the cohesive raw material mixture for brick- and tile-production, 15% to 30% fewer rejects can be expected during and after the burn process.

The cohesive material can be compacted better by adding **Alphasoil®-06** as an additive to the raw material: no air pockets and voids as well less water in the product are the result.

Thereby, cracks and fractures during and after the burn process, are largely prevented (crack and fracture prevention).

The material becomes fine pored and admits a higher compaction.

The capillary action in the final product is reduced in addition enormously.

This was determined, among other things in tests by professional users.
Alphasoil®-06-Additive

Quality improvement & waste reduction for roof tile-, brick- & tile-manufacturing

Brick-, Roof Tile-Production

For conditioning and blending of the raw material, the moisture content of the clay/loam mixture is set to the desired value with the Alphasoil®-06 working solution (Alphasoil®-06-Concentrate on the necessary amount of water). The mined clays and loams have different moisture contents after mining, which must be compensated. Also important is the drying process. The blank must be dry, because water increases in evaporation in volume to 1500 times. The least trapped water content in the raw material would thus destroy the bricks during firing.

*Alphasoil®-06 promotes this necessary dewatering of the raw material for the subsequent drying and firing process enormously.*

Ceramic-, Tile-Production

The art of preparation is inter alia, to be able to control the prevention of demixing before molding and the shrinkage behavior during firing. These factors depend largely not only on the particle size, but above all on the water content, air inclusion and grain shape.

The more water, air pockets and rounder the sand graining in the raw material, the lower the stability and the higher the shrinkage of the final to burning blank.

*Thereby, the dewatering of the raw material for an adequate compaction and avoiding of air inclusions is promoted enormously by Alphasoil®-06.*
The soil consolidation and stabilization by **Alphasoil®-06**

improves the installation capability and compactability of cohesive clay & loam soils.

Thereby a sustainable and durable bearing capacity, stability, volume-stability as well water- and frost-resistance is achieved.

In general, Alphasoil®-06 can be successfully used for soil stabilization and soil improvement of any kind with cohesive soil material...

... and is not limited to the here described application for the producing of pothole repair material and for quality Improvement and waste reduction in the roof tile- brick- and tile-production.

Note for pothole repairs:
The to be used broken-grain gravel material in grain diameter $\approx 4/11$ mm, can be made also from stable recycled materials like brick fragments or high-strength recycled concrete (RC concrete) according to European Standard EN 206-1. This brick fragments or recycled concrete, however, should correspond, after the breaking and vanning, to the sieve-classification, corresponding to the approximate required 4/11mm grain fractions. Because the recycled material is included in the water resistant Alphasoil®-06-filling after compaction, a macerate by moisture is not given. Unstable gravel material from soft broken grains such as soft limestone etc., is not usable as supporting grain!
Please contact us via:

Alphasoil®
Technical solutions GmbH

Heimstraße 8
D-64521 Groß-Gerau

Germany

Tel.: +49 (0) 6152 – 83775
Fax: +49 (0) 6152 - 9479132
mail@alphasoil.com
www.alphasoil.com