Alphasoil®-06 brick production
description for “self-help”

Our guiding principle during the development of Alphasoil®-06

From the basic idea for the inexpensive production of unfired bricks from loam for the Third World, is developed an innovation for soil stabilization of cohesive soil material. The idea was from clayey loam, which globally occurs very frequently and is generally cheap available, to turn into a useful building material for brick production without needing to burn the bricks for weather- and water resistance.

To offer, with locally occurring loam material, a low cost alternative to create better quality of life for the population.

From this developed a pioneering innovative way for soil stabilization of all types with the involvement of clayey soils and Alphasoil®-06.

Alphasoil®-06 is multiple applicable, while helping people in many areas, such as infrastructure, residential construction, construction of water reservoirs and various other required applications.

Alphasoil®-06 is a liquid catalyst concentrate which helps when used correctly, to produce from the locally cohesive soil (clay / loam) a valuable and relatively inexpensive construction material.

*Picture above: clayey laterite in Africa*
Loam / clay is a proven building material for thousands of years and around 2 thirds of earth’s population lives in clayey loam buildings. Unfortunately, the burning of bricks got a high energy requirement and a high calorific technical effort, especially in developing countries, which is for the most people not affordable. Of necessity, therefore, unfired bricks are used – which unfortunately are not water resistant - and cannot withstand very long the destruction, caused by ever-increasing vagaries of the weather and rain fronts. In many cases has to be dispensed of unfired bricks, then the clay material is applied “pure” in wooden fencing.

Picture above: loam hut in Ghana Africa

Our thought on this subject is to help people in developing countries, but not with money or finished products. We want to give them the opportunity, with the locally available soil material, with their own labor force and relatively easy to mediated “know-how” as well as the necessary equipment, to help themselves for the elemental basic need of a domicile and thereby to have a base to an perspective in a better future.
We believe that these infrastructure improvements is or may be also an important step in the direction of the current refugee situation. Because if people have an activity to help themselves for a stable, affordable and pleasant accommodation, which can be a basis for economic self-help and are not forced to leave their home by hopelessness and lack of perspectives.

**Alphasoil®-06 - Technology**

*pressed and unfired water-resistant bricks*

The **Alphasoil®-06 technology** replaces burned bricks and mortar by the use of Alphasoil®-06 manufactured bricks, which are bonded to each other with the same soil material diluted with water and liquid **Alphasoil®-06 catalyst**.

The **Alphasoil®-06 technology** is a unique technology which allows relatively easy, upcoming locally available soil, enhance in an acceptable raw material for the brick production.

The water sensitivity of such unburned bricks is brought under control and even up to the complete impermeability (by adding missing grain fractions - clay or sand).

### Benefits of Alphasoil®-06 Bricks

- water resistant, no capillary action, remains dimensionally stable in case of moisture,
- high breaking strength of the bricks $> 12\text{N/mm}^2 = 12\text{MPA}$
- energy saving, no burning, no time-consuming and costly transportation,
- Excellent thermal features, excellent thermal capacity, almost twice as efficient as burned adobe bricks,
- Environment friendly, Alphasoil®-06 acts as a catalyst, very low application rate, environmentally certified,
- simple processing, also possible by unskilled staff,
Benefits of Alphasoil®-06 in detail:

Significant cost savings

Transport cost savings: Brick Production on site.

Locally available clayey loam soil is the main raw material.

Limitations: no humus like organic content of roots, leaves, etc., (topsoil about 20 - 30 cm deep). Minimum percentage of clay (grainsize <0,002mm) higher 20%. By means of laboratory test (combined sieve and sedimentation test) or by means of finger test detected (see description finger test).

Energy saving: no expensive and complicated burning, brick is pressed hydraulically or mechanically, no high energy costs, no energy consumption through long transports.

Equipment costs: favorable Equipment (hydraulic press, compulsory mixer, grinder), mounted onto a trailer can be brought quickly from site to site, by diesel engine or generator power independently.

Extraneous material: no mortar or cement required by means of:

1. specially formed profile bricks - engaged
2. is diluted with the same catalyst material and water for bonding.

Processing:

Easy operation: 1 trained operator and 3 - 6 untrained workers.

Quick application: bricks can be used immediately after pressing by the special brick mold (locking system), simple but precise installation, it always arise straight walls, even with inexperienced personnel. Attractive brick surfaces can be achieved through natural color of the soil, the walls may also be sealed with plaster as well deleted with paint.
**Alphasoil®-06 – Concentrate**

surface active agent in monomeric and polymeric mixture, solvents, wetting agents and catalysts,  
customs tariff number Nr: 38.24.90.15  

Minimum order amount 6 x 25 liter canister (150 liter)

1 liter **Alphasoil®-06-concentrate** sufficient for 8.33 m³ loam material  

Application rate: 0.12 liter **Alphasoil®-06-concentrate** per m³ loam material

Prices are excl. VAT., Ex works EXW (or free carrier FCA on payment in advance) according to Incoterms 2010.

Packaging: 25-liter plastic canisters  

Delivery time in larger quantities 4 - 6 weeks after written and recorded order  

Payment: 50% deposit on writing only binding order - Rest before taking over the goods to the freight carrier.  
In case of nonacceptance the ordered goods, the deposit will be forfeited.  
Please refer "Terms and Conditions Alphasoil Technical Solutions GmbH” which will be accepted in writing by the customer.

**Soils :**

Suitable soils: All soils with a clay fine fraction of <0.002 mm grain size of at least 20%.  
If the clay content is greater than 40%, the base material can easily be emaciated by adding sand in the ratio.

If there is not enough clay (<0.002mm) in the soil, the lack of clay content should be added to achieve the necessary clay content of 20%.
Necessary machinery and equipment:

1. Grain optimization of the soil:
   - manually: sieve
   - mechanically: crusher mill

2. Suitable mixers:
   - Compulsory mixer with integrated sieve
   - Twin-Shaft Mixer

3. Press - important, as much pressure as possible!
   - mechanical hand press
   - mobile hydraulic press with hydraulic compulsory mixer
c. stationary semi or fully automatic brick plant

Useful additional equipment:

- mechanical brick cutting machine
- mechanical testing device for break load
- moisture measurement – set, according carbide method
- halogen moisture analyser
Brick-mold modification:

The supplied standard compression moldings of most brick presses which are available on the market, are not usable because of the missing Drainage holes who are necessary for the Alphasoil®-06 technology. These need a modification.

The water, that serves as an Alphasoil®-06 catalyst carrier and what is located after the mixing process in the base material, necessarily must have the possibility to get out of the soil during the pressing and compacting process of the brick.

The brick-compression molding should therefore already be modified in the factory of the press manufacturer with the necessary drainage holes at a distance of 0.5cm to 1cm.

Should this not be possible at the factory, the brick mold must be modified eg in a metalworking company, backfitting with these important drainage holes. The prerequisite for this, should be ensured.

Images above and below: Examples of a brick-mold with the necessary drainage holes.
brick molds:

Generally a wide range of molds are possible.

Standard form with interlock:
can be used without mortar in the dry method or
with liquid Alphasoil®-06-soil mixture.

brick dimensions: width 220 mm
               height 115 mm
               length 50 mm to 240mm

breaking load: > 12 N/ mm² = 12 MPa
               about 3 times higher than
               untreated loam brick

Average weight, depending on the type of soil: ca. 9 - 10 kg

Approximately 200 bricks (220 x 200 x 115 mm) per m³ of stabilized soil.

These bricks are very easy to process, no previous knowledge required,
very stable, good heat and sound insulating, water-resistant.

For the floor or bottom plate, the treated Alphasoil®-06 soil material can also be
stomped. The result is a very good insulating and water-impermeable layer – where
you can lay directly floor coverings or tiles after good drying – for the entire house,
hardly or rather no cement is required.

The quality of Alphasoil®-06-bricks depends on several factors:

1. From the existing soil respectively from the preparation of the soil,
   means: from the clay content of the grain size distribution, moisture content,
   the preparation (sieving, grinding, etc.)

2. From the optimal processing, means: good mixing and then well compacting.
3. An important factor is the choice of appropriate equipment. Often various causes leads to, that non-optimal equipment is available, what then lowering the result but never leads to a failure in the result.

Some possible reasons for a lack of equipment:
lack of energy (electricity), in difficult terrain or very simple - lack of financial resources.

Due to our extensive experience, we recommend the following packages, leading in any case to an success:

1. Minimum package: 1 large sieve, some rhynds for hand mixing, a mechanical hand press (possibly with hydraulic) carried out all the work by hand, more staff - more bricks, 500-600 bricks / 8 hour
   acquisition costs ca. 2.000,- €

2. Standard package: 1 large sieve, a mobile brick press on a trailer with its own diesel engine integrated with a hydraulic compulsory mixer (ca. ¾ m³) 1 or 2 hydraulic presses: 3 - 6 of unskilled helpers and 1 trained machine operator
   1500-2000 bricks / 8 hour
   acquisition costs ca. 10.000,- €

3. Optimal package: 1 mill respectively crusher for the soil material, a double shaft mixer and fully automatic press 3 man staff, important is enough energy (electricity) on site,
   3000 brick / 8 hour
   acquisition costs ca. 25.000,- €