

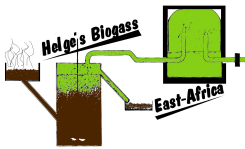
Cement plaster with special additives

Good results in water- and gas-tightness have been achieved by adding 'water-proofer' to the cement plaster. For gas-tightness, double the amount of water-proofer is required as compared to the amount necessary for water-tightness. The time between the applications of the layers of plaster should not exceed one day, as the plaster becomes water-tight after one day and the new plaster cannot adhere to the old plaster. The following 'recipe' from Tanzania guarantees gas-tightness, provided the masonry structure has no cracks:

1. layer: cement-water brushing;
2. layer: 1 cm cement : sand plaster 1 : 2.5;
3. layer: cement-water brushing;
4. layer: cement : lime : sand plaster 1 : 0.25 : 2.5;
5. layer: cement-water brushing with water-proofer;
6. layer: cement : lime : sand plaster with water proofer and fine, sieved sand 1 : 0.25 : 2.5;
7. layer: cement screed (cement-water paste) with water-proofer.

The seven courses of plaster should be applied within 24 hours.

A disadvantage of cement plaster is their inability to bridge small cracks in the masonry structure as, for example, bituminous coats can do.



Construction Details of Biogas Plants

This section provides detailed information on materials and devices used in the construction of biogas plants:

- Checklist for construction
- Agitation
- Heating
- Piping systems
- Plasters and Coats
- Pumps
- Slurry equipment
- Underground water

Checklist for building a biogas plant

1. **Finishing the planning**, i.e. site evaluation, determination of energy demand and biomass supply / biogas yield, plant sizing, selection of plant design, how and where to use the biogas, etc., in accordance with the planning guide
2. **Stipulate the plant's location and elaborate a site plan**, including all buildings, gas pipes, gas appliances and fields to be fertilized with digested slurry
3. **Draft a technical drawing showing all plant components**, i.e. mixing pit, connection to stabling, inlet / outlet, digester, gas-holder, gas pipes, slurry storage
4. **Preparation of material / personnel requirements list and procurement of materials needed for the chosen plant:**
 - bricks / stones / blocks for walls and foundation
 - sand, gravel
 - inlet / outlet pipes
 - metal parts (sheet metal, angle irons, etc.)
 - gas pipes and fittings
 - paint and sealants
 - gas appliances
 - tools
 - mason and helper
 - unskilled labor
 - workshop for metal (gas-holder) and pipe installation
5. **Material / personnel assignment planning**, i.e. procedural planning and execution of:
 - excavation
 - foundation slab
 - digester masonry
 - gasholder
 - rendering and sealing the masonry
 - mixing pit - slurry storage pit
 - drying out the plant
 - installing the gas pipe
 - acceptance inspection
6. **Regular building supervision**
7. **Commissioning**
 - functional inspection of the biogas plant and its components
 - starting the plant
8. **Filling the plant**
9. **Training the user**