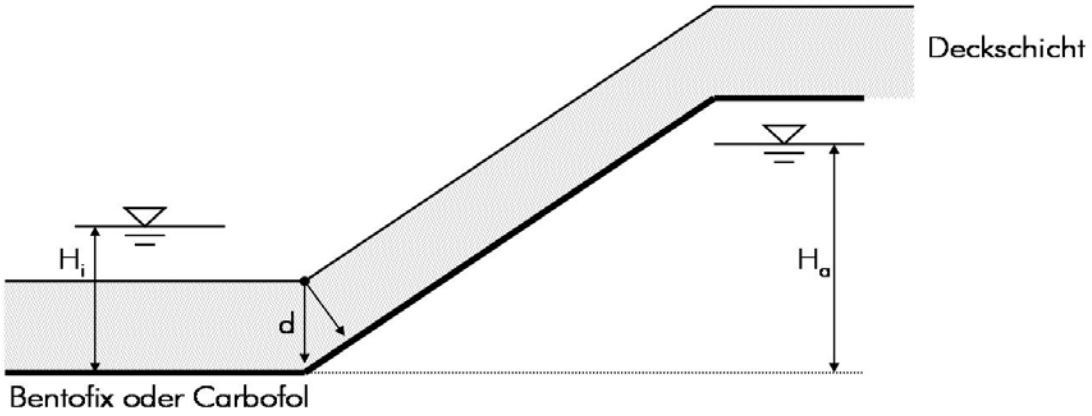
# Buoynacy of the sealing system

**Calculation of the required cover soil layer thickness on top of the planned sealing system to prevent buoyancy.**

## Input value

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|---|---|---|---|---|
| Water level in the pond above the sealing system: | $H_i$ = | 0,00 | m | (Wasserstand innerhalb Dichtung) |
| Groundwater level above the sealing system: | $H_a$ = | 0,60 | m | (Wasserstand außerhalb Dichtung) |
| Unit weight of water: | $\gamma_W$ = | 10,00 | kN/m³ | |
| Unit weight of the soil layer above the sealing s | $\gamma_B$ = | 16,00 | kN/m³ | (gemischtkörniger Oberboden) |
| Partial safety factor (favorable, permenant loads | $\gamma_{G,stb}$ = | 0,95 | [-] | |
| Partial safety factur (unfavourable, permanent lo | $\gamma_{G,dst}$ = | 1,05 | [-] | |

## Bouynacy force $\sigma_A$ below the sealing system:

$\sigma_{A,d} = H_a * \gamma_W * \gamma_{G,dst}$

## Load $\sigma_G$ above the sealing system:

$\sigma_{G,d} = (d * \gamma_B + H_i * \gamma_W) * \gamma_{G,stb}$

*(The load from any existing water level HW in the pond is neglected on the safe side, if the minimum water level can not be permanently ensured.)*

## Safety against bouynacy (dregee of untilisation):

$\mu = \sigma_{A,d} / \sigma_{G,d} \leq 1,0$

## Required cover soil layer thickness d above the sealing system:

$\mu = \sigma_{A,d} / \sigma_{G,d} \leq 1,0$
$\sigma_{G,d} \geq \sigma_{A,d}$
$d \geq ( \gamma_{G,dst} / \gamma_{G,stb} ) * ( H_a * \gamma_W ) / (\gamma_B - H_i * \gamma_W )$

required cover soil layer thickness d: $d \geq$ 0,4145 m

## Result:

The required coverage of the sealing system d to protect against buoyancy and the required cover soil layer thickness is mind. 0,41 m.



ARUN DISTRICT COUNCIL Y/98/18/RES