Be careful when choosing raw material!

Geosynthetic Reinforcements in high alkaline conditions

Common evaluation[1]

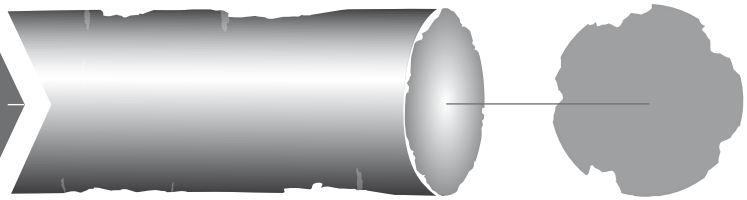
Tensile forces impact

Separate testing

pH > 9

Chemical impact

PET **Slight microcracks** in the material surface due to chemical impact



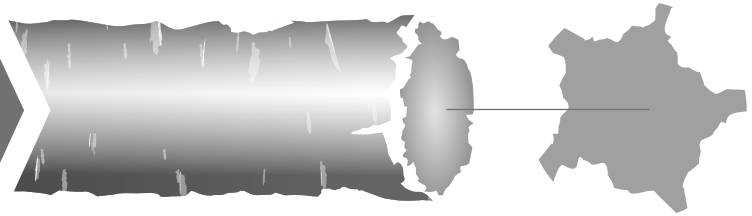
Slight cross-section reduction

Appropriate evaluation[2]

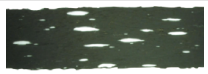
Tensile forces impact + **Chemical** impact

pH > 9

PET **Tensile forces** increase microcracks and **accelerate crack propagation**



Increased cross-section reduction



Microscope image "strand"[3]

Microscope image „fibre"[3]

Test results:

120 years
projected durability

1000-times
shorter durability

3 weeks
real durability

Test conditions pH = 12.6 (Saturated Calcium Hydroxyde) at 40 °C under load

Therefore our recommendation: PVA*

*Reliable long-term reinforcement: no surface damage due to hydrolysis, cross-section reduction.

[1] Typically the projected durability, with respect to chemical degradation, is determined without tensile stresses.

[2] The determination of the projected durability under chemical impact with simultaneous tensile stresses reduces the durability significantly in comparison to the determination without tensile stresses. See: [1] Müller, W. Alterung von Bewehrungsgittern aus Polyester. Geotechnik. Nr. 6, 2013, S. 359-366 and [2] Müller-Rochholz, J. Bronstein, Z. (1994). Einfluss von Zugbeanspruchung auf das Hydrolyseverhalten von Polyester (PET). Schlussbericht 1.94.

[3] Surface erosion and cross section reduction of PET strand and PET fibre. See [2] and [3] Greenwood, J., Schröder, H., Voskamp, W. (2015). Durability of Geosynthetics (2nd Edition). Delft: SBRCURnet.

HUESKER
Ideen. Ingenieure. Innovationen.