Geosynthetic Clay Liners, why hydraulic conductivity (k-value) is the wrong value for a tender

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Geosynthetic clay liners (GCL or GBR-C) are now used in many applications as an alternative to clay liners (CCL), as they offer considerable ecological advantages and protect the natural clay resource.

Tenders for geosynthetic clay liners mainly contain requirements for hydraulic conductivity (k-value). This value alone leads the customer / user in the wrong direction when selecting the product to be used. This value alone does not provide any information about the flow rate through the sealing layer, as this can only be correctly determined together with the thickness (indirectly the mass) of the sealing layer.

Alternatively, the permittivity or the index flux can be evaluated and shall be used in tenders.

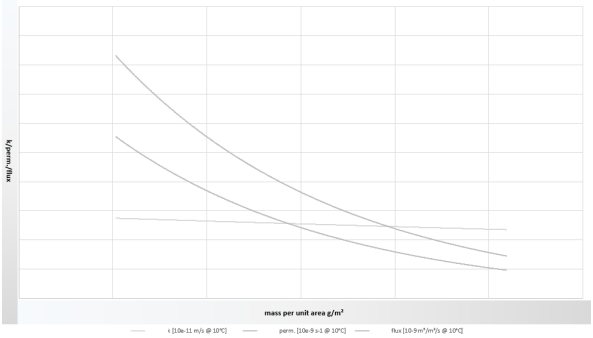

Fig. 1. k-value, perm. flux depending on mass.

The paper shows the influence of the mass of the bentonite on the results and the real flow rate, also in comparison to other sealing elements such as clay.

However, determining the thickness of the GCL is also subject to errors for the calculation of the k-value.

In EN 16416, the thickness measurement for the calculation of the k-value is different from the thickness measurement measured according to ASTM D5887 for the calculation of the k-value.

In addition, in the case of EN 16416, a load must be applied by measuring the thickness.

REFERENCES

EN 16416 (2023). Geosynthetic clay barriers – Determination of water flux index – Flexible wall permeameter method at constant head

ASTM D5887 (2023). Measurement of Index Flux Through Saturated Geosynthetic Clay Liner Specimens Using a Flexible Wall Permeameter