

Hydraulic conductivity of geosynthetic clay liners in mining applications

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Abstract. Over recent decades, the presence of lower grade ore has led the mining industry to reach larger scales of production and develop new technologies for mineral extraction, such as heap leaching. Increasingly, geosynthetic clay liners (GCLs) are being used in tailings and mine waste applications, including as liners for uranium mill facility tailings, brine evaporation ponds, waste rock dumps, and secondary liners for heap leach pads. GCLs are thin (< 10 mm) factory manufactured hydraulic barriers used in a variety of environmental containment systems as an economical alternative to thick layers of compacted clay. However, the leachates encountered in mining applications often contain higher salt concentrations and more extreme pHs than conventional applications. Hydraulic conductivity, k , data are necessary to demonstrate suitability of GCLs in mining applications. This study investigates the use of fiber reinforced GCLs with solutions encountered in mining applications. Hydraulic conductivity tests were performed using a synthetic soil porewater, a synthetic gold pregnant leach solution (PLS), a synthetic bauxite PLS, and a synthetic copper PLS. GCLs were permeated following ASTM D6766-12, but without backpressure saturation, under varying effective stresses. This talk will further discuss the laboratory methods used, and show how mining leachates and effective stress effect the k of GCLs.