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Abstract: Manufacturing defects in a needle-punched geosynthetic clay liner (GCL) may include variation of mass per unit area of the bentonite, uneven thickness of the GCL, poor bonding of the composite components (geotextile/bentonite/geotextile) and, in some cases, a poor distribution of needle-punched fibres. This last case can result in unreinforced patches in the GCL, which can be detrimental to its hydraulic or gas barrier performance and also its internal strength. This paper presents the results of an experimental investigation into the effect of the distribution of needle-punched fibres on the gas permeability of a GCL. It is shown that, at high gravimetric moisture content, a poor distribution of needle-punched fibres can result in gas permeability up to three orders of magnitude higher than in a sample with uniform distribution, whereas the difference was found to be small at low gravimetric moisture content.

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