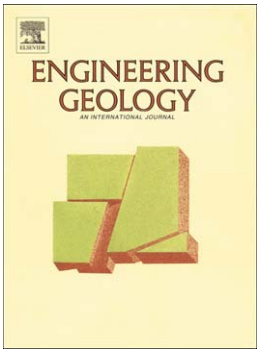

What maximum permeability can be measured with a monitoring well?

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What maximum permeability can be measured with a monitoring well?

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ABSTRACT

The PVC screens of recent monitoring wells (MWs) have thin slots and a low open area, usually in the 2–8% range. The MW screen and filter pack may cause important head losses which are not taken into account when interpreting the data of permeability tests performed using the MW. The equivalent hydraulic conductivity *K* of usual PVC screens was defined by hydraulic tests in a water tank, which have shown that gas micro-bubbles, a common problem in MWs and filter packs, contribute to increase the parasitic head losses. Closed-form equations and numerical models are used to explain by how much a field permeability test in a MW under evaluates an aquifer *K* value due to parasitic head losses in the screen and filter pack. The MW can properly measure the local soil *K* value only if it is markedly lower than the maximum MW value as obtained in a water tank. The MW measuring capacity can reach 5×10^{-3} m/s for large slots and deaired water, but is most often between 10^{-5} and 10^{-4} m/s for small slots in field conditions, and it can be only 10^{-6} m/s for poorly designed and installed MWs. The limited measuring capacity may yield artificial permeability scale effects as often registered in environmental studies.

Keywords: monitoring well; permeability test; screen; filter pack; aquifer