

A falling-head procedure for the measurement of filter media sphericity

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Abstract

Filter media sphericity is normally determined experimentally in a laboratory filtration column. The pressure drop is measured across a bed of known depth while the filtration rate is kept constant. The sphericity is then calculated from a theoretical headloss relationship using the Ergun equation. This paper proposes a method along similar lines, but suggests a much simpler experimental procedure. Instead of having to maintain a constant flow rate and measuring both the flow rate and the pressure, the column is filled and the water then allowed to drain through the bed. The only measurement to be taken is the time it takes for the water level to drop through a known distance, which is called a falling-head procedure. The full theoretical development of the method is provided, as well as a detailed experimental procedure. The practicality of the method is demonstrated with tests performed on a variety of filter media, and a fully-worked example is presented.

Keywords: filter media, granular filtration, sphericity, Ergun, falling-head test, grain shape