

Test Summary

Formation factor via Surface Resistivity test

Objective

To quantify the ability of a concrete mixture to resist transport of fluids through the matrix.

Summary:

The test is based on the premise that electrical charge is more easily transported through pore solution than through solid hydration products, thus measurements of resistivity is an indication of the amount and connectivity of pores in the system. Resistivity is affected by a number of factors including degree of hydration, pore solution chemistry, temperature and formation factor. Formation factor is a physical property of the system and is assessed as the ratio of resistivity of the sample over the resistivity of the pore solution.

This test seeks to control variables such as pore solution chemistry and temperature for samples evaluated over a range of ages.

Guidance on desired formation factor values is provided in AASHTO PP84.

Procedure:

4×8" cylinders are stored in a controlled solution of NaOH, KOH and Ca(OH)₂ that approximates a standard pore solution. At selected ages, samples are removed from the solution, and ensuring that they are in a saturated surface wet condition, resistivity is measured in accordance with AASHTO T358 or TP 119 using a Wenner device (with approximate corrections for sample size) or uniaxially.

Formation factor is calculated as the ratio of the electrical resistivity of a body to the resistivity of the pore solution.

$$F = \rho/\rho_0$$

Where:

ρ is the measured resistivity of the sample.

ρ_0 is 0.1 Ω .m if the samples are stored in the appropriate solution.

More info:

Dr. Jason Weiss

School Head, Professor

Civil & Construction Engineering, Oregon State University

111F Kearney Hall, Corvallis, Oregon 97331

jason.weiss@oregonstate.edu

Phone: 541-737-1885