

Evaluation of Repeatability of Kansas Test Method KT-73, “Density, Absorption and Voids in Hardened Concrete,” Boil Test

Report Number: KS-15-04 • Publication Date: June 2015

Rodney A. Montney, P.E.
Susan F. Barker, P.E.

*Kansas Department of Transportation
Bureau of Research*

Introduction

For years, the Kansas Department of Transportation (KDOT) and concrete producers in the state have used a Rapid Chloride Test for concrete cylinders, AASHTO T277. This test has been thought of as an appropriate quality control test to evaluate permeability in concrete. Unfortunately, it has a low repeatability—a 51% difference in the mean between two laboratories/operators as percent of the mean (AASHTO T277, 2011). This could mean the difference between reliable permeability results and questionable results. This has a direct impact on KDOT’s ability to judge the quality of the concrete mixture, and whether it will be a long-term durable concrete or a concrete that fails early.

KDOT has also used the Kansas Test Method KT-73 (2012), *Density, Absorption and Voids in Hardened Concrete*, a permeability test commonly referred to as the Boil Test, to evaluate concrete durability in the state of Kansas. It covers the determinations of density, percent absorption, and percent permeable voids in hardened concrete. KT-73 reflects testing procedures found in ASTM C642 (2013). KDOT has relied on this test to evaluate concrete permeability, but some concrete producers in the state have objected to its accuracy, preferring the Rapid Chloride Test which has a low repeatability.



**48 Hour Soak of
Concrete Specimens
for KT-73 Boil Test**

Project Description

In 2009, with the help of several ready mix producers and private laboratories, KDOT conducted a round robin evaluation of Kansas Test Method KT-73, *Density, Absorption and Voids in Hardened Concrete*, commonly referred to as the Boil Test.

Project Results

The results of this round robin showed that the KT-73 Boil Test could be repeated with a fairly high degree of precision. This study demonstrates that the expected range between two properly conducted tests at different laboratories should not be more than 8% of the average. The repeatability of the Boil Test is significantly better than the repeatability of the Rapid Chloride Test for concrete cylinders, AASHTO T277 (2011), which many concrete producers have relied on to verify their concrete's durability. The Boil Test and the Rapid Chloride Test take about equal amounts of time to perform, but the equipment required for the Boil Test is significantly less expensive. Thus, the Boil Test is not only less expensive to perform, but is a better indicator with respect to reliability of the permeability and durability of concrete used in the state of Kansas.

Project Information

For information on this report, please contact Rodney A. Montney; Bureau of Research, Kansas Department of Transportation; 2300 SW Van Buren, Topeka, KS 66611; (785) 291-3841 phone; rodney@ksdot.org.

KDOT Research Reports Catalog

Search for:

Search In: Document Title Keyword
 Reference Number Reference Name(s)

Search Period:

Can't find it?? Check the [help](#) page for search tips.
Learn more about the catalog [here](#).

If you have questions or comments, please send an e-mail to: library@ksdot.org
[Help page for retrieval errors](#)

Directions for Downloading the Full Report

To download the full report, visit <http://kdotapp.ksdot.org/kdotlib/kdotlib2.aspx> and do the following:

1. Enter KS-15-04 in the search box.
2. Click the Search button to the right of the search box.
3. You may have to scroll to find the specific report.
4. To download the report, click on the title of the report to open the PDF file and save it to your hard drive.

If you have any questions, please email us at library@ksdot.org.

KDOT RESEARCH