

## **The Potentiometric Method for the Measure Early Age of Shrinkage**

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The hardening concrete shows the differences in its volume as a result of occurring chemical and physical processes.

Shrinkage research done by authors includes the tests since the moment of mixing the ingredients with water, what enables to estimation particular phases of concrete shrinkage, starting with plastic shrinkage, chemical one, self-generated one and shrinkage by drying. Concrete shrinkage researches that have been carried out till today, have not focused wider on shrinkage phenomenon beginning with mixing the concrete components with water, and their values have been not measured with appropriate precision and frequency as they are now. The only exception are the works of S. Miyazawa and E. Tazawa. In authors method metric gauges have been replaced by potentiometers that measure precisely the electric voltage of current that flows constantly through the sensors placed in concrete. The research station consists of the following: Megalab measurement equipment, climatic chamber, clamp bar, the assisting device – a computer and hardware, emergency power generator, manual calibrating device with a micrometric sensor, potentiometer sensors to measure the shrinkage, temperature and humidity measurement devices.

The set ensures long time measurement using relocation sensors, and has the potential of advanced processing of the measurement data collected in the computer .

A change in the length of the sample results in a change of electrical parameters which, after the calibration, are automatically processed and changed into units of length. Measurement using such complex sensors has many advantages. First of all, it is possible to measure chemical shrinkage right after mix concrete components with water. It is, therefore, possible to measure chemical shrinkage, plastic shrinkage, and the shrinkage of hydrated grout. The shrinkage readings can be taken every 2 seconds, and the results are numerically recorded. The disadvantage of this measurement set is an utmost sensitivity to changes in ambient temperature and relative humidity of air, therefore, the results need to be corrected by means of introducing a coefficient taking into consideration the eternal parameters. Concrete samples are placed in a climatic chamber which makes it possible to retain the introduced humidity and temperature parameters at a constant and unchanged level. Such conditions can be retained even over the length of a few months and modified at any time. The size of shrinkage test samples is 250x100x20 mm (length, width, height).