

# Evaluating Shrinkage Cracking Potential of Concrete Using Ring Test

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## *Abstract*

Concrete experiences significant early-age shrinkage particularly in response to the migration of moisture within its porous body. When shrinkage is restrained, concrete develops significant internal stresses that may lead to the development of tensile cracks. Early-age cracking is an ever-present concern in concrete technology, particularly in repair and restoration. The ring test is often used to evaluate the cracking potential of concrete specimens based on the time it takes to crack under restrained shrinkage conditions. This study goes beyond the basic test data analysis and evaluates the rate of stress development under restrained conditions using different drying scenarios. A test procedure addendum is also outlined to quantify the *tensile creep behavior* of concrete using a companion ring where shrinkage is free. The results indicate that the specimen drying condition significantly influences the rate of restrained shrinkage stress and crack development. The cracking sensitivity is found to depend on the combined effect of the shrinkage rate, the early tensile strength development and the tensile creep potential of the concrete. Experimental results further show that there exists a strong correlation between the rate of early age stress development and the time-to-cracking of the concrete ring specimen.

**Keywords:** Shrinkage, restrained, cracking, ring test, time-to-cracking, creep

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