



Drying Shrinkage Testing of Concrete (ASTM C157)

Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete

What is Drying Shrinkage testing?

Drying shrinkage testing is performed to determine the volumetric contraction of concrete caused by the loss of moisture.

How is Drying Shrinkage performance evaluated?

Molded beam specimens are cast from a concrete mixture, moist cured for 28 days (or in accordance with a project specification), and then placed in a drying room maintained at a relative humidity of 50% and temperature of 73 °F (23 °C). The change in beam length is measured over time with a comparator.

What are the concerns about Drying Shrinkage on durability and serviceability?

The major concern with respect to durability is the potential for cracking. Depending on exposure conditions, cracking may permit a faster ingress of deleterious materials, in particular, chlorides that can lead to corrosion of embedded reinforcement. Serviceability issues include: curling and corner cracking in slabs-on-ground, cracking in foundation and tank walls, and loss of strand stress in prestressed and post-tensioned applications.

Where should I be concerned about Drying Shrinkage?

Inevitably, concrete will shrink and will crack if there is sufficient restraint. Therefore, drying shrinkage should be a concern in all applications where cracking will be objectionable. Examples include: industrial slabs-on-ground, concrete pavements and parking lots, concrete overlays, bridge decks, prestressed and post-tensioned concrete applications, foundation and tank walls, and all other applications where water-tightness is required.

How is this standard used in the industry?

This test method is used to provide documentation that a given concrete mixture will meet a specified shrinkage limit. A typical concrete mixture for slab-on-ground applications will have a 28-day drying shrinkage in the range of 0.050 to 0.060 percent. Drying shrinkage limits in project specifications typically range from 0.035 to 0.040 percent at 28 days, with a modified moist-curing period. The use of a shrinkage-reducing admixture or a crack-reducing admixture will reduce the overall drying shrinkage, thus improving cracking resistance, and, in slabs-on-ground, also reducing curling and joint opening.

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