



Flexural Performance of Fiber-Reinforced Concrete (ASTM C1609) Standard Test Method for Flexural Performance of Fiber-Reinforced Concrete (Using Beam with Third-Point Loading)

What is Flexural Performance testing of FRC?

Flexure performance testing is conducted primarily to determine the post-crack residual flexural strength and toughness of a concrete mixture reinforced with fibers.

How is FRC Flexural Performance Evaluated?

Molded fiber-reinforced concrete beams are cast and moist cured until the desired compressive strength is achieved. They are then instrumented and subjected to bending in a third-point loading arrangement under displacement control using a closed-loop, servo-controlled testing system. The load and net deflection are monitored and recorded to an end-point deflection of 1/150 of the span. Values obtained from the load-deflection curve are used to calculate various flexural performance parameters defined in the standard.

Why is this test method important?

FRC is used in a variety of applications, including slabs-on-ground, composite steel floor deck-slabs, shotcrete, and precast elements. This test method provides a rational basis to determine fiber dosage for different applications based on tensile capacity requirements. The test method can also be used to compare the post-crack performance of different fibers.

How is this standard used in the industry?

The post-crack parameters derived from this test are used in the design of fiber-reinforced concrete or to convert an existing steel reinforcement design to fiber reinforcement and, typically, the design engineer will specify the required residual flexural strength for a given application. Fiber suppliers use this test method to develop the residual flexural strength versus fiber dosage relationship needed to enable the determination of a fiber dosage to meet a design tensile capacity requirement.

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