

Daratard[®] Set-Retarding Admixtures

Use of Retarders with Fly Ash

Class F fly ash is often used as a partial replacement for Portland cement in concrete. It is important to understand the extent to which ASTM C494, Type D, water-reducing and retarding admixtures, such as the Daratard[®] family of retarders, maintain their strength enhancing properties in this type of concrete.

Laboratory test data have been summarized in Table 1 which illustrate the influence of Daratard 17 on the compressive strengths of two series of concretes made from two different Type I Portland cements and fly ash from two different sources. In one series, concrete containing 20% fly ash replacement and admixed with Daratard 17 has a 28 day compressive strength which is far greater than the plain concrete. In the second series, the 20% replacement resulted in a 6% reduction in the 28 day strength. At the 10% substitution level, however, the 28 day strength of the Daratard 17 treated concrete exceeded that of the plain concrete.

These two sets of data also serve to illustrate the influence that both the cement and the fly ash can have on the level of performance of water-reducing and retarding admixtures. It appears from this data that Daratard 17, used in combination with 15% to 20% fly ash substitution, will produce acceptable 28 day compressive strength.

Table 1

Cement Type	Cement, kg/m ³ (lbs/yd ³)	Fly Ash, kg/m ³ (lbs/yd ³)	Daratard 17 mL/100 kg (oz/100 lbs)	Slump, mm (in.)	Air, %	Compressive Strength, MPa (psi) @	
						7 Days	28 Days
I	307 (517)	0 (0)	0 (0)	108 (4.25)	1.7	23 (3342)	33 (4752)
	276 (465)	31 (52)	196 (3.0)	108 (4.25)	1.2	23 (3397)	39 (5634)
	214 (361)	62 (104)	196 (3.0)	108 (4.25)	1.2	20 (2888)	35 (5112)
I	307 (517)	0 (0)	0 (0)	102 (4.0)	2.0	19 (2801)	32 (4710)
	307 (517)	0 (0)	196 (3.0)	89 (3.5)	2.0	28 (3998)	41 (5880)
	276 (465)	31 (52)	196 (3.0)	89 (3.5)	1.6	26 (3823)	35 (5144)
	214 (361)	62 (104)	196 (3.0)	108 (4.25)	1.6	25 (3565)	30 (4412)

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