5-10 RAPID STRENGTH CONCRETE

Rapid Strength Concrete (RSC) is a type of concrete that gains strength quickly. Concrete strengths above 3,000 psi can be obtained in as little as 2 hours.

The Standard Specifications allow two alternatives for fast-setting hydraulic cement for the creation of RSC. The first is to either use the cements specified in Section 90-1 or type III Portland cement, and the strength gain rate is accelerated by the use of chemical admixture. The second alternative is to use other hydraulic cement having chemistry that inherently achieves a rapid strength gain, such as modified high-alumina cement (MHAC) or calcium sulfoaluminate cement (CSA).

Guidelines:

1. Allow the use of RSC when the project is expected to need compressive strengths of 3000 psi or more in 24 hours or less.
2. The designer must provide the strength at needed age of break or ages of break and the 28-day strength. These may be different depending on the design application.
3. MHAC and Portland cement-based RSC will generally have a 0.3 water-to-cement ratio. From this, an approximate 28-day strength of 10,000 psi can be anticipated. The CSA cement-based RSC strength curve is accelerated, but the ultimate strength is similar to conventional Portland cement concrete. If a higher ultimate compressive strength of the concrete is problematic for the design, then additional special provisions will be required to limit the 28-day strength.
4. Accelerated strength can also produce higher curing temperatures. Mass concrete specifications should be considered when the least dimension exceeds 2 feet. Note that this does not necessarily mean cooling pipes will be needed. The Contractor will be required to do a thermal analysis and determine what measures are to be utilized to prevent peak temperature from exceeding 160°F and prevent cracking due to thermal differentials during curing and hardening.