



### CHEMICAL ADMIXTURES

Admixtures are natural or manufactured chemicals that are added to concrete before or during mixing to give it certain properties. They may be used to enhance the durability, workability or strength of the concrete, to counteract difficult construction conditions such as extreme temperatures, or to meet pumping requirements, early strength requirements or low water-to-cement ratio specifications.

#### Examples of Admixtures

The most frequently used admixtures are air-entraining agents, water reducers, retarders and accelerators:

- **Air-entraining agents:** Added during mixing to produce microscopic air bubbles in concrete, these entrained bubbles improve the concrete's durability and increase its resistance to damage from freezing, thawing and the use of deicing salts. A higher air content also reduces bleeding and segregation.
- **Water reducers:** Lowers the water content and increases the strength of fresh concrete, and also achieves a higher slump using the same amount of water. Water reducers generally will reduce the required water content for a given slump by approximately 10%. They are typically used to increase slump for pumping concrete, or in hot weather to offset the increased water demand.
- **High range water reducers:** A special class of water-reducers - sometimes called superplasticers - that reduce the water content of a given concrete by 12% to 25%, which greatly increases strength. Also greatly increases slump to improve concrete's ability to flow.
- **Retarders:** Delays the initial set of concrete by an hour or more. Retarders are frequently used in hot weather to counteract the rapid setting caused by high temperatures. They also provide more time for placing and finishing.
- **Accelerators:** Reduce the initial set time of concrete. Liquid accelerators are added to the concrete at the mixing plant and are recommended for cold weather. Accelerators speed up the strength gain of concrete and make it better able to resist damage from freezing.