

Daratard[®] Retarders

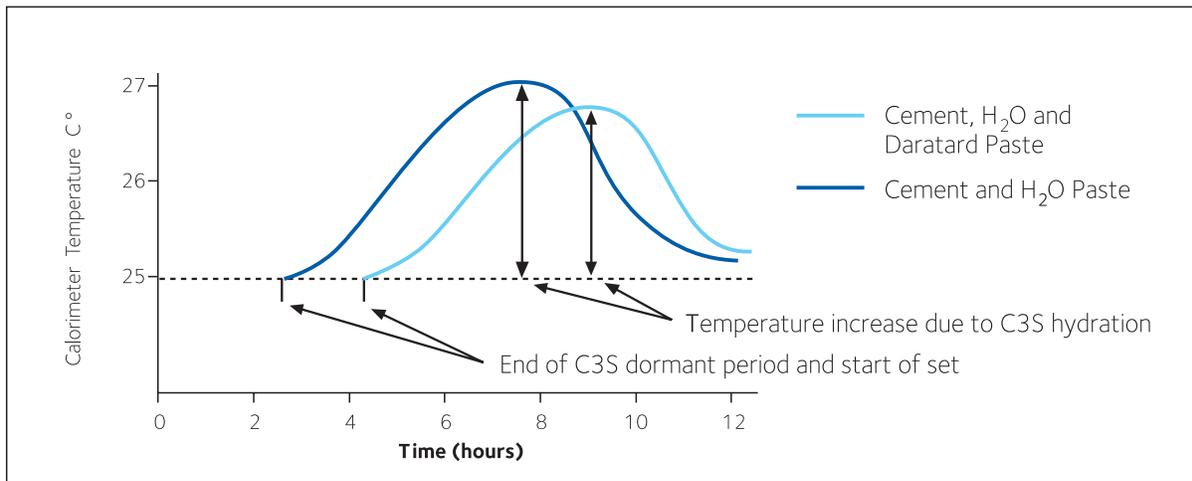
How They Work

Portland cement hardens and sets by a chemical interaction with water known as hydration. Specifically, it is the hydration of the tricalcium silicate (C3S) phase of the Portland cement that is most responsible. C3S also contributes to strength development up to about 90 days.

The hydration of C3S starts at a very slow rate during the first few hours after the cement is mixed with water. This is known as the **dormant period**. The C3S then begins to hydrate at a rapid rate and set occurs. Finally, there is a continuous formation of hydration products and the concrete continues to gain strength.

Daratard[®] retarders affect the C3S activity in two ways. They extend the duration of the dormant period and slow the hydration reaction which follows. As a result, the concrete retains its plasticity longer and the set time is delayed. By moderating the C3S reactivity, Daratard retarders also produce a more efficient cement hydration that typically result in superior strength increases.

When C3S reacts with water heat is produced. The action of Daratard retarders can be followed by observing the temperature change of a cement/water/Daratard mixture in a calorimeter. Typical calorimeter (isothermal) curves for cement/water pastes, with and without Daratard are illustrated below.



Note: This test was performed using Daratard 17.

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