



**EUCLID CHEMICAL**

## Hot Weather Concrete

High temperature placement of concrete can sometimes cause challenging and difficult conditions to ensure that concrete quality and desired properties are maintained. However, it is not just the temperature of the concrete that must be controlled during placement as other factors such as ambient temperature, humidity, wind speed and exposure to sunlight can also play a significant role in the hydration process of cement and ultimately alter the physical setting characteristics of the concrete mixture.

“Hot weather” conditions can create difficulties in placing and finishing fresh concrete such as:

- Increased water demand and accelerated slump loss
- Increased rate of setting times resulting in finishing difficulties
- Increased tendency for plastic and drying shrinkage cracking to occur
- Potential difficulties in controlling entrained air characteristics
- Inability to reach desired strength requirements

### When to take precautions:

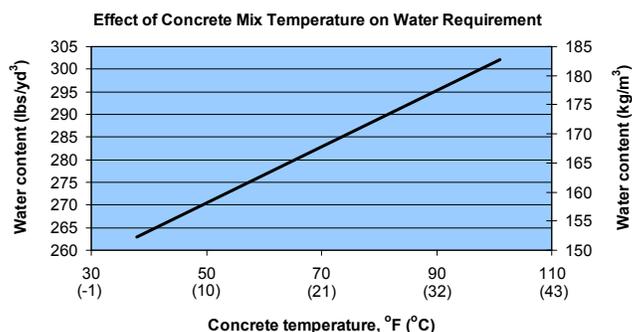
Although many local and national requirements vary, it is generally recommended to consider taking precautions for placing concrete in “hot weather conditions” when the concrete temperature itself is greater than 77-95°F (25-35°C). The following recommendations are also advised to reduce the potential problems of hot-weather concreting.

- Schedule concrete placement to limit exposure and place during ‘cooler’ periods of the day, ie: at night
- Use a concrete consistency that will allow for rapid placement and consolidation
- Reduce the time of transport, placing and finishing
- Employ the use of temporary moisture retaining films immediately after placement
- Use methods to limit the exposure of the concrete such as wind screens and sun shades
- Cool the concrete itself by using chilled water during production and aggregates that have been ‘watered’ down

Source: Portland Cement Association Design and Control of Concrete Mixtures

For a typical 4000 psi (28 MPa) mixture, concrete temperature can be reduced by 2°F (1°C) during the batching process by any of the following means:

- Reduce the cement temperature by 14°F (8°C)
- Reduce the water temperature by 9°F (5°C)
- Cool the aggregates by 3°F (1.5°C)



High temperatures of freshly mixed concrete can increase the rate of setting time by as much as 2 hours for an 18°F (10°C) increase in concrete temperature. This can result in additional problems such as the scheduling of saw-cutting and additional placements. In hot weather, there is an increased tendency for cracks to form both before and after concrete hardens. The addition of water to either cool the concrete or add more workability should never be permitted as this can have detrimental effects on the required strength of the concrete as well as overall long-term durability. Set-retarding admixtures, fibers, hydration stabilizers, evaporation retarders and curing compounds are additional tools that can aid in the successful placement of concrete during adverse weather conditions.