“Hot weather” conditions can create difficulties in placing & 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 temperatures are in the range of 77-95°F (25-35°C). ACI 305.1-14, sections 3.2 and 3.3, recommends a maximum temperature of fresh concrete at time of discharge to not exceed 95°F (35°C), unless supporting field experience or pre-construction testing is available.

The following recommendations may also reduce potential problems associated with hot weather concrete:

- Schedule concrete placement to limit exposure and place during ‘cooler’ periods of the day, i.e., at night.
- Use a concrete consistency that will allow for rapid placement and consolidation.
- Reduce the time of transport, placing, and finishing.
- Consider the use of retarding or hydration stabilizing chemical admixtures and supplemental cementitious materials, such as fly ash and silica fume, to reduce the heat of hydration.
- 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.
- When possible, schedule slab placement after roof structures and walls are in place.
- Provide curing methods to maintain adequate moisture and favorable concrete temperature.
- 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
Impact of hot temperatures on concrete:

For a typical 4000 psi (28 MPa) mixture, concrete temperature can be reduced by 20°F (10°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.

Hot Weather Product Solutions and Recommendations

Appropriate Additives and Admixtures can help protect concrete during hot weather conditions through the use of set-retarding admixtures, fibers, hydration stabilizers, evaporation retarders and curing compounds.

- Set-retarding and hydration stabilizing admixtures can lower water demand, extend working time, and maintain strength.
- Fibers can be utilized to minimize cracking and reduce crack widths.
- Evaporation retarders can be used to maintain moisture during placement.
- Membrane forming curing options can protect concrete from moisture loss.
- White-Pigmented curing compound can also reflect sunlight to help keep concrete cool.