CONCRETE CONTRACTOR®

5 HOT TIPS

for Hot Weather Concrete

TABLE OF CONTENTS

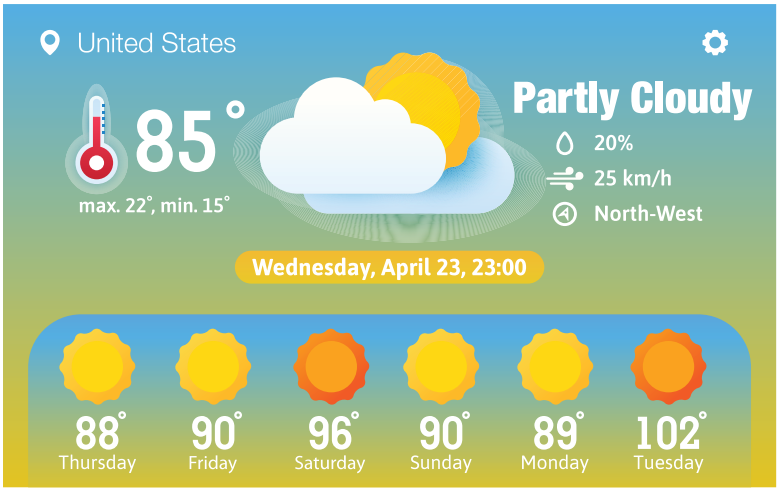
AVOID THE HEAT

Schedule concrete placement during the cooler periods of the day or at night. It's generally recommended to start adjusting to your hot weather concrete tactics when temperatures reach 77-95° F.

Every 18° increase of the ambient air can reduce setting time up to two hours. This rapid hardening can complicate the schedule of saw-cutting and following concrete placements. For concrete repair jobs, excessive heat on the surface can adversely interfere with the bond of the concrete during application by searing on contact with the bottom of the fresh material.

In a mass element, typically 4 ft. or thicker, heat gets trapped inside the core and will rise to high concrete temperatures. Because of the intrinsic concrete property to slowly dissipate heat, the concrete element will slowly cool down at its core.

The concrete must be designed in such a way that the maximum temperature should not be higher than 160° F, unless otherwise specified by the engineer, based on pre-construction tests and the use of supplementary cementitious materials in the mix design. In any case, the concrete temperature must never reach over 185° F.



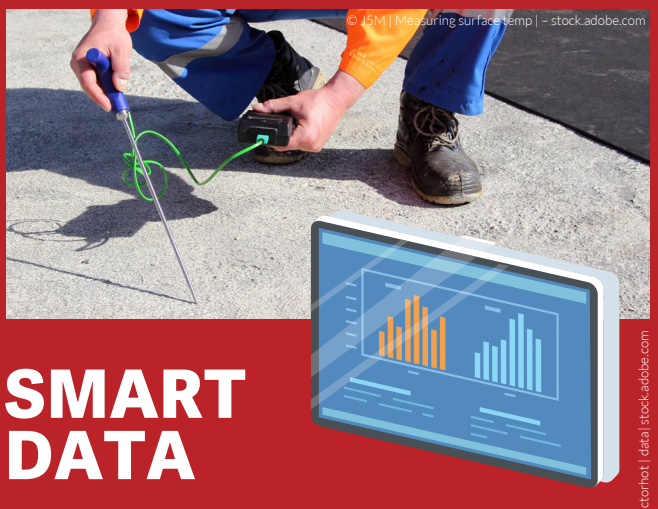
© Dreykon | Weather App | stock.adobe.com

© Sakrete

© ssstocker | Fresh Eggs | stock.adobe.com

DON'T CRACK AN EGG

Use an infrared thermometer heat gun and check the concrete surface temperature before starting any concrete repair in hot weather and make a better-educated decision on whether to begin or delay the placement.



© J5M | Measuring surface temp | – stock.adobe.com

SMART DATA

For mass concrete placements, install a network of concrete sensors to track temperatures and gain data to better gauge maturity levels.

© vectorhot | data | stock.adobe.com

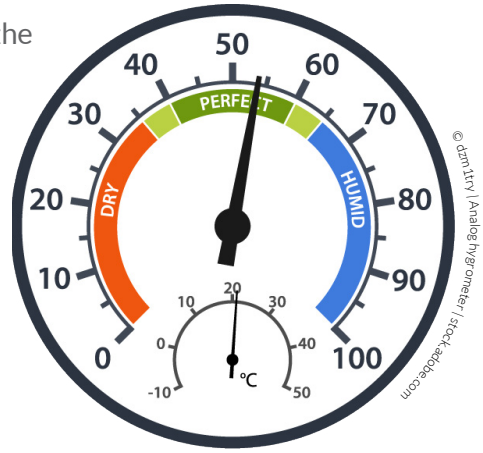
LIMIT ENVIRONMENTAL EXPOSURE

Before placement, erect sunscreens or shades, and utilize windbreaks. An easy way to create a sunshade on a small project is to use a large-area umbrella like one from a patio or pool.

Mixers, chutes, pump lines and other equipment in contact with the mix should be shaded, covered with wet burlap or painted white to reduce solar heat. If small enough of a job (and if possible), store materials out of the sunlight. Stack in a shaded area and on plastic or pallets avoiding ground contact.

Always cover if left out in the open for any period. Use an infrared thermometer to double-check the powered materials before mixing. During the pour, fog the area above the concrete being placed. This can be accomplished by using a pressure washer and indirect spray.

For smaller areas, mist the repair with water from a pump-up sprayer. These measures act to raise the relative humidity around the pour and to satisfy the increased moisture demand of the air. Effective fogging puts a cloud of water drops in the air over the concrete.



© dzm.1try | Analog hygrometer | stock.adobe.com

As the drops evaporate, the humidity of the air goes up, and the slab's evaporation rate goes down. Once the fog cloud settles to the concrete, it accomplishes secondary purposes of providing an artificial bleed water and cools the concrete surface.


© Giatec Scientific Inc.

RULE OF THUMB

Always avoid small concrete placement or concrete repair projects on windy days. Put up a windbreak when necessary.

COOL THE CONCRETE

One of the easiest and most cost-effective ways to slow the set of bagged concrete or concrete repair materials is by lowering the temperature of the mix water. Adding ice to the mix water is a great way to lower the temperature of a mix. Make sure to let the ice melt completely in the water before adding to the mix cycle.

If you choose to add ice, you must subtract the amount of water the ice contributes to the mix. The math is simple. One gallon of water weighs 8.33 pounds. Take the pounds of ice being used and divide by 8.33 to get the gallons or portion of a gallon the ice is contributing to the mix. Take that total and subtract it from the target mix water.

© Lumos sp | water bottle | stock.adobe.com

A COOL IDEA FOR SMALLER JOBS

Bring a frozen plastic liter bottle of water to the jobsite in a cooler and place in a 5-gallon pail of water. Use this chilled water for mixing as needed.

SPRAY DOWN SURFACES

Moisten the subgrade, steel reinforcement, and forms before placement.

© peuceta | Construction worker | stock.adobe.com

CHEMICALLY SLOW DOWN HYDRATION

A retardant or hydration control admixture can slow down the hydration reaction and reduce the setting rate of the concrete mixture. By slowing the initial set rate, the concrete mixture remains plastic and workable for an extended period.

Contractors can spray an evaporation reducer on the concrete surface to reduce plastic shrinkage cracking. Evaporation reducers form a monomolecular film that reduces surface moisture evaporation and, if necessary, they can be reapplied prior to final finishing operations.

Hydration control admixtures, depending on the addition rate, can be used as a conventional retarder in freshly batched concrete, or to control hydration in situations where discharge could be delayed for an extended period, such as long-hauls.

IT SHOULD BE NOTED....

Retarding admixtures alone will not result in quality concrete. These should be used in concert with established concreting best practices to ensure quality concrete in hot weather.

Workability retaining admixtures provide slump and workability retention without affecting the set rate of a concrete mixture.

Depending on the specific application, they can be used in combination with retarding admixtures to provide exceptional slump and workability retention and the desired time of set.

The use of evaporation retardants should help prevent rapid evaporation and shrinkage cracking. An evaporation retardant works by forming a thin, monomolecular (single molecule) film across the entire surface of the treated concrete.

Evaporation retardants are hydrophobic, meaning the water within the concrete is held in place until such a time that the film evaporates, and the bleed water breaks through the surface. Thus, evaporation retardants are ideal for use in hot, dry, or windy conditions where rapid moisture loss at the concrete surface causes the concrete to crust over, become unworkable, or crack.

PRODUCT SELECTION

Make sure to adhere to the project specifications or discuss options with your local producer or admixture supplier. They should have prior experience with a particular admixture and can help you conduct trial mixtures that best serve your needs.

Products that provide benefit in hot weather include those conforming to ASTM C 494/C 494M and AASHTO M194, the Standard Specifications for Chemical Admixtures for Concrete for Type B, retarding, Type D, retarding water-reducing, Type F, high-range water-reducing and Type G, high-range water-reducing and retarding as well as the requirements for Type B, Type D, Type F and Type G admixtures in the Corps of Engineers CRD-87. Workability-retaining admixtures should conform to ASTM C 494/C 494M Type S, Specific Performance.

HANDLE DECORATIVE CONCRETE WITH CARE

Decorative concrete needs more care than regular concrete to ensure the color remains consistent and to the owner's expectations, especially in hot weather. When placing decorative concrete in hot weather conditions, consistent water content from batch to batch should be taken into consideration, and not adjusting the slump with water. The use of a hydration control admixture is recommended as is the use of a workability-retention admixture to ensure slump retention and the utilization of a good-quality curing compound is essential.

Purchase the American Concrete Institute's "Guide to Hot Weather Concreting" at Concrete.org.

ACCESS CONTENT >>

FORCONSTRUCTIONPROS.com/concrete

Follow us on:

AC BUSINESS MEDIA

AC Business Media is a leading business-to-business media and business intelligence company with a portfolio of renowned brands in heavy construction, asphalt, concrete, paving, rental, sustainability, landscape, manufacturing, logistics and supply chain markets. AC Business Media delivers relevant, cutting-edge content to its audiences through its industry-leading digital properties, trade shows, videos, magazines, webinars and newsletters. It also provides advertisers the analytics, data and ability to reach their target audience.