Tech Letter

Hot Weather Concreting

Hot weather concreting is the placement of concrete during which any or all of the following conditions exist:

- *High air temperature (over 90°F)*
- *Low relative humidity (below 65°F)*
- *Windy conditions*
- *High concrete temperatures (over 90°F)*

(Note that a cold, windy day meets the requirements for hot weather conditions.)

How Do Hot Weather Conditions Affect Concrete?

Hot weather concreting conditions can have detrimental effects on both plastic and hardened concrete. Plastic concrete may experience increased water demand (causing a higher water/cement ratio, lower strength and more shrinkage), accelerated slump loss, faster setting, problems with control of air content and increased plastic shrinkage cracking (see chart on reverse side). Hardened concrete may exhibit decreased ultimate strength, increased drying shrinkage and thermal cracking and increased permeability.

How Can The Effects of Hot Weather Be Lessened?

Although environmental conditions cannot be altered, measures can be taken during concrete manufacture, placing and finishing to minimize the harmful impact of hot weather.

1. *Cool materials.* The concrete producer can sprinkle aggregate stockpiles; use crushed ice or chilled water as a portion of the mixing water.
2. *Maximize the use of fly ash.* The use of a pozzolan such as Boral Fly Ash as a partial cement replacement will significantly lower the heat of hydration generated by the concrete, and reduce potential slump loss.
3. *Maximize the use of chemical admixtures.* Use water-reducing/ retarding admixtures to lower net water content and slow setting times.
4. *Be prepared at the jobsite.* The subgrade and forms should be sprinkled but not saturated with water prior to concrete placement. Concrete placement during the hottest part of the day should be avoided and concrete deliveries scheduled to avoid excessive delays in unloading.
5. *Properly cure the concrete.* Protect the concrete against moisture loss during placing and finishing, and for several days thereafter by erecting wind breaks or shade cloth, using initial curing spray and by moist curing or correct and prompt application of a reputable curing compound.
6. *Ensure proper inspection and testing practices.* Test specimens should be fabricated in strict accordance with procedures outlined in ASTM C 31. Cylinders should not be exposed to temperatures exceeding 80°F or allowed any loss of moisture.
7. *Review ACI 305, "Hot Weather Concreting."*

For more information on producing durable concrete in any weather conditions, consult a Boral representative. The Boral technical staff is prepared to assist you in developing the most durable concrete possible.

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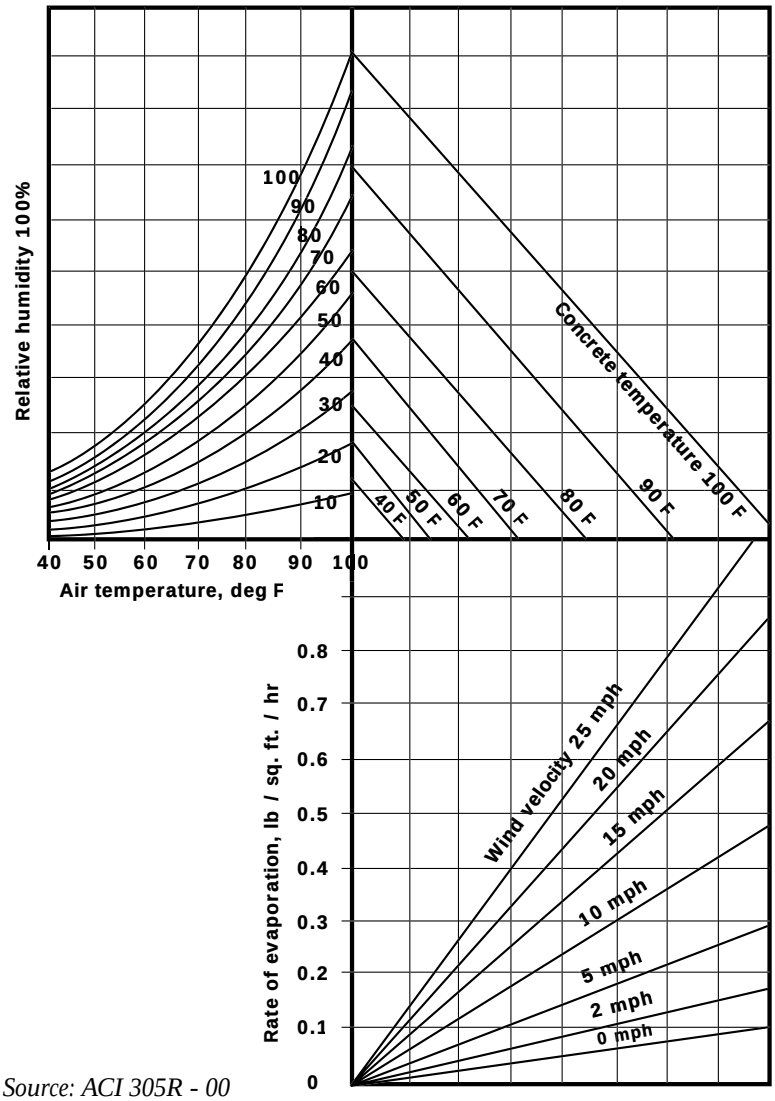
Effect of Concrete and Air Temperatures, Relative Humidity and Wind Velocity on the Rate of Evaporation of Surface Moisture From Concrete



Source: ACI 305R - 00

HOW TO USE THE CHART:

1. Enter with air temperature, move ***up*** to relative humidity.
2. Move ***right*** to concrete temperature.
3. Move ***down*** to wind velocity.
4. Move ***left***; read approximate rate of evaporation.

If the rate of evaporation approaches 0.2 lb/ft^2/hr, precautions against plastic shrinkage cracking are necessary.

Boral Material Technologies is a major processor and marketer of coal combustion products in the United States. With over 40 years of marketing experience, Boral is committed to supplying quality products broadly supported with skilled technical sales professionals. To meet both our customer's present and future needs with coal combustion products Boral continues its commitment to customer based research and development and broad based marketing programs.

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