



PDHonline Course S129 (1 PDH)

Cold Weather Concreting

Instructor: Matthew Stuart, PE, SE

2020

PDH Online | PDH Center

5272 Meadow Estates Drive
Fairfax, VA 22030-6658
Phone: 703-988-0088
www.PDHonline.com

An Approved Continuing Education Provider

RECOMMENDATION FOR COLD WEATHER CONCRETE

COLD WEATHER

Cold weather is defined as a period when for more than three (3) consecutive days of the following conditions exist:

- ✓ The average daily air temperature is less than 40°F
- ✓ Air temperature is not greater than 50°F for more than ½ day

OBJECTIVE

- ✓ To prevent damage to concrete due to freezing at early ages
- ✓ NOTE: Concrete that is protected from freezing until it has attained a compressive strength of at least 500 psi will not be damaged by exposure to single freezing and as per American Institute of Concrete (ACI). Most well proportioned concrete mixtures reach this strength during the second day.
- ✓ Assure that the concrete develops the required strength
- ✓ Maintain faster than normal strength curing conditions so that it is safe for removal of forms, removal of shores and for safe loading
- ✓ Limit rapid temperature change
- ✓ Provide protection consistent with intended serviceability of the structure

PREPARATION BEFORE CONCRETING

- ✓ Temperature of surfaces in contact with fresh concrete must be above freezing about 35°F and preferably not more than 10°F higher than the minimum placement temperatures
- ✓ Removal of snow and ice hot air jets can be used to remove frost
- ✓ Condition of sub-grade
 - Concrete should not be placed on frozen sub grade

RECOMMENDED CONCRETE TEMPERATURE

- ✓ If the minimum dimension is less than (<) 12 inches (SLAB)
 - Air temperature **ABOVE 30°F**Concrete mix 60°F
 - Air temperature **0 - 30°F**Concrete mix 65°F
 - Air temperature **BELOW 0°F**.....Concrete mix 70°F

And the maximum allowable gradual temperature drop is the first 24 hours after end of protection is 50°F.

- ✓ If the minimum dimension is 12 – 36 inches
 - Air temperature **ABOVE 30°F**Concrete mix 55°F
 - Air temperature **0 - 30°F**Concrete mix 60°F
 - Air temperature **BELOW 0°F**.....Concrete mix 65°F

And the maximum allowable gradual temperature drop is the first 24 hours after end of protection is 40°F.

PROTECTION AGAINST FREEZING AND PROTECTION FOR CONCRETE NOT REQUIRING CONSTRUCTION SUPPORTS

Protection to prevent early age freezing – must provide immediately after concrete placement – arrangement for covering, insulating, housing or heating should be made before placement

LENGTH OF PROTECTION PERIOD

- ✓ Footing and Substructures.....2 days (Type I or II cement)
- ✓ Slabs, Walls.....3 days (Type I or II cement)

NOTE

IT IS THE CONTRACTOR’S RESPONSIBILITY TO FOLLOW THE AMERICAN CONCRETE INSTITUTE’S (ACI) RECOMMENDATION FOR COLD WEATHER CONCRETING.