

COLD WEATHER CONCRETE

Revised April 2019

This procedure may be used as the basis for the acceptance or rejection of any concrete foundation respective to concrete placement during cold weather conditions. It is the intent of this procedure to closely follow ACI 306, Standard Specification for Cold Weather Concreting.

Code requirements

The minimum compressive strength requirements of concrete shall be in accordance with the 2018 International Residential Code or as follows per the Residential Foundation Guideline endorsed by the City of Lenexa and the Johnson County Building Officials:

- 2500 psi for interior slabs on grade.
- 3000 psi for footings and foundation walls.
- 3500 psi for exterior and structural slabs.

The code also specifies that the concrete be air entrained. The total air content (percent by volume of concrete) shall not be less than 5% or greater than 7%.

For garage floors with a steel troweled finish, reduction of the total air content (percent by volume of concrete) to not less than 3 percent is permitted if the specified compressive strength of the concrete is increased to not less than 4,000 psi.

Inspection practices

1. The enforcement of cold weather concrete protection requirements will occur when the ambient air temperature is at or below 40 degrees Fahrenheit, or a temperature is forecasted within 48 hours of below 40 degrees Fahrenheit. Footings, walls, structural slabs, sidewalks and driveway approaches shall be protected.
2. The air temperature shall be at least 25 degrees and rising for an inspection of concrete related construction.

Exception: If the air temperature is below 25 degrees an inspection may be conducted provided special permission is granted from City Inspectors. Special permission may be granted for approved on-site heating or other approved methods.

3. Inspectors will verify the sub-grade is not frozen prior to concrete placement and that adequate protection components are on site at the time of inspection. They will also be checking the maintenance of the protection for two days following the inspections.
4. If footings were required to be protected from freezing, foundation walls will not be allowed to be poured for at least 48 hours.
5. At the inspector's discretion, concrete drivers batch tickets may be reviewed for the purpose of determining the time the concrete truck left the plant, strength of the concrete, percent of air entrainment or any special additives in the concrete mix.



Protection during cold weather

In cold weather conditions it is important to protect the concrete from freezing and to maintain curing conditions to ensure adequate strength development. When cold weather conditions exist, surface concrete temperatures must be maintained at 55° F for three days. Curing time may be reduced to two days if the cement content is increased by 100 lbs. per cubic yard or Type III Portland Cement is used, or if an approved accelerator is employed.

Methods of protection

- For footings and slabs, an acceptable method of protection from freezing during the curing process is to cover footings with 6 inches of straw. The straw shall be held in place with tarps or polyethylene sheeting.
- For foundation walls, insulated blankets may be used.
- After the initial curing period, it is recommended that the concrete be kept dry (protected from the elements) for at least two or three additional days before it is exposed to freezing conditions.
- When pouring conventional concrete during cold weather conditions, the concrete shall be protected from freezing for at least 72 hours (three days).
- When pouring concrete utilizing approved accelerators, Type III Portland Cement, or where the cement ratio is increased 100 lbs. per cubic yard; the concrete shall be protected from freezing for at least 48 hours (two days).
- If footings were required to be protected from freezing, foundation walls will not be allowed to be poured for at least 48 hours.

If the inspector believes that the concrete has not been protected as described above or per another approved method, the inspector will require that the concrete be tested in order to ensure that proper strength of the concrete has been developed.