

**CONCRETE HIGHLIGHTS**  
**FOR RESIDENTIAL CONSTRUCTION**

**Updated December 2013**

- **BASEMENT FLOOR SLABS** - 4" Thick over one layer of 6 Mil Vapor Barrier (lapped 6" minimum at all joints) and placed on 4 inch minimum granular base.
- **GAS CURBS** - A 6" minimum height gas curb shall be provided at each wall common with the attached garage and residence. A foundation wall may be utilized as a gas curb only if six (6) inches of foundation is exposed above the garage floor slab at each common wall.
- **DRIVEWAYS**- 5" thick with welded wire fabric placed on 4" minimum well compacted gravel base.
- **DRIVEWAY APPROACH** - 6" thick concrete with welded wire fabric placed on 4" minimum well compacted gravel base. Main walk must be 6" thick concrete at driveway and approach.
- **FOOTINGS** – 10" X 20" minimum.
- **FOUNDATION WALLS** - 8" minimum thickness for frame construction and includes 2-#4 Continuous T. & B. Reinforcing bars. 10" minimum thickness for brick veneer construction. All anchor bolts shall be 1/2" round, 7" embedment, 6'- 0" o.c. (maximum spacing), 12" from each corner, and 2" minimum per sill plate.
- **GARAGE FLOOR SLAB** - 5" minimum thickness with welded wire fabric (fiber mesh may be utilized when the Building Department is notified) over 4" minimum thick compacted gravel fill. Slope slab toward the overhead door a minimum of 2". Provide one layer of 6 mil vapor barrier (lapped 6" minimum at all joints) over the compacted gravel fill.
- **PATIO SLAB** - 4" minimum thickness with welded wire fabric (fiber mesh may be utilized when the Building Department is notified) over 4" minimum thick compacted gravel fill. Slope slab away from the building.
- **PORCHES AND STOOPS** - 4" minimum thickness with welded wire fabric over 4" minimum thick compacted gravel fill. Slope slab away from the building.
- **POST HOLES** - 12" diameter, 3' - 6" minimum depth below finished grade and 2" above grade.

- **WALKS-PUBLIC** - are required and shall consist of:
  1. 2 x 6 form boards, no 2 x 4 forms are allowed.
  2. Width 5'0".
  3. 5" thick concrete on 5" thick minimum compacted CA-10 or CA-6 gravel fill.
  4. 6" thickness at driveway, with welded wire fabric.
  5. 5'0" on Center construction joints.
  6. One half inch (1/2") thick minimum expansion joints 30'0" on center.
  7. Slope 1/4" per foot toward curb.
  8. Location 1'0" from front property line(s).
  9. Wire fabric required through driveway.
  10. Driveway apron - 6" thick with welded wire fabric.
  11. Accessibility ramps required at corner lot intersections with detectable warning tiles.
  
- **WALKS-SERVICE** - 4" minimum thickness over 4" minimum thick compacted gravel fill.  
All sloping walks shall be no greater than 1/4" per foot.

**NOTES:**

**DEBRIS**- shall be removed in all areas of concrete placement.

**FROST**- shall be removed completely. No concrete shall be poured when frost is present in the area of placement.

**WATER**- All water shall be removed prior to concrete placement.

**WELDED WIRE FABRIC**- shall be lapped a minimum of one mesh, or 6", and be wired together to avoid displacement.

# **CONCRETE DESIGN STANDARD HIGHLIGHTS**

## **THE DESIGN AND CONSTRUCTION OF CONCRETE SHALL CONFORM TO THE FOLLOWING GENERAL REQUIREMENTS:**

**CONCRETE DESIGN**- concrete shall be designed and constructed in accordance with the provisions set forth in ACI 318.

**CONCRETE STRENGTH**-The minimum compressive strength of concrete at twenty-eight days for outside flatwork shall be 4000 psi with 6 bag mix.

**CONTINUOUS CONCRETING**- Once started, concreting shall be carried on as a continuous operation until the placement is complete.

**CONVEYING**- Concrete shall be conveyed from the mixer to the place of final deposit by methods that will prevent separation or loss of materials.

**CURING**- Concrete (other than high-early strength) shall be maintained above 50 degrees (fifty) and in a moist condition for at least the first seven (7) days after placement.

**DEPOSITING**- Concrete shall be deposited as nearly as practicable in its final position to avoid segregation caused by re-handling or flowing.

**HIGH EARLY STRENGTH CONCRETE**- Shall be maintained above 50 degrees (fifty) and in a moist condition for at least the first three (3) days after placement.

**RE-TEMPERING**- re-tempered concrete or concrete that has been remixed after initial set shall not be used **unless** approved in writing by a registered design professional.

**UNACCEPTABLE CONCRETE**- Concrete that has partially hardened or has been contaminated by foreign materials shall not be utilized.

**MOISTURE BARRIER** – Provide 6 mil plastic moisture barrier for attached garage floors.

## **PREPARATION OF EQUIPMENT AND PLACEMENT OF DEPOSIT SHALL INCLUDE THE FOLLOWING CRITERIA:**

1. All **equipment for mixing** and transporting concrete **shall be clean**.
2. All **debris and ice shall be removed** from spaces to be occupied by concrete.
3. **Forms shall be properly coated**.
4. **Reinforcement shall be thoroughly clean** of ice or other deleterious coating.
5. **Water shall be removed** from the place of deposit before concrete is placed.

# **CONCRETE HOT WEATHER HIGHLIGHTS**

## **THE FOLLOWING INFORMATION PERTAINS TO HOT WEATHER CONCRETING REQUIREMENTS.**

**DEFINITION OF HOT WEATHER**- Hot weather is defined as any combination of the following conditions that tend to impair the quality of freshly mixed or hardened concrete by accelerating the rate of moisture loss and rate of cement hydration, or otherwise resulting in detrimental results:

- a. High ambient temperature.
- b. High concrete temperature.
- c. Low relative humidity.
- d. Wind velocity.
- e. Solar radiation.

During hot weather, attention shall be given to ingredients, production methods, handling, placing, protection and curing to prevent excessive concrete temperatures or water evaporation that could impair required strength or serviceability of the member(s) or structure.

## **CONCRETE PROTECTION FOR REINFORCEMENT**

### **THE FOLLOWING INFORMATION PERTAINS TO CONCRETE PROTECTION FOR REINFORCING STEEL.**

#### **CONCRETE COVER:**

Concrete cover as protection of reinforcement against weather and other effects is measured from the concrete surface to the outermost surface of the steel to which the cover requirement applies, where not specified on construction documents. The following minimum standard covers shall be observed for reinforcement in cast-in-place concrete (non-prestressed).

- Concrete cast against and permanently exposed to earth (footings) - 3"
- Concrete exposed to earth or weather: (Walls)
  - No. 6 through No. 18 bars - 2"
  - No. 5 bar, W31 or D31 Wire or smaller - 1 1/2"
- Spirals and ties in columns - 1 1/2"
- Beams and girders - top, bottom and sides - 1 1/2"
- Concrete surfaces not exposed directly to ground or weather, for #11 bars and smaller on top, bottom and side of joists and on top of slabs - 3/4"
- Concrete surfaces not exposed directly to ground or weather, for #14 and #18 bars - 1 1/2"
- Face of walls not exposed to ground or weather for #11 or smaller bars - 3/4"
- Face of walls not exposed to ground or weather for #14 and #18 bars - 1 1/2"

# CONCRETE COLD WEATHER HIGHLIGHTS

## **THE FOLLOWING INFORMATION PERTAINS TO COLD WEATHER CONCRETING REQUIREMENTS.**

**DEFINITION OF COLD WEATHER**- Cold weather is defined as a period when, for more than three (3) consecutive days, the following conditions exist.

1. The average daily air temperature is less than forty (40) degrees Fahrenheit.
2. The air temperature is less than forty (40) degrees Fahrenheit for more than one half of any 24 hour period.
3. The average daily air temperature is the average of the highest and the lowest temperatures occurring during the period from midnight to midnight. Cold weather usually starts during fall and usually continues until spring.

**FLATWORK**- no flatwork can be installed during cold weather conditions. Flatwork shall include driveways, sidewalks, patios and other concrete installations which are placed at grade level.

**FOOTINGS**- shall be placed only when the temperature is or exceeds twenty five (25) degrees Fahrenheit and must be blanketed for twenty-four (24) hours and poured only on dry, unfrozen, soil.

**FOUNDATION WALLS**- Shall be placed only when the temperature is or exceeds twenty-five (25) degrees Fahrenheit and must be protected with insulation blankets on wood forms for not less than seventy-two (72) hours prior to removal of any form work. **Metal forms are not allowed during cold weather conditions.**



# Village of Mokena Community Development Department

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## **What is cold weather?**

The Village of Mokena and the American Concrete Institute (ACI) define cold weather as a period of **3 or more consecutive days** where the average daily air temperature is:

- **Less than 40° Fahrenheit**
- **Less than 50° Fahrenheit for more than half of any 24-hour period.**

**\*NOTE\*** The average daily air temperature is derived from the average of the highest and lowest temperatures occurring during a 24-hour period (midnight to midnight).

## **What type of concrete work should be avoided during periods of cold weather?**

In general, all concrete flatwork should be avoided when the temperature is less than 40° Fahrenheit. Concrete flatwork includes (but is not limited to), driveways, sidewalks, and patios that are placed at grade level with a thickness of less than 12 inches.

## **Why should I avoid pouring concrete during cold weather?**

The concrete curing process is directly responsible for determining the overall strength and durability of a concrete pour. As the air temperature decreases, the rate of hydration also decreases, which subsequently reduces the rate at which concrete hardens. Other types of cold weather impacts may include:

- Permanent damage due to early freezing of concrete (prior to hardening)
- Slower setting and slower strength gains
- Reduced durability
- Increased risk of cracking, flaking, and other surface imperfections due to sudden temperature changes

## **How can I minimize the negative impacts of cold weather?**

Although concrete flatwork should be avoided during periods of cold weather, it is still possible for concrete to cure properly if the right precautionary measures are followed. Some of these measures include:

- Removing snow, ice and frost from the subgrade and all surfaces that will be in contact with the concrete.
- Planning ahead. Have heaters, enclosures, and protective materials (i.e. heat blankets) on-hand during the pour.
- Heating the water and aggregates, and handling the concrete with minimum delay.
- Using admixtures and air-entrained concrete if possible.
- Avoid overheating the concrete.

**What if pouring concrete during cold weather is my only option?**

If the proposed concrete work cannot be postponed until warmer weather arrives, the Village may allow the property owner or contractor to perform the concrete flatwork once the following items have been submitted:

1. A "miscellaneous" permit application that includes a description of the work.
2. A copy of the plat of survey that shows the location of the proposed work.
3. A signed copy of the "Cold Weather and Concrete" waiver form (*see below*).

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## **"Cold Weather and Concrete" WAIVER FORM**

As the owner of the property listed on the attached permit application, I have read the contents of the "Cold Weather and Concrete" handout, and understand the implications of pouring concrete during periods of cold weather. I will work with the contractor(s) listed on the attached permit application to ensure that all cold weather precautions are followed.

**Address of Construction:**

\_\_\_\_\_

**Property Owner Name (Please Print):**

\_\_\_\_\_

**Property Owner Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**Contractor Name (Include Business Name):**

\_\_\_\_\_

**Contractor Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

\_\_\_\_\_

*Mokena*



*Illinois*