

# M. A. Day Engineering, PC

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City of Beacon  
Pool Modification Contract  
University Settlement Camp  
Beacon Campus

## Addenda #1

### Winter Weather Conditions for CMU Masonry Walls:

1. The Contractor shall be responsible for winter weather conditions for the protection of the CMU walls to be installed as part of this contract.
  - a. The Contractor shall protect all materials during cold weather
  - b. The Contractor shall heat all materials as required.
  - c. The Contractor shall protect the work area or enclose work area.
  - d. The Contractor shall heat work area and in-place work.
  
2. **Protection, Storage, and Heating.** All masonry materials should be protected from rain, snow, and ice. Masonry units and packaged mortar materials should be securely wrapped with canvas or polyethylene tarpaulins and stored above the reach of moisture migrating from the ground. Sand piles should also be covered and care taken to avoid contamination of the sand with mud and clay. Masonry materials may need to be heated prior to use to assure cement hydration in mortar. At temperatures of less than 40°F (4.4°C), cement hydration necessary for strength development is minimal. At temperatures of 120°F (48.9°C) or higher, flash set is imminent. When mixed, the mortar should be in the range of 40°F to 120°F (4.4°C to 48.9°C) and kept above freezing until used in masonry. If ambient temperatures are falling below freezing, a minimum grout temperature of 70°F (21.1°C) is recommended at the time of grout placement. Figures 3a and 3b. Sand can be heated over fire in a pipe, and water can be heated in metal drums. A temporary shelter protects the mortar preparation area from rain and snow. Cold Weather Masonry Construction 3 Water can be heated in barrels or tubs. It is the easiest material to heat and it can store much more heat (per unit mass) than the other materials used in mortar. Although recommendations vary as to the highest temperature to which water should be heated, the Specification for Masonry Structures places a maximum of 140°F (60°C) because higher temperatures pose a safety hazard and could result in flash set. To avoid flash set, heated water should be combined with cold sand in the mixer before adding cement. Sand is typically delivered to the project and used in a damp loose condition. Even though sand piles are covered, it may be necessary to heat sand to thaw frozen lumps when temperatures fall below

freezing. Generally, sand is heated to about 50°F (10°C), although higher temperatures are permissible as long as the sand is not scorched and as long as resultant mortar or grout temperatures do not exceed 120°F (48.9°C). Sand piles can be heated with electric heating pads, by placing sand over a heated pipe, or by using steam heating systems. Masonry units should not have any visible ice on bedding surfaces when used, nor should the temperature of masonry units be less than 20°F (- 6.7°C) to avoid rapid lowering of mortar or grout temperatures. Better productivity is often attained by using units that have a minimum temperature of 40°F (4.4°C). Masonry units are usually heated on pallets in an enclosure or stored in a heated area. The units should be kept dry, although very high-absorption fired-clay brick may need to be wetted, but not saturated prior to use.

**Table 1. Cold Weather Construction Requirements**

<b>Ambient temperature</b>	<b>Cold weather procedures for work in progress</b>
Above 40°F (4.4°C)	No special requirements.
Below 40°F (4.4°C)	Do not lay glass unit masonry.
32°F to 40°F (0°C to 4.4°C)	Heat sand or mixing water to produce mortar temperature between 40°F and 120°F (4.4°C and 48.9°C) at the time of mixing. Heat materials for grout only if they are below 32°F (0°C).
25°F to 32°F (-3.9°C to 0°C)	Heat sand or mixing water to produce mortar temperature between 40°F and 120°F (4.4°C and 48.9°C) at the time of mixing. Keep mortar above freezing until used in masonry. Heat materials to produce grout temperature between 70°F and 120°F (21.1°C and 48.9°C) at the time of mixing. Keep grout temperature above 70°F (21.1°C) at the time of placement.
20°F to 25°F (-6.7°C to -3.9°C)	In addition to requirements for 25°F to 32°F (-3.9°C to 0°C), heat masonry surfaces under construction to 40°F (4.4°C) and use wind breaks or enclosures when the wind velocity exceeds 15 mph (24 km/h). Heat masonry to a minimum of 40°F (4.4°C) prior to grouting.
20°F (-6.7°C) and below	In addition to all of the above requirements, provide an enclosure and auxiliary heat to keep air temperature above 32°F (0°C) within the enclosure.
<b>Ambient temperature (minimum for grouted; mean daily for ungrouted)</b>	<b>Cold weather procedures for newly completed masonry</b>
Above 40°F (4.4°C)	No special requirements, except for the following: Maintain glass unit masonry above 40°F (4.4°C) for the first 48 hours after construction. Maintain autoclaved aerated concrete (AAC) above 32°F (0°C) for the first 24 hours after thin-bed mortar application.
25°F to 40°F (-3.9°C to 4.4°C)	Cover newly constructed masonry with a weather-resistive membrane for 24 hours after being completed.
20°F to 25°F (-6.7°C to -3.9°C)	Cover newly constructed masonry with weather-resistive insulating blankets (or equal protection) for 24 hours after being completed. Extend the time period to 48 hours for grouted masonry, unless the only cement used in the grout is ASTM C 150 Type III.
20°F (-6.7°C) and below	Keep newly constructed masonry above 32°F (0°C) for at least 24 hours after being completed. Use heated enclosures, electric heating blankets, infrared lamps, or other acceptable methods. Extend the time period to 48 hours for grouted masonry, unless the only cement used in the grout is ASTM C 150 Type III.

3. **Protecting Work Areas and Construction:** Wind breaks, heated wall coverings, and plain or heated enclosures are used to maintain adequate mortar temperatures and to improve the comfort and efficiency of masons and laborers. The level of protection required will depend on the severity of weather encountered. The Specification for Masonry Structures defines certain cold weather construction requirements as summarized in Table 1. It includes provisions needed during the work day while masonry is being laid, as well as protection requirements for newly constructed masonry. Several means of implementing these provisions are available to the mason contractor. Regional climatic differences and project-specific factors must be taken into account when selecting the most effective methods of protection for a given project. Basic principles required for satisfactory cold weather masonry construction described here and in the reference documents are well established. The use of innovative construction and protection techniques based on these established principles can improve the effectiveness and efficiency of a cold weather construction program.