protective materials. Canvas, vinyl, and polyethylene coverings are often used. In most instances, a windbreak or unheated enclosure will reduce the chill factor sufficiently to provide the degree of protection required. Precautions must also be taken to safeguard workers against injury, and enclosures must be adequate to resist wind, snow, and uplift loads. The MSJC Code requires cold weather protection measures during construction when the ambient temperature is below 40°F. The table in *Fig. 15-65* summarizes heating and protection requirements for various work temperatures.

15.7 HOT WEATHER CONSTRUCTION

Hot weather conditions also pose special concerns for masonry construction (see table in *Fig. 15-66*). High temperatures, low humidity, and wind can adversely affect performance of the masonry. Rapid evaporation and the high suction of hot, dry units can quickly reduce the water content of mortar and grout mixes so that cement hydration actually stops.

When ambient temperatures are above 100°F, or above 90°F with wind velocities greater than 8 mph, the MSJC Code requires that protective measures be taken to assure continued hydration, strength development, and maximum bond. Whenever possible, materials should be stored in a shaded location, and aggregate stockpiles covered with black plastic sheets to retard moisture evaporation. High-suction brick can be wetted to reduce initial absorption, and metal accessories such as reinforcing steel, anchors and ties, mixers, mortar boards, and wheelbarrows can be kept cool by spraying with water.

MSJC Cold Weather Construction Requirements		
	Temperature	Action Required
		During Construction
Ambient Temperature	32 to 40°F or When temperature of masonry units is less than 40°F	Do not lay glass unit masonry. Do not lay units that have a temperature below 20°F. Remove visible ice on units before laying. Heat mortar sand or mixing water to produce mortar temperature between 40°F and 120°F at time of mixing. Maintain mortar above freezing until used in masonry.
	20 to 25°F	Perform actions required when ambient temperature is 32 to 40°F. Provide heat sources on both sides of the masonry. When wind velocity exceeds 15 mph, install wind breaks.
	Less than 20°F	Perform actions required when ambient temperature is 32 to 40°F. Enclose masonry under construction. Provide supplementary heat to maintain temperature within enclosure above 32°F.
		For 24 Hours After Construction
Mean Daily Temperature	32 to 40°F	Cover completed masonry with weather-resistive membrane to protect from rain and snow.
	25 to 32°F	Completely cover completed masonry with weather-resistive membrane.
	20 to 25°F	Completely cover completed masonry with insulating blankets or equal protection.
	Less than 20°F	Enclose masonry. Provide supplementary heat to maintain temperature of masonry within enclosure above 32°F.
		For 48 Hours After Construction
	All	Maintain temperature of glass unit masonry above 40°F.

Figure 15-65 Cold weather masonry construction. (*From Masonry Standards Joint Committee,* Specification for Masonry Structures, *ACI 530.1/ASCE 6/TMS 602.*)

MSJC Hot Weather Construction Requirements	
Temperature	Action Required
Preparation	
Ambient temperature above 100°F, or 90°F with wind velocity greater than 8 mph	Maintain sand piles in a damp, loose condition. Provide necessary conditions and equipment to produce mortar having a temperature below 120°F.
Ambient temperature above 115°F, or 105°F with wind velocity greater than 8 mph	Maintain sand piles in a damp, loose condition. Provide necessary conditions and equipment to produce mortar having a temperature below 120°F. Shade materials and mixing equipment from direct sunlight.
During Construction	
Ambient temperature above 100°F, or 90°F with wind velocity greater than 8 mph	Maintain temperature of mortar and grout below 120°F. Flush mixer, mortar transport container, and mortar boards with cool water before they come into contact with mortar ingredients or mortar. Maintain mortar consistency by retempering with cool water. Use mortar within 2 hrs. of initial mixing.
Ambient temperature above 115°F, or 105°F with wind velocity greater than 8 mph	Maintain temperature of mortar and grout below 120°F. Flush mixer, mortar transport container, and mortar boards with cool water before they come into contact with mortar ingredients or mortar. Maintain mortar consistency by retempering with cool water. Use mortar within 2 hrs. of initial mixing. Use cool mixing water for mortar and grout. Ice is permitted in the mixing water prior to use. Do not permit ice in the mixing water when added to the other mortar ingredients or grout materials.
Protection	
Mean daily temperature above 100°F or 90°F with wind velocity greater than 8 mph	Fog spray all newly constructed masonry until damp, at least three times a day until the masonry is 3 days old.

Figure 15-66 Hot weather masonry construction. (*From Masonry Standards Joint Committee,* Specification for Masonry Structures, *ACI 530.1/ASCE 6/TMS 602.*)

Additional mixing water may be needed in mortar and grout, and additional lime will increase water retentivity (refer to Chapter 6). Increasing the cement content in the mix accelerates early strength gain and maximizes hydration before evaporative water loss. Adding ice to the mixing water can also lower the temperature of the mortar and grout and slow evaporation. Water that is too hot can cause the cement to flash set. Approved set-retarding or water-reducing admixtures may also be used. Retempering should be limited to the first 2 hours after mixing. Mortar beds should not be spread more than 4 ft ahead of the masonry, and units should be set within 1 minute of spreading the mortar.

Sun shades and wind screens can modify the effects of hot, dry weather, but consideration should also be given to scheduling work during the cooler parts of the day.

15.8 MOIST CURING

Cement hydration cannot occur if the temperature of the mortar or grout is below 40°F or if the internal moisture content of the mix is less than 75%. Both hot and cold weather can produce conditions that cause hydration to stop before curing is complete. These *dryouts* occur most frequently in concrete masonry construction and under winter conditions, but may also occur in brick construction and in hot, dry weather. Dryouts are reactivated by higher temperatures and the subsequent introduction of natural