

D & M Painting
© 2014 HEAT STRESS SAFETY PLAN

D & M Painting
1759 North Batavia Street
Orange, CA 92865

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1. HEAT STRESS DEFINITIONS

DEFINITIONS: For purposes of D & M Painting's Heat Stress Safety Plan, the following will apply:

"Acclimatization" means the temporary adaptation of the body to work in the heat that occurs gradually when an employee is exposed to it. Acclimatization peaks in most people within four to fourteen days of regular work for at least two hours per day in the heat.

"Heat Illness" means a serious medical condition resulting from the body's inability to cope with a particular heat load, and includes heat cramps, heat exhaustion, heat syncope and heat stroke.

"Environmental Risk Factors for Heat Illness" means working conditions that create the possibility that heat illness could occur, including air temperature, relative humidity, radiant heat from the sun and other sources, conductive heat sources such as the ground, air movement, workload severity and duration, protective clothing and employee protective equipment worn by employees.

"Employee Risk Factors for Heat Illness" means factors such as an employee's age, degree of acclimatization, health, water consumption, alcohol consumption, caffeine consumption, and use of prescription medications that affect the body's water retention or other physiological responses to heat.

"Preventative Recovery Period" means a period of time to recover from the heat in order to prevent heat illness.

"Access to Shade" Employees suffering from heat illness or believing a preventative recovery period is needed, will be provided access to an area with shade that is either open to the air or provided with ventilation or cooling for a period of no less than five minutes. Such access to shade will be permitted at all times. Except for employers in the agriculture industry, cooling measures other than shade (e.g., use of misting machines) may be provided in lieu of shade if D & M Painting can demonstrate that these measures are at least as effective as shade in allowing employees to cool.

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"Adequate Shade" means blockage of direct sunlight. Canopies, umbrellas and other temporary structures or devices may be used to provide shade. One indicator that blockage is sufficient is when objects do not cast a shadow in the area of blocked sunlight.

"Inadequate Shade" means shade that is not adequate when heat in the area of shade defeats the purpose of shade, which is to allow the body to cool. For example, a car sitting in the sun does not provide acceptable shade to an employee inside it, unless the car is running with air conditioning.

"Provision of Water" Employees will have access to potable drinking water. Where it is not plumbed or otherwise continuously supplied, it will be provided in sufficient quantity at the beginning of the work shift to provide one quart per employee per hour for drinking for the entire shift. D & M Painting may begin the shift with smaller quantities of water if they have effective procedures for replenishment during the shift as needed to allow employees to drink one quart or more per hour. The frequent drinking of water will be encouraged.

2. HOW THE BODY HANDLES HEAT

- 1** The human body, being warm blooded, maintains a fairly constant internal temperature, even though it is being exposed to varying environmental temperatures.
- 2** To keep internal body temperatures within safe limits, the body must get rid of its excess heat, primarily through varying the rate and amount of blood circulation through the skin and the release of fluid onto the skin by the sweat glands.
- 3** These automatic responses usually occur when the temperature of the blood exceeds 98.6°F and are kept in balance and controlled by the brain.
- 4** In this process of lowering internal body temperature, the heart begins to pump more blood, blood vessels expand to accommodate the increased flow, and the microscopic blood vessels (capillaries) which thread through the upper layers of the skin begin to fill with blood.

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- 5** The blood circulates closer to the surface of the skin, and the excess heat is lost to the cooler environment.
- 6** If heat loss from increased blood circulation through the skin is not adequate, the brain continues to sense overheating and signals the sweat glands in the skin to shed large quantities of sweat onto the skin surface. Evaporation of sweat cools the skin, eliminating large quantities of heat from the body.
- 7** As environmental temperatures approach normal skin temperature, cooling of the body becomes more difficult.
- 8** If air temperature is as warm as or warmer than the skin, blood brought to the body surface cannot lose its heat.
- 9** Under these conditions, the heart continues to pump blood to the body surface, the sweat glands pour liquids containing electrolytes onto the surface of the skin and the evaporation of the sweat becomes the principal effective means of maintaining a constant body temperature.
- 10** Sweating does not cool the body unless the moisture is removed from the skin by evaporation.
- 11** Under conditions of high humidity, the evaporation of sweat from the skin is decreased and the body's efforts to maintain an acceptable body temperature may be significantly impaired.
- 12** These conditions adversely affect a D & M Painting employee's ability to work in the hot environment. With so much blood going to the external surface of the body, relatively less goes to the active muscles, the brain, and other internal organs; strength declines; and fatigue occurs sooner than it would otherwise.
- 13** Alertness and mental capacity also may be affected. D & M Painting employees who must perform delicate or detailed work may find their accuracy suffering, and others may find their comprehension and retention of information lowered.

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3. SAFETY PROBLEMS RELATED TO HEAT

1. Certain safety problems are common to hot environments. Heat tends to promote accidents due to the slipperiness of sweaty palms, dizziness, or the fogging of safety glasses.
2. Wherever there is molten metal hot surfaces, steam, etc., the possibility of burns from accidental contact also exists.
3. Aside from these obvious dangers, the frequency of accidents, in general appears to be higher in hot environments than in more moderate environmental conditions.
4. One reason is that working in a hot environment lowers the mental alertness and physical performance of D & M Painting employee.
5. Increased body temperature and physical discomfort promote irritability, anger, and other emotional states which sometimes cause D & M Painting employees to overlook safety procedures or to divert attention from hazardous tasks.

4. HEALTH PROBLEMS RELATED TO HEAT

Excessive exposure to a hot work environment can bring about a variety of heat-induced disorders.

HEAT STROKE

1. Heat stroke is the most serious of health problems associated with working in hot environments. It occurs when the body's temperature regulatory system fails and sweating becomes inadequate.
2. The body's only effective means of removing excess heat is compromised with little warning to the employee that a crisis stage has been reached.

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3. A heat stroke employee's skin is hot, usually dry, red or spotted. Body temperature is usually 105°F or higher, and the employee is mentally confused, delirious, perhaps in convulsions, or unconscious.
4. Unless D & M Painting employee receives quick and appropriate treatment, death can occur. Any employee with signs or symptoms of heat stroke requires immediate hospitalization.
5. However, first aid will be immediately administered. This includes removing the employee to a cool area, thoroughly soaking the clothing with water, and vigorously fanning the body to increase cooling.
6. Further treatment at a medical facility will be directed to the continuation of the cooling process and the monitoring of complications which often accompany the heat stroke.
7. Early recognition and treatment of heat stroke are the only means of preventing permanent brain damage or death.

HEAT EXHAUSTION

1. Heat exhaustion includes several clinical disorders having symptoms which may resemble the early symptoms of heat stroke.
2. Heat exhaustion is caused by the loss of large amounts of fluid by sweating, sometimes with excessive loss of salt. D & M Painting employee suffering from heat exhaustion still sweats but experiences extreme weakness or fatigue, giddiness, nausea, or headache. In more serious cases, the employee may vomit or lose consciousness.
3. The skin is clammy and moist, the complexion is pale or flushed, and the body temperature is normal or only slightly elevated.
4. Treatment for heat exhaustion involves having the employee rest in a cool place and drinks plenty of liquids.
5. Employees with mild cases of heat exhaustion usually recover spontaneously with this treatment.

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6. Those with severe cases may require extended care for several days. There are no known permanent effects.
7. **CAUTION**
D & M Painting employees with heart problems or those on a low sodium diet who work in hot environments will consult a physician about what to do under these conditions.

HEAT CRAMPS

1. Heat cramps are painful spasms of the muscles that occur among those who sweat profusely in heat, drink large quantities of water, but do not adequately replace the body's salt loss.
2. The drinking of large quantities of water tends to dilute the body's fluids, while the body continues to lose salt.
3. Shortly thereafter, the low salt level in the muscles causes painful cramps.
4. The affected muscles may be part of the arms, legs, or abdomen, but tired muscles (those used in performing the work) are usually the ones most susceptible to cramps.
5. Cramps may occur during or after work hours and may be relived by taking salted liquids by mouth.
6. **CAUTION**
D & M Painting employees with heart problems or those on a low sodium diet who work in hot environments will consult a physician about what to do under these conditions.

FAINTING

1. D & M Painting employee who is not accustomed to hot environments and who stands erect and immobile in the heat may faint.

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2. With enlarged blood vessels in the skin and in the lower part of the body due to the body's attempts to control internal temperature, blood may pool there rather than return to the heart to be pumped to the brain.
3. Upon lying down, D & M Painting employee will soon recover. By moving around, and thereby preventing blood from pooling, the employee can prevent further fainting.

HEAT RASH

1. Heat rash, also known as prickly heat, is likely to occur in hot, humid environments where sweat is not easily removed from the surface of the skin by evaporation and the skin remains wet most of the time.
2. The sweat ducts become plugged, and a skin rash soon appears.
3. When the rash is extensive or when it is complicated by infection, prickly heat can be very uncomfortable and may reduce D & M Painting employee's performance.
4. D & M Painting employee can prevent this condition by resting in a cool place part of each day and by regularly bathing and drying the skin.

TRANSIENT HEAT FATIGUE

1. Transient heat fatigue refers to the temporary state of discomfort and mental or psychological strain arising from prolonged heat exposure.
2. D & M Painting employees unaccustomed to the heat are particularly susceptible and can suffer, to varying degrees, a decline in task performance, coordination, alertness, and vigilance.
3. The severity of transient heat fatigue will be lessened by a period of gradual adjustment to the hot environment (heat acclimatization).

5. PREPARING FOR THE HEAT

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1. One of the best ways to reduce heat stress on D & M Painting employees is to minimize heat in the workplace.
2. However, there are some work environments where heat production is difficult to control, such as when furnaces or sources of steam or water are present in the work area or when the workplace itself is outdoors and exposed to varying warm weather conditions.
3. Humans are, to a large extent, capable of adjusting to the heat.
4. This adjustment to heat, under normal circumstances, usually takes about 5 to 7 days, during which time the body will undergo a series of changes that will make continued exposure to heat more endurable.
5. On the first day of work in a hot environment, the body temperature, pulse rate, and general discomfort will be higher.
6. With each succeeding daily exposure, all of these responses will gradually decrease, while the sweat rate will increase.
7. When the body becomes acclimated to the heat, the employee will find it possible to perform work with less strain and distress.
8. Gradual exposure to heat gives the body time to become accustomed to higher environmental temperatures.
9. Heat disorders in general are more likely to occur among D & M Painting employees who have not been given time to adjust to working in the heat or among employees who have been away from hot environments and who have gotten accustomed to lower temperatures. Hot weather conditions of the summer are likely to affect the employee who is not acclimatized to heat.
10. Likewise, D & M Painting employees who return to work after a leisurely vacation or extended illness may be affected by the heat in the work environment. Whenever such circumstances occur, the employee will be gradually reacclimatized to the hot environment.

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6. REDUCING HEAT STRESS CONDITIONS

1. D & M Painting will reduce the hazards of heat stress by introducing engineering controls, training employees in the recognition and prevention of heat stress, and implementing work-rest cycles.
2. Heat stress depends, in part, on the amount of heat the employee's body produces while a job is being performed.
3. The amount of heat produced during hard, steady work is much higher than that produced during intermittent or light work.
4. Therefore, one way of reducing the potential for heat stress is to make the job easier or lessen its duration by providing adequate rest time.
5. Mechanization of work procedures can often make it possible to isolate employees from the heat sources (perhaps in an air-conditioned booth) and increase overall productivity by decreasing the time needed for rest.
6. Another approach to reducing the level of heat stress is the use of engineering controls which include ventilation and heat shielding.

7. EXPOSURES TO THE HEAT

1. Rather than be exposed to heat for extended periods of time during the course of a job, D & M Painting employees, wherever possible, be permitted to distribute the workload evenly over the day and incorporate work-rest cycles.
2. Work-rest cycles give the body an opportunity to get rid of excess heat, slow down the production of internal body heat, and provide greater blood flow to the skin.
3. D & M Painting employees employed outdoors are especially subject to weather changes. A hot spell or a rise in humidity can create overly stressful conditions.

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4. The following D & M Painting practices can help to reduce heat stress:
- Postponement of nonessential tasks,
 - Permit only those employees acclimatized to heat to perform the more strenuous tasks,
 - Provide additional employees to perform the tasks keeping in mind that all employees will have the physical capacity to perform the task and that they will be accustomed to the heat.

8. TEMPERATURE CONDITIONS

1. D & M Painting can use a variety of engineering controls can be introduced to minimize exposure to heat.
2. For instance, improving the insulation on a furnace wall can reduce its surface temperature and the temperature of the area around it. In a laundry room, exhaust hoods installed over those sources releasing moisture will lower the humidity in the work area.
3. In general the simplest and least expensive methods of reducing heat and humidity can be accomplished by:
 - Opening windows in hot work areas,
 - Using fans,
 - Using other methods of creating airflow such as exhaust ventilation or air blowers.

9. REST AREAS

1. Providing a cool rest area in hot work environments considerably reduces the stress of working in those environments.

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2. If working outdoors, D & M Painting will provide a cool shaded rest area for their employees,
3. A rest area with a temperature near 76/F appears to be adequate and may even feel chilly to a hot, sweating employee, until acclimated to the cooler environment.
4. The rest area will be as close to the workplace as possible. Individual work periods will not be lengthened in favor of prolonged rest periods. Shorter but frequent work-rest cycles are the greatest benefit to D & M Painting employee.
5. D & M Painting employees suffering from heat illness or believing a preventative recovery period is needed, will be provided access to an area with shade that is either open to the air or provided with ventilation or cooling for a period of no less than five minutes.
6. Such access to shade will be permitted at all times. Except for employers in the agricultural industry, cooling measures other than shade (e.g., use of misting machines) may be provided in lieu of shade. D & M Painting will demonstrate that these measures are at least as effective as shade in allowing employees to cool.

10. DRINKING WATER

1. In the course of a day's work in the heat, D & M Painting employee may produce as much as 2 to 3 gallons of sweat.
2. Because so many heat disorders involve excessive dehydration of the body, it is essential that water intake during the workday be about equal to the amount of sweat produced.
3. Most D & M Painting employees exposed to hot conditions usually will drink less water than needed because of an insufficient thirst drive.
4. , therefore, will not depend on thirst to signal when and how much to drink.

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5. Instead, the employee will drink 5 to 7 ounces of fluids every 15 to 20 minutes to replenish the necessary fluids in the body.
6. There is no optimum temperature of drinking water, but most people tend not to drink warm or very cold fluids as readily as they will cool ones.
7. Whatever the temperature of the water, it must be palatable and readily available to the employee. Individual drinking cups will be provided. D & M Painting employees never use a common drinking cup.
8. D & M Painting employees will always have access to potable drinking water.
9. Where water is not plumbed or otherwise continuously supplied, it will be provided in sufficient quantity at the beginning of the work shift to provide one quart per employee per hour for drinking for the entire shift.
10. D & M Painting may begin the shift with smaller quantities of water if they have effective procedures for replenishment during the shift as needed to allow employees to drink one quart or more per hour.
11. D & M Painting will encourage the frequent drinking of water.
12. **CAUTION**
D & M Painting employees with heart problems or those on a low sodium diet who work in hot environments will consult a physician about what to do under these conditions.

10. PROTECTIVE CLOTHING

1. Clothing inhibits the transfer of heat between the body and the surrounding environment. Therefore, in hot jobs where the air temperature is lower than skin temperature, wearing clothing reduces the body's ability to lose heat into the air.

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2. When air temperature is higher than skin temperature, clothing helps to prevent the transfer of heat from the air to the body. However, this advantage may be nullified if the clothes interfere with the evaporation of sweat.
3. In dry climates, adequate evaporation of sweat is seldom a problem. In a dry work environment with very high air temperatures, protective clothing could be an advantage to the worker.
4. D & M Painting knows that the proper type of clothing depends on the specific circumstance.
5. Certain work in hot environments may require insulated gloves, insulated suits, reflective clothing, or infrared reflecting face shields.
6. For extremely hot conditions, D & M Painting will have thermally conditioned clothing available. One such garment carries a self-contained air conditioner in a backpack, while another is connected a compressed air source which feeds cool air into the jacket or coveralls through a vortex tube.
7. Another type of garment is a plastic jacket which has pockets that can be filled with dry ice or containers of ice.
8. D & M Painting will provide appropriate head cover (hats) and sun screen for employees that are exposed to direct sun light during their outdoor working hours.

12. HEAT STRESS TRAINING

D & M Painting will provide training in the following topics to all supervisory and non-supervisory employees.

1. The safety and health problems for heat illness that are related to environmental and risk factors;
2. D & M Painting's procedures for complying with the requirements for this Heat Stress Safety Plan.

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3. The importance of frequent consumption of small quantities of water, up to 4 cups per hour, when the work environment is hot and employees are likely to be sweating more than usual in the performance of their duties;
4. D & M Painting will train their employees on the importance of acclimatization to the climate.
5. D & M Painting will instruct both employees and supervisors about the different types of heat illness and the common signs and symptoms of heat stress.
6. D & M Painting's job superintendent or the site supervisor will monitor the employees regularly for signs and symptoms of heat stress.
7. D & M Painting employees will also be trained in the "Buddy System" and will remain observant of their fellow workers' conditions.
8. Employees of D & M Painting will immediately report to their supervisor, symptoms or signs of heat illness in themselves, or in co-employees.
9. D & M Painting has procedures in place for responding to symptoms of possible heat illness that include emergency medical services if it will become necessary.
10. If any employee is found to demonstrate signs of heat illness, they will immediately be removed from their working area and treated accordingly.
11. D & M Painting has procedures for contacting emergency medical services, and if necessary, for transporting employees to a point where they can be reached by an emergency medical service provider by calling 911.
12. D & M Painting has procedures for ensuring that, in the event of an emergency there are clear and precise directions to the work site can and will be provided as needed to emergency responders.

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- 13.** D & M Painting will provide Supervisor training before they supervise employees working in the heat.
- 14.** D & M Painting's required training information and procedures by will be in writing and will be made available to all employees in a language that they can understand.

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EMPLOYEE PROCEDURES
HEAT ILLNESS PREVENTION

PROVISION OF WATER:

1. Water is a key preventive measure to minimize the risk of heat related illnesses. D & M Painting employees will have access to potable drinking water.
2. Where the supply of water is not plumbed or otherwise continuously supplied, water will be provided in sufficient quantity at the beginning of the work shift to provide one quart per employee per hour for drinking for the entire shift.
3. D & M Painting may begin the shift with smaller quantities of water if they have effective procedures for replenishment during the shift as needed to allow employees to drink one quart or more per hour. The frequent drinking of water will be encouraged.
4. Bring at least 2 quarts per employee at the start of the shift, Supervisor and/or a designated person will monitor water containers every 30 minutes, and employees are encouraged to report to designated person low levels or dirty water.
5. D & M Painting supervisor will provide frequent reminders to employees to drink frequently, and more water breaks will be provided.
6. It is suggested that every morning there will be short tailgate meeting to remind workers about the importance of frequent consumption of water throughout the shift.
7. Water containers will be as close as possible to the employees, not away from them.

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8. When drinking water levels within a container drop below 50%, the water will be replenished immediately; or water levels should not fall below the point that will allow for adequate water during the time necessary to effect replenishment.
9. Disposable/single use drinking cups will be provided to employees, or provisions will be made to issue employees their own cups each day.
10. Noise making devices, such as air horns, may be used to remind employee's to take their water break.

To ensure access to sufficient quantities of potable drinking water, the following steps will be taken:

To encourage frequent drinking of potable water, the following steps will be taken:

ACCESS TO SHADE

1. D & M Painting will provide rest and shade areas or other cooling measures are important preventive steps to minimize the risk of heat related illnesses.
2. Employees suffering from heat illness or believing a preventative recovery period is needed, will be provided access to an area with shade that is either open to the air or provided with ventilation or cooling for a period of no less than five minutes.

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3. Such access to shade will be permitted at all times. (Except for employers in the agriculture industry, cooling measures other than shade (e.g., use of misting machines) may be provided in lieu of shade if the employer can demonstrate that these measures are at least as effective as shade in allowing employees to cool.)
4. D & M Painting supervisor will set-up an adequate number of; umbrellas, canopies or other portable devices, at the start of the shift and will relocate them to be closer to the crew, as needed. Equipment should be placed in close proximity (i.e., no more than 50-100 yards) to the work activity.
5. Employees will have access to the office or construction trailer, or other building with air conditioning.
6. Every morning there will be short tailgate meeting (in the employees' language) to remind workers about the importance of rest breaks and the location of shade.
7. If D & M Painting is a non-agricultural employer they can use other cooling measures if they demonstrate that these methods are as effective as shade.

To ensure access to shade at all time, the following steps will be taken:

To ensure that employees have access to a preventative recovery period, the following steps will be taken:

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WRITTEN PROCEDURES

1. D & M Painting will help reduce the risk of heat related illnesses, and ensure that emergency assistance is provided without delay.
2. D & M Painting procedures required by will be in writing and will be made available to employees and to representatives of the OSHA upon request.
3. These include procedures for complying with the requirements of the prevention of heat stress illness, procedures for responding to symptoms of possible heat illness, including how emergency medical services will be provided should they become necessary, procedures for contacting emergency medical services, and if necessary, for transporting employees to a point where they can be reached by an emergency medical service provider;
4. Procedures for ensuring that, in the event of emergency, clear and precise directions to the work site can and will be provided as needed to emergency responders.
5. D & M Painting will provide written procedures include but are not limited to the following:
 - All employees will be trained prior to working outdoors.
 - Working hours will be modified to work during the cooler hours of the day, when possible.
 - When a modified or shorter work-shift is not possible, more water and rest breaks will be provided.
 - Supervisors will continuously check all employees, and stay alert to the presence of heat related symptoms.
 - Supervisors will carry cell phones or other means of communication, to ensure that emergency services can be called, and check that these are functional at the worksite prior to each shift.
 - Every morning, workers will be reminded about address and directions to the worksite and emergency procedures.

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To reduce the risk of heat-related illness (HI) and respond to possible symptoms of HI, the following steps will be taken:

To ensure that emergency medical services are provided without delay, the following steps will be taken:

HEAT STRESS TRAINING

1. D & M Painting knows that heat stress training is critical to help reduce the risk of heat related illnesses.

2. Training in the following topics will be provided to all supervisory and non-supervisory employees:
 - (A) The environmental and personal risk factors for heat illness;
 - (B) D & M Painting knows the importance of frequent consumption of small quantities of water, up to 4 cups per hour, when the work environment is hot and employees are likely to be sweating more than usual in the performance of their duties.
 - (C) D & M Painting knows the importance of acclimatization.
 - (D) The different types of heat illness and the common signs and symptoms of heat illness.
 - (E) The importance to employees of immediately reporting to the employer, directly or through the employee's supervisor, symptoms or signs of heat illness in themselves, or in co-workers.
 - (F) The employer's procedures for responding to symptoms of possible heat illness, including how emergency medical services will be provided should they become necessary.

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- (G) The employer's procedures for contacting emergency medical services, and if necessary, for transporting employees to a point where they can be reached by an emergency medical service provider.
- (H) D & M Painting procedures for ensuring that, in the event of an emergency, clear and precise directions to the work site can and will be provided as needed to emergency responders.
- (I) D & M Painting requires that communication for employees will be in a form readily understandable by all affected employees.
- (J) D & M Painting supervisor training will be provided prior to assignment to supervision of employees working in the heat. All the procedures the supervisor is to follow when an employee exhibits symptoms consistent with possible heat illness, including emergency response procedures.
- (K) All employees will receive heat illness prevention training prior to working outdoors. Especially all newly hired employees.
- (L) On hot days, and during a heat wave, supervisors will hold short tailgate meetings to review this important information with all workers and newly hired employees.
- (M) On hot days, and during a heat wave, supervisors will hold short tailgate meetings to review this important information with all workers. (Primary Farm Labor Contractors, staffing companies, etc, and secondary employers will ensure that all employee's (including temporary) working outdoors is trained in heat illness prevention.)

To ensure employees are trained, the following steps will be taken:

To ensure supervisors are provided training, the following steps will be taken:

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TRAINING DOCUMENTATION FORM

INSTRUCTOR _____

DATE _____

TRAINING: English Spanish

PRINT NAME

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Heat Wave: A Major Summer Killer

Heat is the number one weather-related killer. On average, more than 1,500 people in the U.S. die each year from excessive heat. This number is greater than the 30-year mean annual number of deaths due to tornadoes, hurricanes, floods and lightning combined. In the 40-year period from 1936 through 1975, nearly 20,000 people were killed in the United States by the effects of heat and solar radiation.

In the disastrous heat wave of 1980, more than 1,250 people died. In the heat wave of 1995 more than 700 deaths in the Chicago, Illinois area were attributed to this event. And in August 2003, a record heat wave in Europe claimed an estimated 50,000 lives.

North American summers are hot; most summers see heat waves in one section or another of the United States. East of the Rockies, they tend to combine both high temperature and high humidity although some of the worst have been catastrophically dry.

Watch, Warning, and Advisory Products for Extreme Heat

Each National Weather Service (NWS) Weather Forecast Office (WFO) can issue the following heat-related products as conditions warrant:

Excessive Heat Outlook: when the potential exists for an excessive heat event in the next 3 to 7 days. An outlook is used to indicate that a heat event may develop. It is intended to provide information to those who need considerable lead time to prepare for the event, such as public utilities, emergency management and public health officials.

Excessive Heat Watch: when conditions are favorable for an excessive heat event in the next 12 to 48 hours. A watch is used when the risk of a heat wave has increased, but its occurrence and timing is still uncertain. It is intended to provide enough lead time so those who need to set their plans in motion can do so, such as established individual city excessive heat event mitigation plans.

Excessive Heat Warning/Advisory: when an excessive heat event is expected in the next 36 hours. These products are issued when an excessive heat event is occurring, is imminent, or has a very high probability of occurrence. The warning is used for conditions posing a threat to life or property. An advisory is for less

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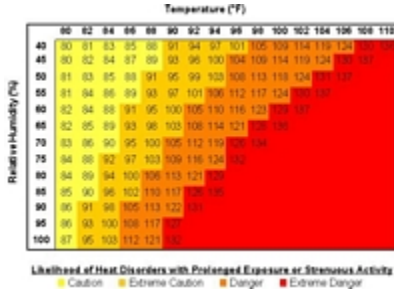
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serious conditions that cause significant discomfort or inconvenience and, if caution is not taken, could lead to a threat to life and/or property.

How Forecasters Decide Whether to Issue Excessive Heat Products

National Weather Service Heat Index Based Guidance the "Heat Index" (HI) is sometimes referred to as the "apparent temperature". The HI, given in degrees F, is a measure of how hot it really feels when relative humidity (RH) is added to the actual air temperature.

To find the HI, look at the **Heat Index Chart**. As an example, if the air temperature is 96°F (found on the top of the table) and the RH is 65% (found on the left of the table), the HI-or how hot it really feels-is 121°F. This is at the intersection of the 96° column and the 65% row.



IMPORTANT: Since HI values were devised for shady, light wind conditions, EXPOSURE TO FULL SUNSHINE CAN INCREASE HI VALUES BY UP TO 15°F. Also, STRONG WINDS, PARTICULARLY WITH VERY HOT, DRY AIR, CAN BE EXTREMELY HAZARDOUS.

Note on the Heat Index Chart shaded zone above 105°F. This corresponds to a level of HI that may cause increasingly severe heat disorders with continued exposure and/or physical activity.

Heat Alert Procedures based mainly on Heat Index Values

The National Weather Service will initiate alert procedures when the Heat Index is expected to exceed 105°- 110°F (depending on local climate) for at least two consecutive days. The procedures are:

1. Include Heat Index values in zone and city forecasts.
2. Issue Special Weather Statements and/or Public Information Statements presenting a detailed discussion of: Extent of the hazard including Heat Index values, who is most at risk, and safety rules for reducing the risk.
3. Assist state/local health officials in preparing Civil Emergency Messages in severe heat waves. Meteorological information from Special Weather Statements will be included as well as more detailed medical information, advice, and names and telephone numbers of health officials.
4. Release all of the above information to the media and over NOAA All-Hazard Weather Radio

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Heat Health Watch/Warning System

Recent research has shown that a heat index threshold does not fully account for a variety of factors which impact health including the impact of consecutive stressful days on human health, the time of year, or the location where excessive heat events occur. For example, studies indicate large urban areas are particularly sensitive to heat early in the summer season. Based on this research, NOAA/NWS has supported the implementation of new Heat Health Watch/Warning System (HHWS) that its forecasters use as guidance in producing their daily warning and forecast products. This system was developed in conjunction with researchers at the University of Delaware.

As of summer 2007, about 20 Weather Forecast Offices (WFO's) now utilize the HHWS as additional guidance in their forecast decision-making process. The NWS goal is to expand the HHWS coverage to include approximately 70 vulnerable urban cities across the continental U.S. with mostly populations of 500,000 or more.

The HHWS, tailored for each urban locale, is the first and only meteorological tool based upon the occurrence of certain air masses that have historically been associated with elevated mortality levels. Air masses consider the entire "umbrella" of air over a region, rather than a single meteorological variable such as the heat index. HHWS consider numerous meteorological, seasonal, and social factors, and are based upon actual human health responses. Through the use of, it is possible to predict the likelihood of excess mortality given the synoptic conditions present at specific cities, the number of consecutive days an oppressive air mass is present, and the time of year the event occurs.

Currently, those urban areas with HHWS coverage include Philadelphia, PA; Seattle, WA; Dallas, Fort Worth and Houston. TX; Phoenix and Yuma, AZ; Baltimore, MD; Washington, D.C.; Chicago, IL; St. Louis, MO Cincinnati and Dayton, Ohio; New Orleans, Baton Rouge, Lake Charles, Alexandria, Shreveport and Monroe, LA.; Memphis, TN; Jackson, Meridian and Tupelo, MS; Little Rock and Pine Bluff, AR; Portland, OR; Minneapolis, MN; San Francisco and San Jose, CA.

The NWS forecaster analyzes the HHWS guidance, as well as heat index values, time of year and expected length of the heat event, collaborate with neighboring WFO's as needed, and then decide which, if any, excessive heat product to issue.

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If an Outlook, Watch, Warning, or Advisory will be issued, the forecaster will notify the local health department and/or emergency management agency to insure that they are aware of the excessive heat forecast.

The Hazards of Excessive Heat

How Heat Affects the Human Body

Human bodies dissipate heat by varying the rate and depth of blood circulation, by losing water through the skin and sweat glands, and-as the last extremity is reached-by panting, when blood is heated above 98.6 degrees. The heart begins to pump more blood, blood vessels dilate to accommodate the increased flow, and the bundles of tiny capillaries threading through the upper layers of skin are put into operation. The body's blood is circulated closer to the skin's surface, and excess heat drains off into the cooler atmosphere. At the same time, water diffuses through the skin as perspiration. The skin handles about 90 percent of the body's heat dissipating function.

Sweating, by itself, does nothing to cool the body, unless the water is removed by evaporation, and high relative humidity retards evaporation. The evaporation process itself works this way: the heat energy required to evaporate the sweat is extracted from the body, thereby cooling it. Under conditions of high temperature (above 90 degrees) and high relative humidity, the body is doing everything it can to maintain 98.6 degrees inside. The heart is pumping a torrent of blood through dilated circulatory vessels; the sweat glands are pouring liquid-including essential dissolved chemicals, like sodium and chloride onto the surface of the skin.

Too Much Heat

Heat disorders generally have to do with a reduction or collapse of the body's ability to shed heat by circulatory changes and sweating, or a chemical (salt) imbalance caused by too much sweating. When heat gain exceeds the level the body can remove, or when the body cannot compensate for fluids and salt lost through perspiration, the temperature of the body's inner core begins to rise and heat-related illness may develop.

Ranging in severity, heat disorders share one common feature: the individual has overexposed or over exercised for his age and physical condition in the existing thermal environment.

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Sunburn, with its ultraviolet radiation burns, can significantly retard the skin's ability to shed excess heat. Studies indicate that, other things being equal, the severity of heat disorders tend to increase with age-heat cramps in a 17-year-old may be heat exhaustion in someone 40 years old and heat stroke in a person over 60.

Acclimatization has to do with adjusting sweat-salt concentrations, among other things. The idea is to lose enough water to regulate body temperature, with the least possible chemical disturbance.

Cities Pose Special Hazards

The stagnant atmospheric conditions of the heat wave trap pollutants in urban areas and add the stresses of severe pollution to the already dangerous stresses of hot weather, creating a health problem of undiscovered dimensions. A map of heat-related deaths in St. Louis during 1966, for example, shows a heavier concentration in the crowded alleys and towers of the inner city, where air quality would also be poor during a heat wave.

The high inner-city death rates also can be read as poor access to air-conditioned rooms. While air conditioning may be a luxury in normal times, it can be a lifesaver during heat wave conditions.

The cost of cool air moves steadily higher, adding what appears to be a cruel economic side to heat wave fatalities. Indications from the 1978 Texas heat wave suggest that some elderly people on fixed incomes, many of them in buildings that could not be ventilated without air conditioning, found the cost too high, turned off their units, and ultimately succumbed to the stresses of heat

Children, Adults, and Pets Enclosed in Parked Vehicles Are at Great Risk

Each year children die from hyperthermia as a result of being left enclosed in parked vehicles. This can occur even on a mild day. Studies have shown that the temperature inside a parked vehicle can rise rapidly to a dangerous level for children, adults, and pets. Leaving the windows slightly open does not significantly decrease the heating rate. The effects can be more severe on children because their bodies warm at a faster rate than adults.

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Excessive Heat Cautions and Safety Tips

Preventing Heat-Related Illness

Elderly persons, small children, chronic invalids, those on certain medications or drugs (especially tranquilizers and anticholinergics), and persons with weight and alcohol problems are particularly susceptible to heat reactions, especially during heat waves in areas where a moderate climate usually prevails.

Heat Wave Safety Tips

Slow down. Strenuous activities should be reduced, eliminated, or rescheduled to the coolest time of the day. Individuals at risk should stay in the coolest available place, not necessarily indoors.

Dress for summer. Lightweight light-colored clothing reflects heat and sunlight, and helps your body maintain normal temperatures.

Put less fuel on your inner fires. Foods (like proteins) that increase metabolic heat production also increase water loss.

Drink plenty of water or other non-alcohol fluids. Your body needs water to keep cool. Drink plenty of fluids even if you don't feel thirsty. Persons who (1) have epilepsy or heart, kidney, or liver disease, (2) are on fluid restrictive diets or (3) have a problem with fluid retention should consult a physician before increasing their consumption of fluids.

Do not drink alcoholic beverages.

Do not take salt tablets unless specified by a physician.

Spend more time in air-conditioned places. Air conditioning in homes and other buildings markedly reduces danger from the heat. If you cannot afford an air conditioner, spending some time each day (during hot weather) in an air conditioned environment affords some protection.

Don't get too much sun. Sunburn makes the job of heat dissipation that much more difficult

Never leave persons, especially children, and pets in a closed, parked vehicle

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Know These Heat Disorder Symptoms

SUNBURN: Redness and pain. In severe cases swelling of skin, blisters, fever, headaches. First Aid: Ointments for mild cases if blisters appear and do not break. If breaking occurs, apply dry sterile dressing. Serious, extensive cases should be seen by physician.

HEAT CRAMPS: Painful spasms usually in muscles of legs and abdomen possible and heavy sweating. First Aid: Firm pressure on cramping muscles, or gentle massage to relieve spasm. Give sips of water. If nausea occurs, discontinue use.

HEAT EXHAUSTION: Heavy sweating, weakness, skin cold, pale and clammy. Pulse is irregular and normal temperature possible. Fainting and vomiting. First Aid: Get victim out of sun. Lie down and loosen clothing. Apply cool, wet cloths. Fan or move victim to air conditioned room and give sips of water. If nausea occurs, discontinue use. If vomiting continues, seek immediate medical attention.

HEAT STROKE (or sunstroke): High body temperature (106° F or higher) with hot dry skin and rapid and strong pulse and possible unconsciousness. First Aid: HEAT STROKE IS A SEVERE MEDICAL EMERGENCY. SUMMON EMERGENCY MEDICAL ASSISTANCE OR GET THE VICTIM TO A HOSPITAL IMMEDIATELY. DELAY CAN BE FATAL. Move the victim to a cooler environment Reduce body temperature with cold bath or sponging. Use extreme caution. Remove clothing, use fans and air conditioners. If temperature rises again, repeat the process. Do not give fluids. Persons on salt restrictive diets should consult a physician before increasing their salt intake.

Community Guidance: Preparing for and Responding to Excessive Heat Events the "[Excessive Heat Events Guidebook](#)" was developed by the Environmental Protection Agency (EPA) in 2006, in collaboration with NOAA's National Weather Service (NWS), the Centers for Disease Control and Prevention (CDC), and the U.S. Department of Homeland Security (DHS). This guidebook provides best practices that have been employed to save lives during heat waves in different urban areas, and provides a menu of options that communities can use in developing their own mitigation plans.

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Worker Safety: Outdoor workers can be especially vulnerable to excessive heat. See [Occupational Safety and Health Administration \(OSHA\)](#) resources and recommended practices (planning, prevention, and response) when working under hot conditions, such as drinking fluids, changing work/rest schedules to lengthen breaks, cooling down in shade, and looking out for co-workers, particularly those who work alone. Check weather forecasts ahead of time so that you can be better prepared.

Types of Heat Stress

Heat Stroke

Heat stroke is the most serious heat-related disorder. It occurs when the body becomes unable to control its temperature: the body's temperature rises rapidly, the sweating mechanism fails, and the body is unable to cool down. When heat stroke occurs, the body temperature can rise to 106 degrees Fahrenheit or higher within 10 to 15 minutes. Heat stroke can cause death or permanent disability if emergency treatment is not given.

Symptoms

Symptoms of heat stroke include:

- Hot, dry skin or profuse sweating
- Hallucinations
- Chills
- Throbbing headache
- High body temperature
- Confusion/dizziness
- Slurred speech

First Aid

Take the following steps to treat a worker with heat stroke:

- Call 911 and notify their supervisor.
- Move the sick worker to a cool shaded area.
- Cool the worker using methods such as:
 - Soaking their clothes with water.
 - Spraying, sponging, or showering them with water.
 - Fanning their body.

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Heat Exhaustion

Heat exhaustion is the body's response to an excessive loss of the water and salt, usually through excessive sweating. Workers most prone to heat exhaustion are those that are elderly, have high blood pressure, and those working in a hot environment.

Symptoms

Symptoms of heat exhaustion include:

- Heavy sweating
- Extreme weakness or fatigue
- Dizziness, confusion
- Nausea
- Clammy, moist skin
- Pale or flushed complexion
- Muscle cramps
- Slightly elevated body temperature
- Fast and shallow breathing

First Aid

Treat a worker suffering from heat exhaustion with the following:

- Have them rest in a cool, shaded or air-conditioned area.
- Have them drink plenty of water or other cool, nonalcoholic beverages.
- Have them take a cool shower, bath, or sponge bath.

Heat Syncope

Heat syncope is a fainting (syncope) episode or dizziness that usually occurs with prolonged standing or sudden rising from a sitting or lying position. Factors that may contribute to heat syncope include dehydration and lack of acclimatization.

Symptoms

Symptoms of heat syncope include:

- Light-headedness
- Dizziness
- Fainting

First Aid

Workers with heat syncope should:

- Sit or lie down in a cool place when they begin to feel symptoms.
- Slowly drink water, clear juice, or a sports beverage.

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Heat Cramps

Heat cramps usually affect workers who sweat a lot during strenuous activity. This sweating depletes the body's salt and moisture levels. Low salt levels in muscles causes painful cramps. Heat cramps may also be a symptom of heat exhaustion.

Symptoms

Muscle pain or spasms usually in the abdomen, arms, or legs.

First Aid

Workers with heat cramps should:

- Stop all activity, and sit in a cool place.
- Drink clear juice or a sports beverage.
- Do not return to strenuous work for a few hours after the cramps subside because further exertion may lead to heat exhaustion or heat stroke.
- Seek medical attention if any of the following apply:
 - The worker has heart problems.
 - The worker is on a low-sodium diet.
 - The cramps do not subside within one hour.

Heat Rash

Heat rash is a skin irritation caused by excessive sweating during hot, humid weather.

Symptoms

Symptoms of heat rash include:

- Heat rash looks like a red cluster of pimples or small blisters.
- It is more likely to occur on the neck and upper chest, in the groin, under the breasts, and in elbow creases.

First Aid

Workers experiencing heat rash should:

- Try to work in a cooler, less humid environment when possible.
- Keep the affected area dry.
- Dusting powder may be used to increase comfort.

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Recommendations for Employers

Employers should take the following steps to protect workers from heat stress:

- Schedule maintenance and repair jobs in hot areas for cooler months.
- Schedule hot jobs for the cooler part of the day.
- Acclimatize workers by exposing them for progressively longer periods to hot work environments.
- Reduce the physical demands of workers.
- Use relief workers or assign extra workers for physically demanding jobs.
- Provide cool water or liquids to workers.
 - Avoid drinks with caffeine, alcohol, or large amounts of sugar.
- Provide rest periods with water breaks.
- Provide cool areas for use during break periods.
- Monitor workers who are at risk of heat stress.
- Provide heat stress training that includes information about:
 - Worker risk
 - Prevention
 - Symptoms
 - The importance of monitoring yourself and coworkers for symptoms
 - Treatment
 - Personal protective equipment

Recommendations for Workers

Workers should avoid exposure to extreme heat, sun exposure, and high humidity when possible. When these exposures cannot be avoided, workers should take the following steps to prevent heat stress:

- Wear light-colored, loose-fitting, breathable clothing such as cotton.
- Avoid non-breathing synthetic clothing.
- Gradually build up to heavy work.
- Schedule heavy work during the coolest parts of day.
- Take more breaks in extreme heat and humidity.
- Take breaks in the shade or a cool area when possible.
- Drink water frequently. Drink enough water that you never become thirsty.
- Avoid drinks with caffeine, alcohol, and large amounts of sugar.
- Be aware that protective clothing or personal protective equipment may increase the risk of heat stress.
- Monitor your physical condition and that of your coworkers.