

Heat Stress Policy
UFEHS-SAFE-04/04/01
Environmental Health and Safety
Finance and Administration
University of Florida

OBJECTIVE The objective of this policy is to reduce the risk of illness, injury or fatality to UF employees, students, volunteers and contractors under direct UF supervision from heat related disorders.

AUTHORITY ACGIH 2001 Threshold Limit Values for Physical Agents in the Workplace;
Governors Executive Order 2000-292

POLICY This policy sets forth the requirements for work hot environments by University of Florida personnel.

RESPONSIBILITIES

Supervisors/Principal Investigators have the primary responsibility for the implementation of the Heat Stress Prevention Program in their work area. The supervisor has ultimate responsibility for the safety of the employees. This includes evaluation of the work to be performed, providing ready access to drinking water or electrolyte replacement drinks, ensuring workers take are familiar with the signs and symptoms of heat related disorder, allow for acclimatization of workers in hot environments, adoption of work rest regimes and scheduling of work to reduce heat stresses as appropriate and providing training for employees.

Employees have the primary responsibility for working in accordance with the provisions of this policy.

Departments have the primary responsibility for providing training, sources of drinking water, and supporting supervisors in adjusted work schedules to reduce heat exposure during heat events.

Environmental Health and Safety (EH&S) has the primary responsibility for assisting departments in implementation of this policy through training and consultation.

PROCEDURES Specific procedures and requirements are outlined in the UF Heat Stress Prevention Program (see attachment).

Heat Stress Prevention Program
Environmental Health & Safety
Administrative Affairs
University of Florida

OBJECTIVE

Many workers at the University work in hot environments. These include employees working at physical plant, housing, hazardous waste, pest control, fine arts, laundry and agricultural worksites. Working in hot conditions poses many safety and health hazards to the workers. This policy addresses ways to minimize and control these hazards.

Four environmental factors affect the amount of stress a worker experiences in a hot environment: temperature, humidity, air velocity and radiant heat. Examples of radiant heat include direct heat from the sun or a furnace. Job-related factors that affect heat stress include work rate and physical effort required, type of clothing and protective equipment used, and duration of activity. All of these factors need to be evaluated in order to minimize their impact on the worker. Personal characteristics such as age, weight, physical fitness, and acclimatization to the heat also need to be factored in to determine those people and areas at high risk.

RESPONSIBILITIES

Environmental Health and Safety (EH&S) is available to monitor the heat exposure of individual jobs and make recommendations to reduce heat stress risk. If employees must work for extended periods (i.e. more than 1 continuous hour/day) outdoors during hot weather or above the threshold limit value (TLV) for heat exposure, EH&S will arrange for the training of supervisors. This training will include the signs and symptoms of heat stress and preventive measures that can be taken.

Departments are responsible for ensuring employees who are working in hot environments take necessary precautions as outlined in the section entitled *Control of Heat Stress*.

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Employees are responsible for attending training and following the instructions given. They are also responsible for monitoring themselves for signs and symptoms of heat stress.

HEALTH DISORDERS

The human body regulates high temperatures by two primary mechanisms; blood flow and sweating. Blood is circulated to the skin, increasing the skin temperature and allowing the body to give off the excess heat through the skin. Sweating occurs when the body senses the heat loss due to increased blood circulation is not enough to cool the body. Evaporation of the sweat cools the skin and eliminates large quantities of heat from the body. If the body is unable to release excess heat, it will store it. When this happens, the body's core temperature rises and the heart rate increases. If the body continues to store heat, the person may begin to have difficulty concentrating, may become irritable and lose the desire to drink. The next stage is often fainting which would signal a medical emergency. Listed in Table 1 are the common heat disorders with the accompanying symptoms and appropriate first aid measures.

Table 1: Heat Disorders

DISORDER	CAUSE	SIGNS & SYMPTOMS	TREATMENT
Heat Cramps	Heavy sweating Loss of salt	-Painful spasms of arms, legs and abdomen -Sudden onset -Hot, moist skin	Drink water Massage cramped area Rest
Heat Exhaustion	Dehydration Non-acclimatized	Heavy sweating Intense thirst Pale, moist, cool skin Rapid pulse Fatigue, weakness Fainting, collapse	-Move to shade or an air-conditioned space -Rest, lying down, legs elevated -Loosen clothing -Drink water
Heat Stroke	-Excessive exposure to hot environments -Body's system of temp. regulation fails -Body temp. rises to critical levels	High body temperature Lack of sweating Hot, red, dry skin Rapid pulse Chills Difficulty breathing Disoriented Weakness Unconsciousness	MEDICAL EMERGENCY Call for emergency help Immerse person in water Massage body with ice

WORKPLACE SURVEILLANCE

Work being done in non-air-conditioned indoor spaces may be monitored by an industrial hygienist or technician from EH&S. This monitoring will give a wet bulb globe temperature (WBGT) reading that can be used to assess the heat illness risk of the job. Employees identified as working in a high-risk area will need to follow the guidelines in Table 2 and the section *Control of Heat Stress*. Employees who are working outdoors or in non-air-conditioned space should pay attention to the temperature, humidity and heat stress indices. When the

heat stress index, as defined in Table 3, exceeds the extreme caution level of 90° F, precautions as outlined in Table 2 and the section *Control of Heat Stress* should be followed. If employees are wearing protective clothing such as welding leathers or tyvek for asbestos or agricultural work, precautions as outlined in Table 2 and the section *Control of Heat Stress* should be followed at a heat index in excess of 88° F.

If the heat stress index exceeds 120° F, or 118° F for workers with protective clothing, work in a heat stress environment must stop. If it is imperative that work gets done, contact EH&S for additional assistance. Historical data obtained throughout the state from the Florida Automated Weather Network (FAWN) indicates that this heat stress index was not exceeded during the summer of 1998.

Table 2. Guidelines for Heat Exposure Limits

Always monitor signs and symptoms of heat-stressed workers. Discontinue any activity for a person when:

- Sustained heart rate greater than 160 beats per minute for those under 35 and 140 for those 35 and over.
- There are complaints of sudden and severe fatigue, nausea, dizziness, lightheadedness, or fainting.
- There are periods of inexplicable irritability, malaise or flu-like symptoms.
- Sweating stops and the skin becomes hot and dry.

Table 3: Apparent temperature, Heat Stress Index (HSI)*

Relative Humidity %	Environmental Temperature °F									
	70	75	80	85	90	95	100	105	110	115
0%	64	69	73	78	83	87	91	95	99	103
10%	65	70	75	80	85	90	95	100	105	111
20%	66	72	77	82	87	93	99	105	112	120
30%	67	73	78	84	90	96	104	113	123	135
40%	68	74	79	86	93	101	110	123	137	151
50%	69	75	81	88	96	107	120	135	150	
60%	70	76	82	90	100	114	132	149		
70%	70	77	85	93	106	124	144			
80%	71	78	86	97	113	136	Extreme Danger			
90%	71	79	88	102	122					
100%	72	80	91	108						

Category	Apparent temperature (°F)	Dangers
Extreme danger	Greater than 120	Heat stroke imminent
Danger	105-120	Heat exhaustion likely
Extreme caution	90-105	Heat cramps, exhaustion possible
Caution	80-90	Exercise more fatiguing than normal

*Apparent temperature, Heat Stress Index (HSI): A measure of how hot it really feels in degrees Fahrenheit when relative humidity is factored with the actual air temperature. This chart has been adapted from the National Weather Service's "heat index" and an adjustment has been made with the apparent temperature categories to match more closely working in full sunshine. This guideline should be followed for employees not wearing protective clothing.

WORKER INFORMATION AND TRAINING

Employees who work in hot environments will receive training yearly regarding heat disorders, and their recognition, prevention and treatment. Training for jobs that are seasonal will be done prior to the hot season. New employees will receive training prior to working in a hot work environment.

CONTROL OF HEAT STRESS

The following guidelines should be followed to prevent heat-related disorders.

1. **Engineering Controls:** Heat may be controlled through general ventilation and spot cooling by local exhaust ventilation at the point of high heat production. Shielding may be needed for protection against radiant heat sources. Other control measures include opening windows or using fans to create airflow. Outdoor work areas need to have a shaded area accessible to the employees. Shaded areas can be created by using tarps or canopies or equipping tractors with canopies or cabs.
2. **Acclimatization:** Employees need to adapt to new temperatures. This adaptation period is usually 5 days. New employees and employees returning from an absence of two weeks or more should have a 3-5 day period of acclimatization. This period should begin with 50% of the normal workload the first day and gradually build up to 100% on the last day.
3. **Weather Conditions:** Check weather conditions frequently during the day and adjust the work schedule. It might be appropriate to change the actual hours of work to minimize working during the heat of the summer months. Heavy work should be scheduled for the cooler hours of the day. Non-essential tasks should be postponed when there is a heat warning issued.
4. **Work/Rest Cycles:** Heavy and minimal work activities should be alternated. Tasks should be rotated among workers. Employees should be allowed sufficient breaks in a cool area to avoid heat strain and promote recovery. Shade or an air-conditioned break room should be provided.
5. **Personal Protective Equipment:** During work in hot environments, workers should use the lightest weight or "breathable" protective garments that give adequate protection. This may include the wearing of shorts if this does not create a hazard for the legs. For work in extremely hot environments, cool vests are available from several manufacturers. These vests typically provide 1-2 hours of cooling, recharge in 20 minutes, and maintain a constant temperature of 55° F.
6. **Fluid Intake:** Fluids, such as water or electrolyte replacement drinks, i.e. Gatorade®, need to be conveniently available to workers so they can drink about 8 oz. of liquids every 20 minutes. The ideal temperature for liquids should be 50° - 60° F. For remote outdoor work locations this means providing a cooler of liquids and ice that the workers can transport with them to the location.
7. **Training:** Employees should be trained prior to working in a high heat area to be aware of the hazards of working in the heat, how to recognize heat-related illnesses and procedures for first aid and medical attention. They should also be aware of the methods used to avoid heat-related illnesses, including how some things, which happen off the job, can increase the risk of heat illnesses at work.

REFERENCES

1. American Conference of Governmental Industrial Hygienists. TLVs and BEIs. 1999.
 2. U.S. Environmental Protection Agency. A Guide to Heat Stress in Agriculture. Publication number EPA-750-b-92-001. May 1993.
 3. U.S. Department of Health and Human Services, National Institute for Occupational Safety and Health. Criteria for a Recommended Standard. Occupational Exposure to Hot Environments. Publication number 86-113. 1986.
- U.S. Department of Labor, Occupational Safety and Health Administration, Instruction TED 1.15, OSHA Technical Manual, Section II: Chapter 4, Heat Stress. September 22, 1995.