

**BY ORDER OF THE COMMANDER,  
436TH AIRLIFT WING**



**DOVER AIR FORCE BASE  
INSTRUCTION 48-102**

**6 OCTOBER 2003**

***Aerospace Medicine***

***HEAT STRESS AVOIDANCE***

**COMPLIANCE WITH THIS PUBLICATION IS MANDATORY**

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This instruction implements AFD 48-1, *Aerospace Medical Program*. It assigns responsibilities for determining the heat stress condition and relates how this information is relayed to ground and flying units. The heat stress condition provides guidance to commanders for determining when strenuous duties should be curtailed to prevent heat stress. This instruction applies to all base and tenant units.

***SUMMARY OF REVISIONS***

**This document is substantially revised and must be completely reviewed.**

**1. Responsibilities.**

1.1. The 436 ADOS Bioenvironmental Engineering Flight will:

1.1.1. Collect heat stress data at the discretion of the Bioenvironmental Engineering Flight.

1.1.2. Calculate the Wet Bulb Globe Temperature (WBGT) and determine the heat condition and update it as necessary.

1.1.3. Provide the 436 AW Command Post with heat condition information.

1.1.4. Provide the Crisis Action Team (CAT) with heat stress control information in the event of an exercise.

1.1.5. As required, provide recommendations for control of heat stress in addition to the ones in this instruction.

1.2. The 436 ADOS Public Health Flight will:

- 1.2.1. Provide general information to base personnel on heat stress avoidance through the Air-lifter, base bulletin, or other means at the beginning of the summer.
- 1.2.2. Provide information and training, as requested, to base personnel on potential heat stress hazards.
- 1.3. 436 AW Command Post will:
  - 1.3.1. Advise commanders when an extreme heat stress condition occurs.
  - 1.3.2. Provide recommended work/rest cycles and water intake guidelines to commanders. This notification will include, as a minimum: Eagle Gram notification to group control centers and radio notification to flight line supervisors.
- 1.4. Group and Squadron Commanders will:
  - 1.4.1. Ensure all personnel are aware of heat stress hazards and control measures.
  - 1.4.2. During extreme heat stress conditions ensure strenuous physical activities are curtailed. When the mission requires continuation of duties during extreme heat, ensure workers are closely supervised and observed for signs and symptoms of heat stress (see [Attachment 2](#)).
  - 1.4.3. Ensure supervisors implement the heat stress control measures described in paragraph [3](#).
  - 1.4.4. Ensure heat stress information is passed on to supervisors.
- 1.5. Supervisors will:
  - 1.5.1. Brief personnel on hazards and warning signs of heat stress.
  - 1.5.2. Implement heat stress control measures described in paragraph [3](#).
  - 1.5.3. Contact the Bioenvironmental Engineering Flight for additional guidance on heat stress as needed.
  - 1.5.4. Contact the Ambulance Response Team the Fire Department or 9-911 if serious heat stress signs or symptoms are observed.

## **2. Heat Conditions and Work/Rest Cycles.**

- 2.1. The Bioenvironmental Engineering Flight will determine the heat condition and provide that information to the Command Post. The Command Post will then disseminate the information.
- 2.2. The following are recommended work/rest cycles. These are recommendations only; supervisors must use their discretion to determine appropriate work/rest cycles based on factors such as local conditions, type of work done, and acclimatization of workers to heat. Additionally, Operational Risk Management (ORM) techniques should be used when assessing mission completion during hot weather. There may be situations where more frequent or longer periods of rest are required, such as work on aircraft, which may be hotter than the outside temperature; it is the supervisor's responsibility to ensure rest periods and water intake are adequate. The supervisor ensures this by direct observation of subordinates; this may include looking for symptoms of heat stress or fatigue, monitoring water intake, and observing the behavior of workers.

HEAT CONDITION	WGBT INDEX	WATER INTAKE	WORK/REST CYCLE
Moderate	82-87°F	0.5 to 1.5 quarts per hour	50/10
Extreme	88°F & above	1.5 or more quarts per hour	25/35

2.3. Protective clothing such as coveralls, gloves and respirators can add significantly to heat load. When this clothing is worn, supervisors must monitor workers closely to ensure heat-related illnesses do not occur.

2.4. The heat condition will remain in effect until notification that the heat condition has changed or the sun sets. The heat condition will return to normal after sunset. Please note that once the sun sets, workers are no longer exposed to a solar heat load (sunlight); however, they should still be aware of the potential signs/symptoms of heat exhaustion.

**3. Control of Heat Stress.** The following measures shall be taken by the supervisors to prevent heat stress:

3.1. Ensure water is available for workers to drink.

3.2. Ensure workers take adequate breaks and drink enough water.

3.3. Consumption of caffeinated drinks is not recommended. Caffeine is known to accelerate fluid loss.

3.4. Consumption of sports drinks is acceptable.

3.5. When possible, provide cooling devices. This may include portable air conditioners, vortex coolers for respirators, or vests with ice packs. **NOTE:** Fans that simply move air should be used when the air temperature is less than 90°F. When the air temperature is extremely high (greater than skin temperature, which is normally 90°F), moving air will increase heat stress.

3.6. When possible, schedule heavy work during the night or early morning.

3.7. When possible, adjust work schedules of people who work outside so work during the hottest part of the day is avoided.

3.8. Allow workers a period of time to become acclimatized to heat. This period may last 1 to 2 weeks.

3.9. Monitor workers to ensure they are not experiencing heat-related illnesses (see [Attachment 2](#)). The supervisor must keep in mind that older workers and overweight workers are more likely to experience problems. In addition, the use of alcohol or therapeutic drugs may increase the risk of heat-related problems, as may some medical conditions.

**4. Exercises.** When heat stress may be a problem during base exercises, information on heat stress work/rest cycles and heat stress prevention will be disseminated through the CAT by the Bioenvironmental Engineering and Public Health Flights, respectively. For work/rest cycles when wearing the ground crew ensemble, refer to AFMAN 32-4005, *Personnel Protection and Attack Actions*.

**5. High Temperatures in Administrative Areas.** In some situations, the temperature in administrative areas may be high due to malfunction or lack of cooling or other ventilation systems. In most situations, productivity of workers in this type of environment is a bigger concern than the potential health hazards. Fans (see paragraph 3.5.) should be used when possible if high temperatures are a concern. Unless the worker has a medical condition, which precludes them from working in the area, work limitations are normally not necessary when the temperature is less than the outdoor temperature. In any case, temperatures less than 90°F normally do not present a significant health risk to healthy workers performing sedentary duties.

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Commander

**Attachment 1****GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION*****Terms***

**Heat Condition**—A term used to describe potential for heat injury and designate recommended precautions.

**Rest**—Minimal physical activity accomplished in shaded or air-conditioned areas. Examples include training by lecture, minor maintenance procedures on vehicles or weapons and personal hygiene activities.

**Wet Bulb Globe Temperature (WBGT)**—A temperature index which takes into account the temperature, humidity, and radiant heat.

## Attachment 2

**HEALTH EFFECTS AND FIRST AID FOR HEAT INJURIES**

<b>HEAT CRAMPS</b>	
Symptoms	Painful cramps in sides, abdomen and large muscle groups Body temperature is normal
Treatment	Provide liquids Place patient in shade if possible
<b>HEAT EXHAUSTION</b>	
Symptoms	Excessive sweating Tingling in extremities Pallor (skin color) Nausea Raised blood pressure Elevated body temperature
Treatment	Cool body in shade Have person drink water Elevate person's legs if possible Call for professional medical assistance (Ambulance Response Team, 9-911)
<b>HEAT STROKE</b>	
Symptoms	Hot, dry skin Extremely high body temperature Deep and rapid breathing Headache Vomiting Death
Treatment	<b>EXTREME MEDICAL EMERGENCY</b> <b>Call the Ambulance Response Team (9-911) for ambulance transportation to hospital.</b> Until transportation to the hospital is available: - Lower person's body temperature immediately -- Remove clothing, put in shade, and sprinkle with water - Elevate person's legs

**A2.1.** In all cases, if conditions persist or worsen, professional medical attention must be given.

**A2.2.** The likelihood of heat injuries may increase with any of the following:

A2.2.1. Diseased/injured workers with fevers, vomiting, diarrhea, heat rash or sunburn

A2.2.2. Recent use (within 24 hours) of alcohol

A2.2.3. Physically unfit

A2.2.4. Older than 40 years of age

A2.2.5. Fatigue/lack of sleep

A2.2.6. Medicated workers

A2.2.7. Previous heat injuries

A2.2.8. Lack of recent experience in a hot environment