

**BY ORDER OF THE COMMANDER
LOS ANGELES AIR FORCE BASE**

**LOS ANGELES AIR FORCE BASE
INSTRUCTION 48-151**



6 NOVEMBER 2012

Aerospace Medicine

THERMAL STRESS PROGRAM

COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

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(Col Subrina Linscomb)

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This instruction implements Air Force Policy Directive 48-1, *Aerospace Medicine Enterprise*, Air Force Pamphlet 48-151, *Thermal Injury*, and Air Force Pamphlet 10-100, *Airman's Manual*. It establishes responsibilities and procedures to prevent adverse effects of heat stress. This instruction establishes policies and rules for all personnel who are assigned to Los Angeles Air Force Base (LAAFB) and perform non-flying (ground) duties during periods of hot weather. It does not apply to contractor personnel. It defines the Wet Bulb Globe Temperature (WBGT) Index, WBGT monitoring and reporting procedures, Heat Stress Index, Heat Stress posting, and unusual clothing stipulations. During mission essential, contingency or emergency operations, commanders may waive the provisions of this instruction. However, when commanders waive procedures, they must ensure all supervisors exercise caution, and ensure all subordinate personnel are aware of heat injury symptoms and take actions to protect the health of their personnel. Refer recommended changes and questions about this publication to the Office of Primary Responsibility (OPR) using the AF IMT Form 847, *Recommendation for Change of Publication*; route Air Force IMT 847s from the field through the appropriate functional manager's chain of command. Ensure all records created as a result of processes prescribed in this publication are maintained in accordance with Air Force Manual (AFMAN 33-363), *Management of Records*, and disposed of in accordance with the Air Force Records Disposition Schedule located at <https://www.my.af.mil/afirms/afirms/afirms/rims.cmf>. Additionally, if the publication generates a report(s), alert readers in a statement and cite all applicable Reports Control Numbers in accordance with Air Force Instruction (AFI) 33-324, *The Information Collections and Reports Management Program; Controlling Internal, Public, and Interagency Air Force Information Collections*. (**NOTE:** See Attachment 1, Glossary of References and Supporting Information, associated with this instruction).

SUMMARY OF CHANGES

This publication has been substantially revised and must be completely reviewed. All references to the Air Base Wing (ABW) were changed to Air Base Group (ABG) and Medical Group (MDG) to Medical Squadron (MDS). Administrative changes to wording was made throughout the document and grammatical errors addressed. Paragraph 1 definitions was moved to Attachment 1, the heading was renamed Overview and subparagraphs added. Wording in Paragraph 2.7 was revised to clarify responsibilities. Paragraph 4 was converted to bullet format to simplify the information provided and clarify requirements. Information in Attachment 1 was verified as accurate and updated accordingly.

1. OVERVIEW:

- 1.1. This instruction establishes guidance and procedures for performing work and/or physical training activities during severe weather conditions on LAAFB.
- 1.2. The purpose of this instruction is to provide guidance in the prevention and treatment of weather related injury in LAAFB personnel.
- 1.3. The focus of this instruction is on thermal injury and severe weather conditions that may cause injury to personnel. Cold injuries are unlikely in the local area as temperatures tend to be moderate in the winter months and rarely drop below freezing.

2. ROLES AND RESPONSIBILITIES:

- 2.1. 61st Air Base Group Commander (61 ABG/CC) will enforce base participation in this program to ensure the health and safety of all personnel on LAAFB.
- 2.2. 61st Medical Squadron Commander (61 MDS/CC) will be the final authority for thermal stress conditions for release to LAAFB Notices to Airmen (NOTAMS).
- 2.3. 61st Medical Squadron Bioenvironmental Engineering (61 MDS/SGPB) will:
 - 2.3.1. Use the Wet Bulb Globe Temperature (WBGT) to measure the hourly heat stress potential from May to September, when weather conditions dictate.
 - 2.3.2. Bioenvironmental Engineering (BE) maintains the right to use discretion in modifying the frequency of monitoring based on local weather conditions (e.g. rain, overcast, drop in temperature), as required by AFPAM 48-151, *Thermal Stress* paragraph 3.1.4.
 - 2.3.3. Ensure thermal stress readings and guidance are available 8 hours a day during the duty week when the predicated or forecasted outside temperatures reach 85⁰F as a daily high, and in support of exercises at the request of commanders.
 - 2.3.4. Prepare and forward alert messages to 61 MDS/CC for approval. Heat stress messages will include Flag Condition according to Attachment 2.
 - 2.3.5. Forward approved alert message(s) to: 61 ABG Command Post (61 ABG/XP), DSN 633-3070, commercial (310) 653-3070 for base notification (e.g. via computer “pop-up”).
 - 2.3.6. Investigate all thermal stress illnesses documented through the Air Force Safety Automated System (AFSAS).

2.4. 61 MDS/Public Health (61 MDS/SGPM) will:

2.4.1. Provide thermal stress education and training on preventing and controlling heat induced illness, when requested.

2.4.2. Report and track all thermal stress illnesses through AFSAS. **NOTE:** IAW AFI 33-332, *Privacy Act Program*, records retrieved by name or personal identifier are subject to Privacy Act requirements.

2.5. 61 FSS/FSSV will post Flag Condition(s) when notified by 61 MDS/SGPB at each Fitness Center.

2.6. Unit Fitness Leaders will:

2.6.1. Determine whether physical training (PT) can be conducted outside during current weather conditions. Physical training leaders (PTLs) should consider conducting PT indoors when severe environmental conditions exist. Refer to Air Force Instruction 36-2905, *Fitness Program*, Attachment 8, for environmental conditions required for PT testing. PT should not be conducted outside under the following conditions:

2.6.2. Limited visibility due to heavy precipitation/fog.

2.6.3. Temperature reading less than 20⁰ F.

2.6.4. Wind speed greater than 20 mph.

2.6.5. Visibility less than ¾ miles if crossing or running beside vehicular traffic.

2.6.6. Lightning within 6 miles, or less than 30 minutes after the last observed lightning.

2.6.7. Significant rain (accumulation <0.5 inch/hour).

2.6.8. Hail forecasted or reported within 25 miles.

2.6.9. WBGT greater than 85⁰ F or the heat index greater than 99⁰ F when WBGT is not available.

2.7. Supervisors will:

2.7.1. Routinely retrieve the thermal stress index from Command Post, and implement thermal stress safety procedures accordingly. Work center supervisors may have to adjust the work-rest cycles for operations that require heavy personal protective equipment.

2.7.2. Ensure employees working outside in hot environments increase their fluid intake, and implement appropriate work-rest cycles, reference Attachment 3.

2.7.3. Ensure all employees are trained to recognize thermal stress disorders and first aid treatment, reference Attachment 4.

2.7.4. Ensure employees are acclimatized in accordance with paragraph 4.

2.7.5. Report all thermal stress illnesses to 61 MDS/SGP at DSN 633-6870 or commercial(310) 653-6870.

2.8. Work center employees will:

2.8.1. Understand the signs and symptoms of thermal stress, and the associated first aid treatments.

2.8.2. Report all thermal stress illnesses to the work center's supervisor.

3. MONITORING HEAT STRESS:

3.1. BE will routinely monitor heat stress index during the summer months. The summer monitoring period will begin around Memorial Day and end around Labor Day. The summer monitoring period may be increased or decreased based on seasonal variations.

3.1.1. When the predicted or forecasted outside temperatures reach 85⁰ F as a daily high, BE will perform heat stress monitoring at least four times during the hottest part of the day. Examples of monitoring schedules might be 1000, 1200, 1400, and 1600 or 0900, 1100, 1300, and 1500.

3.1.2. When the heat stress index reaches 85⁰ F, BE will initiate heat stress monitoring hourly during normal duty hours.

3.1.3. The heat stress index is a tool to provide guidance to workplace supervisors in order to reduce heat stress injuries. The heat stress index should not be used directly for operations requiring heavy personal protective equipment or hot indoor operations.

4. ACCLIMATIZATION:

4.1. Acclimatization is a series of physiological adjustments, which occur when an individual is exposed to a hot or cold climate. A period of acclimatization is required for all personnel regardless of each individual's physical condition. The better the individual's physical condition, the quicker acclimatization is reached. Acclimatization is achieved through progressive degrees of heat exposure and physical exertion. Acclimatization to heat begins with the first exposure and is usually developed to about 50% by the end of the first week. Substantial acclimatization (about 78%) should occur by the end of the second week. Full acclimatization is attained quickest by gradually increasing period of work in the heat.

4.2. Acclimatization is required for the following:

4.2.1. Individuals who are routinely and occupationally exposed to strenuous duties or heavy work need acclimatization each year. This may occur during regular duty or work as outside temperatures increase during the spring and summer.

4.2.2. Newly assigned personnel arriving from cooler climates should follow the acclimatization guidelines given above.

4.2.3. Personnel returning to work after four days of illness should undergo a four-day reacclimatization.

4.2.4. Personnel returning to work after nine or more days away from work should undergo a four-day reacclimatization.

4.3. For personnel needing acclimatization supervisors should adjust work schedules. The most strenuous tasks should be performed early in the morning or late in the evening with lighter duty tasks performed during the remainder of the duty day. As personnel become acclimatized, work schedules can be shifted back to normal routines. When un-acclimated personnel are exposed to heat, they may experience some discomfort and signs of heat strain,

such as high body temperature, increased heart rate and fatigue on the first day. On each succeeding day, personnel's ability to perform at the same level of heat stress improves as signs of discomfort and strain diminish. During the two weeks it takes to acclimatize, personnel should be especially aware of the signs and symptoms of heat stress disorders and drink plenty of water. When discomfort and heat stress symptoms occur, personnel should self-pace their activities to perform below maximum physical capacity by adjusting their work speed and interspersing brief, unscheduled and in-place breaks. After a period of one to two weeks, personnel should be able to perform all tasks without difficulty.

ELLEN M. PAWLIKOWSKI, Lt Gen, USAF
Commander

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

Air Force Instruction 33-324, *The Information Collections and Reports Management Program; Controlling Internal, Public, and Interagency Air Force Information Collections*, 1 June 2000.

Air Force Instruction 33-332, *Privacy Act Program*, 16 May 2011

Air Force Guidance Memorandum to AF Manual 33-363, *Management of Records*, 9 April 2012

Air Force Pamphlet 10-100, *Airman's Manual*, 1 March 2009, Incorporating Change 1, 24 June 2011

Air Force Guidance Memorandum to AF Pamphlet 48-151, *Thermal Injury*, 24 April 2012

Air Force Policy Directive 48-1, *Aerospace Medicine Enterprise*, 23 August 2011

Prescribed Forms

No forms are prescribed in this publication.

Adopted Forms

AF IMT 847, *Recommendation for Change of Publication*, 22 September 2009

Abbreviations and Acronyms

ABG—Air Base Group

BE—Bioenvironmental Engineering

CC—Commander

DSN—Defense Switching Network

F—Fahrenheit

FSS—Force Support Squadron

LAAFB—Los Angeles Air Force Base

MDS—Medical Squadron

NOTAMS—Notices to Airmen

OPR—Office of Primary Responsibility

PT—Physical Training

PTL—Physical Training Leader

WBGT—Wet Bulb Globe Temperature.

AFSAS—Air Force Safety Automated System

Terms

Acclimatization— A series of physiological adjustments, which occur when an individual is exposed to a hot or cold climate. In simple terms, this is considered a break-in period to help personnel slowly adjust to hot and cold environments.

Heat Stress— The net heat load to which a worker may be exposed from the combined contributions of metabolic cost of work, environmental factors (air temperature, humidity, air movement, etc.) and clothing. In simple terms, heat stress is the body burden from these three categories above.

Heat Stress Posting— Visual notification of heat stress flag conditions, work rest cycles and or special personal protective equipment.

May— Indicates an acceptable or satisfactory method of accomplishment.

Should— Indicates a preferred method of accomplishment.

Thermal Stress— The common term used to cover both heat and cold stress.

Wet Bulb Globe Temperature— The WBGT is an instrument used to measure the heat stress index.

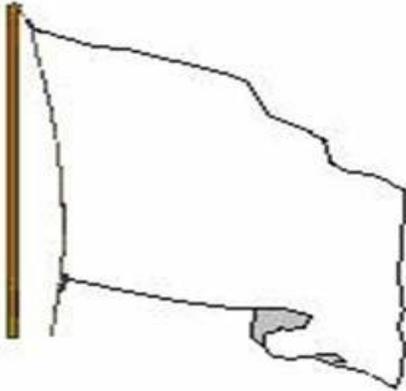
Will— Indicates a mandatory requirement and is also used to express a declaration of intent, probability, or determination.

Work/Rest Cycle— A guidance schedule for personnel to ensure adequate rest breaks are taken to avoid heat stress disorders.

Attachment 2

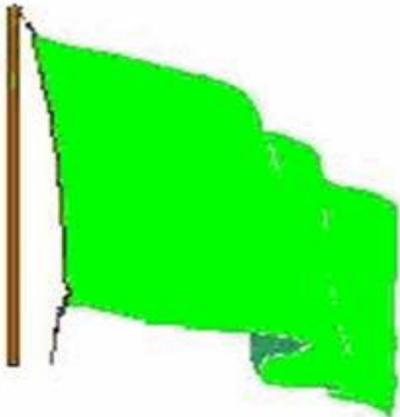
FLAG CONDITIONS

*Readings given are in degrees Fahrenheit (⁰F) Wet Bulb Globe Temperature (WBGT) index.
Readings are not ambient temperature or heat index temperature.*

WHITE FLAG (78 – 81.9⁰F WBGT)

Nonacclimated: Extremely intense physical exertion may cause heat exhaustion or heatstroke. Use caution conducting physical activity.

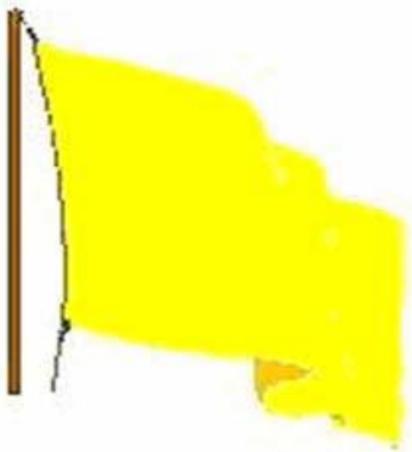
Acclimated: Normal activity

GREEN FLAG (82-84.9⁰F WBGT)

Nonacclimated: Use discretion in planning intense physical activity. Provide constant supervision.

Acclimated: Normal activity.

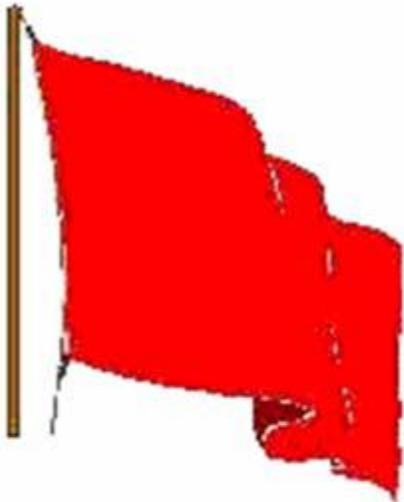
YELLOW FLAG (85-87.9⁰F WBGT)



Nonacclimated: Curtail strenuous exercises. Outdoor classes involving physical exertion canceled. Curtail outside work details. Provide constant supervision.

Acclimated: Use discretion in planning intense physical activity. Provide constant supervision.

RED FLAG (88-89.9⁰F WBGT)



Nonacclimated: Terminate all physical conditioning when above 88⁰ F.

Acclimated: Curtail strenuous exercise. Limited conditioning for periods not exceeding 6 hours. Curtail outdoor training involving physical exertion. Provide constant supervision.

BLACK FLAG (= \geq 90⁰F WBGT)



Nonacclimated or acclimated: No physical conditioning. All outdoor classes involving physical exertion canceled $\geq 90^{\circ}\text{F}$.

Attachment 3

WORK AND REST CYCLES FOR OCCUPATIONAL HEAT EXPOSURES

A3.1. Permissible Heat Exposure Limits: The permissible heat exposure limits are extracted from the American Conference of Governmental Industrial Hygienists Threshold Limit Value booklet. The limits in the table below are based on the following assumptions.

A3.1.1. Personnel are assumed to be acclimated, fully clothed, with average water and salt intake.

A3.1.2. Personnel can take breaks to prevent becoming overheated.

A3.1.3. Exposure limits are based on personnel working in normal work clothing.

Table A3.1. Work Rest Cycle Table (Values given in degrees F WBGT).

Work/Rest Regimen (per hour)	WORKLOAD		
	Light	Moderate	Heavy
Continuous Work	86	80	77
75% Work/25% Rest	87	82	78
50% Work/50% Rest	89	85	82
25% Work/75% Rest	90	88	86

A3.1.3.1. Continuous Work = No work restrictions.

A3.1.3.2. 25% rest = 15 minute rest each hour.

A3.1.3.3. 50% rest = 30 minute rest each hour.

A3.1.3.4. 75% rest = 45 minute rest each hour.

Table A3.2. Work Level Examples.

Light	Sitting with moderate arm and leg movement
	Standing with light work at machine or bench while using mostly arms
	Using a table saw
	Standing with light or moderate work at machine or bench and some walking about
Moderate	Walking about with moderate lifting or pushing
	Scrubbing in a standing position
	Walking on level at 6Km/hr. while carrying 3Kg weight load
Heavy	Shoveling dry sand
	Carpenter sawing by hand
	Heavy assembly work on a non-continuous basis
	Intermittent heavy lifting with pushing or pulling (pick and shovel work)
Very Heavy	Shoveling wet sand

A3.2. Personal Protective Equipment Adjustment: Personnel required to wear heavy personal protective equipment (e.g. tyvek suits, respiratory protection, etc.) during normal work center processes have an increase potential for heat stress. Supervisors of personnel who require heavy personal protective equipment should contact 61 MDG/SGPB (653-6539/6636/6644) to identify the appropriate correction factors to **Table A3.1.**

A3.3. Prevention of Heat Stress Disorders:

A3.3.1. Education: Personnel working and/or training in hot environments must be educated on the causes, symptoms, first-aid treatments and prevention of heat disorders. Personnel must also be educated on the following factors, which may contribute to heat injury.

A3.3.2. Water: Drink large quantities of cool water to make up for water lost through sweating. It is better to drink small amounts of water frequently (a pint every 20 minutes) to replace water than to drink large amounts less frequently. Milk and coffee do not make up for water loss. Carbonated beverages, while containing water, are not as effective as water in keeping the body hydrated because of the tendency to delay gastric emptying.

A3.3.3. Salt: Some salt is lost in the sweat. Because the typical North American diet contains so much salt, an individual should season food to taste, but should not make any additional attempts to add excessive salt to the diet. Salt tablets must not be used except under special operating environments when ordered by competent medical authority.

A3.3.4. Clothing: Wear loose fitting clothing, especially at the neck and wrist, to allow air circulation. Wear appropriate headgear. When exposed to the Sun's rays, cover yourself and apply a sun-blocking lotion to prevent sunburn. When not exposed to the sun, consideration should be given to wearing the least allowable amount of clothing.

A3.3.5. Acclimatization: Personnel must be acclimated to heat exposures. See paragraph 4.

A3.3.6. Work Schedules: Modify work schedules to perform the heaviest work in the coolest parts of the day. When working in hot environments, establish work and rest cycles as outlined in Table A3.1. Take rest breaks in cool, shaded areas.

A3.3.7. Food: Avoid eating greasy, fatty or heavy foods.

Attachment 4

HEAT STRESS DISORDERS

Table A4.1. Heat Stress Disorders:

INJURY	SYMPTOMS	FIRST AID
Heat Syncope	Fainting when standing erect and immobile in the heat	Remove to cool area. Allow to recline and provide cool water. Recovery will be prompt and complete.
Heat Cramps	Active sweating, muscle cramps. Spasms, usually in the muscles of arms.	Remove to cool area. Massage extremities. Contact medical facility.
Heat Exhaustion	Profuse sweating or moist, cool skin. Cramps in abdomen or limbs. Pale face. Dizziness, faintness, weakness, nausea or vomiting. Weak pulse. Normal body temperature.	Treat for shock. Lay person down in cool area and elevate feet. Loosen clothing and cool body by sprinkling with cool water or fanning (not to the point of shivering). Give cool water to drink with conscious. Contact medical facility.
Heat Stroke	Headache, dizziness, red face/skin. Hot, dry skin (no sweating), and strong, rapid pulse. High body temperature.	THIS IS A MEDICAL EMERGENCY. CALL 911. Treat for shock. Lay person down in cool area and elevate feet. Loosen clothing and cool body by sprinkling with cool water or fanning (not to the point of shivering). Give cool water to drink with conscious – add two teaspoons of salt to one canteen if available.