AFI48-151_DAVISMONTHANAFBSUP, Thermal Injury Prevention Program, implements requirements of AFPD 48-1, Aerospace Medical Program and AFI 48-151, Thermal Injury Prevention Program. It establishes the Davis-Monthan Air Force Base (DMAFB) responsibilities and procedures to prevent the adverse effects of heat stress. This supplement prescribes policies and responsibilities for all military and civilian personnel assigned to DMAFB and the Aerospace Maintenance and Regeneration Group (AMARG). This instruction does not apply to contractor personnel. 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, employ operational risk management, and take necessary actions to protect the health of personnel. Ensure that 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 (IAW) Air Force Records Disposition Schedule located in the Air Force Records Information Management System (AFRIMS) located at https://www.my.af.mil/gcss-af61a/afrims/afrims/. Contact supporting records managers as required. Refer recommended changes and questions about this publication to the Office of Primary Responsibility (OPR) using the AF Form 847, Recommendation for Change of Publication; route AF Forms 847 from the field through the appropriate functional chain of command.
2.7.3.1. **(Added)** The 355th Aerospace Medicine Squadron BE Flight Commander is the DMAFB TIPP manager.

2.11.1.1. **(Added)** Upon request, provide BE with various temperatures and wind speeds in support of determining the FITS and Equivalent Chill Temperature (“Wind Chill”).

2.11.1.2. **(Added)** Outside normal duty hours any parameters needed to calculate the Equivalent Chill Temperature and FRL can be obtained from the Sensor Display [https://owsjet2.dm.af.mil/portal/private/KDMAGuest/KDMASensorData](https://owsjet2.dm.af.mil/portal/private/KDMAGuest/KDMASensorData)

2.12.7.1. **(Added)** Accomplish heat stress monitoring (WBGT and FITS) 1 April through 30 September.

2.12.7.2. **(Added)** Completes cold stress monitoring 1 October through the last calendar day of February. Obtain temperatures and wind speeds from the Weather Flight to complete cold stress monitoring.

2.12.7.3. **(Added)** Report the environmental monitoring measurement and recommendation as outlined in paragraph 3.3.1.1 – 3.3.1.2. In addition, notify 355 FW/CP and AMARG Job Control when the flag condition/heat category changes.

2.12.8. **(Added)** Ensure environmental monitoring measurements and recommendations are available throughout normal duty hours (i.e. Monday-Friday, 0730-1630 hrs). Additional monitoring may be completed in support of weekend operations and/or exercises at the request of unit commanders.

2.12.8.1. **(Added)** BE personnel “deployed” to Base X will perform environmental monitoring, report measurement, and provide health risk assessments for the deployed location in accordance with exercise objectives and the deployed commander and senior BE member’s directions.

2.12.8.2. **(Added)** If “real world” thermal stress information will be used, contact the deployed BE EOC representative for assistance.

2.12.9. **(Added)** During the hot weather months as defined in paragraph 2.12.7.1, collect and report via eDASH, WBGT measurements at 0800, 0815, and 0830 hrs in support of AF Fitness Assessments.

2.16.1. **(Added)** Installation Fire Department will notify 355 FW Command Post of the location, unit, number of personnel involved, and status (i.e. transport to MTF, civilian medical facility, etc.) when responding to heat-related medical emergencies on base.

2.17.3.1. **(Added)** Enforce work activity level and hydration recommendations.

2.18.5.1. **(Added)** Brief workers annually on the health hazards of thermal stress, the WBGT index, the FITS when applicable, notification procedures, and appropriate preventive measures. Document this briefing on the worker’s AF Form 55, *Employee Safety and Health Record* or electronic equivalent.

2.18.8. **(Added)** Disseminate the environmental monitoring measurements (i.e. WBGT, FITS, FRL), to include proper thermal category/flag conditions and heat and cold stress
management to workers. The environmental monitoring measurements can be obtained using a method outlined in paragraphs 3.3.1.1 – 3.3.1.2 at 0900, 1100, 1300, and 1500 hrs Monday- Friday, except for federal holidays and authorized wing or MAJCOM down days.

2.18.8.1. (Added) In addition to obtaining environmental monitoring measurements as outlined in paragraph 3.3.1.1 – 3.3.1.2, maintenance personnel can receive the information from 355 MOS/MXOC (the MOC) via radio.

2.18.9. (Added) Ensure all personnel are acclimatized in accordance with paragraph A2.2

2.18.10. (Added) Schedule work that requires strenuous physical effort during the cool part of the day/shift, as much as duty requirements will allow.

2.18.11. (Added) Discourage the use of salt tablets and caffeinated drinks such as sodas during heat stress conditions. A balanced diet must be consumed in addition to water intake to prevent water intoxication.

2.18.12. (Added) Permit individuals to remove unnecessary clothing whenever practical during heat stress conditions.


2.18.13.1. (Added) The carbohydrate content should not exceed 15% prior to dilution.

2.18.13.2. (Added) Dilute sports drinks to half strength [1 part water: 1 part beverage] or [2 parts water: 1 part beverage powder] for optimal fluid replacement.

3.2.2.1. (Added) Environmental monitoring for heat stress hazards:

3.2.2.1.1. (Added) BE will monitor heat stress indexes routinely during the hot weather season as defined in paragraph 2.12.7.1. At the discretion of the installation BEE, the monitoring period may be extended based on unusual seasonal variations (i.e. routine elevated temperatures earlier than anticipated or after the established monitoring period).

3.2.2.1.2. (Added) BE will perform thermal stress monitoring at 0845, 1045, 1245, and 1445 hrs Monday-Friday and report by the times listed in paragraph 2.18.8, except for federal holidays and authorized MAJCOM or wing down days. If the WBGT reading at 1445 hrs. is greater than or equal to 85°F, BE will collect an additional reading at 1545 hrs.

3.2.2.1.3. (Added) At the end of the duty week, BE will average the previous three days’ thermal stress measurements for each time block and provide to the 355 FW Command Post, in addition to flag condition, category, and heat stress management information. Personnel working on weekends should follow these recommendations.

3.2.2.2. (Added) Environmental monitoring for cold stress hazards:

3.2.2.2.1. (Added) Cold stress is generally not a concern at Davis-Monthan AFB. However, during the winter months as defined in paragraph 2.12.7.2, BE
will monitor cold stress when the daily forecasted temperature will be less than or equal to 40°F.

3.2.2.2. (Added) When daily forecasted temperature is 40°F or less, BE will gather temperature and wind speed data from the Base Weather Flight at 0845 and 1245 hrs and calculate the Equivalent Chill Temperature (“Wind Chill”) and Frostbite Risk Level (FRL). These readings will be reported to the 355 FW Command Post.

3.3.1. (Added) BE will report thermal environmental monitoring:


3.3.1.2. (Added) To the 355 FW Command Post at DSN 228-7400.

SCOTT C. CAMPBELL, Colonel, USAF
Commander, 355th Fighter Wing
Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References
DoDI 6055.05, *Occupational and Environmental Health*, November 11, 2008
OSH Act of 1970, General Duty Clause, Section 5,

American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limits Values (TLV) and Biological Exposure Indices (BEI) Handbook, 2015


ASCC Adv Pub 61/114/9, ‘*Procedures for Protecting Aircrew During Routine Operations in Cold Climates*,’ 61/114/9, 30 July 1986

International Standards Organization (ISO) 7933, ‘*Analytical Determination and Interpretation of Thermal Stress Using Calculation of Required Sweat Rate,*’ Second Edition 2004

USARIEM, ‘*Sustaining Health and Performance in Cold Weather Operations*,’ October 2001

USAF/SG Memorandum, ‘*Cold Weather Injury Prevention*,’ 17 December 01

Brice S et al, ‘*Sunburn*,’ UpToDate.com, September 2010

Center for Disease Control and Prevention, *Morbidity and Mortality Weekly Report*, [http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6331a1.htm?s_cid=mm6331a1_w](http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6331a1.htm?s_cid=mm6331a1_w)


Moran & Pandolf, ‘Wet Bulb Globe Temperature - to what extent is GT essential?’, Aviation, Space & Environmental Medicine, Vol 70(7), July 1999, p. 720


Adopted Forms

AF847, Recommendation for Change of Publication, 22 September 2009
Abbreviations and Acronyms

AEA — Aircrew Equipment Assembly
AFMAN — Air Force Manual
AFRIMS — Air Force Records Information System
AFSAS — Air Force Safety Automated System
ABU — Airman Battle Dress Uniform
AMARG — Aircraft Maintenance and Regeneration Group
AME — Aerospace Medicine Enterprise
BE — Bioenvironmental Engineering
BEE — Bioenvironmental Engineer
CBRN — Chemical, Biological, Radiological, Nuclear
DOEHRS-IH — Defense Occupational and Environmental Health Readiness System – Industrial Hygiene
DMAFB — Davis Monthan Air Force Base
ESOHC — Environment, Safety and Occupational Health Council
FCI — Freezing Cold Injury
FITS — Fighter Index of Thermal Stress
FRL — Frostbite Risk Level
ICD — International Classification of Disease
IPE — Individual Protective Equipment
ISO — International Organization for Standardization
MOPP — Mission-Oriented Protective Posture
NFCCI — Non Freezing Cold Injury
OEH — Occupational and Environmental Health
OEHWG — Occupational and Environmental Health Working Group
OPR — Office of Primary Responsibility
OSHA — Occupational Safety and Health Administration
PH — Public Health
PMR — Program Management Review
RH — Relative Humidity
SEG — Similar Exposure Group
TLV — Threshold Limit Values
TIPP — Thermal Injury Prevention Program
UCHS—Uncompensable Heat Stress
USAFSAM—USAF School of Aerospace Medicine
USARIELM—US Army Research Institute of Environmental Medicine
UV—Ultra-violet Radiation
WBGT Index—Wet Bulb Globe Thermometer Index

Terms
Acclimatization—Acclimatization is the physiological adaptation of an individual to changes in climate or environment, such as temperature, humidity, or altitude.

Black Globe Temperature (Tg)—This is a measurement that integrates radiant (or direct sunlight) heat exchange and convective heating or cooling into one value. The WBGT index is based on the response of the six inch diameter globe. This measurement uses a six inch diameter hollow copper sphere painted matte black on the outside and containing an unshielded dry-bulb thermometer in the center of the sphere. Note that some current meters use a smaller sphere that is correlated to a six inch sphere.

Cold Injury—Cold environments pose a threat to the individual if they exceed the capacity of the body’s thermo-regulatory response mechanisms. The main hazards are hypothermia associated with a fall in the body’s core temperature and/or tissue damage that falls under the broad headings of FCI and NFCI (Non-freezing Cold Injury). For the purpose of this AFI the term ‘Cold Injury’ is all encompassing and applies to an individual who becomes incapacitated as the result of a drop in core body temperature, FCI or NFCI.

Conduction—The transfer of heat between two materials that are in contact with each other, with heat passing from the warmer material to the cooler material.

Convection—The heat transfer between molecules directly adjacent to each other, such as between the body and the surrounding air. The rate of heat exchange is a function of the difference in temperature between the skin and the surrounding air and the rate of air movement over the skin. As the temperature of the air decreases, the amount of heat loss due to convection increases. Increasing air movement increases convective heat loss.

Diuresis—Unusually large urine output. Increased excretion of urine caused by excessive intake of fluids, a drug, or a disease.

Dry—Bulb (air) Temperature (Td)—This is the temperature measured with an ordinary alcohol-in glass, or mercury-in-glass thermometer whose bulb is kept dry and shielded from direct sun radiation.

Evaporation—The process of liquid water converting to a vapor. Evaporation produces a cooling effect on the skin. Evaporative heat loss is a function of the rate of air movement over the skin and the water vapor pressure difference between the surrounding air and the wet skin. As the rate of air movement increases, the rate of evaporation increases, resulting in a cooling effect. However, as humidity increases, evaporative heat loss decreases.

Exercise-associated Collapse—Inability to stand or walk as a result of lightheadedness or syncope occurring immediately after completing a workout due to abrupt decrease in venous return.
**Exertional Heat Stroke**—The two main criteria for diagnosing exertional heat stroke (EHS) are a core temperature above 104°F (40°C), measured immediately following collapse during strenuous activity, and central nervous system dysfunction (disorientation, headache, irrational behavior, irritability, emotional instability, confusion, altered consciousness, or seizure).

**Heat Exhaustion**—Heat exhaustion is characterized by collapse due to the inability to maintain adequate cardiac output due to strenuous physical exercise and environmental heat stress. Core temperature is usually 101 to 104 degrees Fahrenheit and no significant central nervous system dysfunction is present at the time of collapse.

**Heat Illness**—Traditionally heat illness has been divided into heat exhaustion and (exertional) heat stroke. In practice the division is difficult to define; thus, for the purpose of this AFI the term ‘Heat Illness’ is all encompassing and applies to an individual who collapses as the result of a rise in core body temperature.

**Heat Index (HI)**—An alternative measure of heat risk that combines dry bulb temperature and relative humidity. Used in the AF for risk assessment when the preferred method (WBGT) is unavailable. See 3.2.7.

**Heat Strain**—The physiological or psychological response to heat stress, which is manifested in specific cardiovascular, thermoregulatory, respiratory, renal, endocrine, and other bodily functions, which differ from acceptable human norms.

**Heat Stress**—The combination of factors which result in heat gains or losses relative to the body, or which prevent the body’s regulatory mechanisms from working efficiently.

**Heat Stroke**—See ‘Exertional Heat Stroke.’

**Heat Syncope**—See ‘Exercise-associated Collapse’ and ‘Non-exertional Heat Syncope.’

**Humidity**—An expression of the quantity of water vapor mixed with the other atmospheric gases.

**Hypo-hydration**—Dehydration of the human or animal body.

**Natural Wet—Bulb Temperature (Tnwb)**—This is the temperature measured with a thermometer, with a wet wick fitted closely over the bulb or electronic sensor.

**Non-exertional Heat Syncope**—Transient loss or near-loss of consciousness due to the indirect effects of high ambient temperatures. Heat induced vasodilation can cause non-exertional syncope prior to acclimatization in the first few days of new exposure to high temperatures with prolonged standing or sudden standing.

**Radiant Heat**—Radiant heat loss occurs when surrounding objects have lower surface temperatures than the body. Radiant heat gain occurs when surrounding objects have higher surface temperatures than the body. Heat exchange due to radiation is independent of air movement.

**Vasodilation**—Widening of blood vessels, which increases heat removal but also lowers blood pressure.