

910 AWI91-302

BY ORDER OF THE COMMANDER 910th AIRLIFT WING

910th AIRLIFT WING INSTRUCTION 91-302

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Safety

SEVERE WEATHER OPERATING INFORMATION

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This instruction implements Air Force Policy Directive (AFPD) 91-3, *Occupational Safety and Health*. It establishes the Youngstown Air Reserve Station policy, responsibilities, and procedures for preventing the adverse effects of extreme weather conditions. This instruction applies to all personnel, civilian and military, who are assigned to or are attending training on this installation. During mission essential, contingency, or emergency operations, the unit commanders may waive the provisions of this instruction. However, when commanders waive procedures they must ensure all supervisors exercise caution, make certain all subordinate personnel are aware of heat/cold injury symptoms, and take appropriate actions to protect the health of their personnel.

SUMMARY OF REVISIONS

This revision substantially revises 910 TAGR 127-1.

1. Responsibilities:

1.1. Base Commander will establish notification procedures to inform affected base and tenant units of the Wet Bulb Globe Temperature (WBGT), actual, or, equivalent temperature as required.

1.2. Organization/Unit Commanders:

1.2.1. Will ensure all personnel are briefed annually on the health hazards of heat and cold stress, the WBGT index, notification procedures, and appropriate preventive measures.

1.2.2. Will ensure all personnel under their command follow the provisions of this regulation or waive the requirements due to mission considerations. If commanders waive the provisions of this instruction, they will ensure that the waiver and the reasons for it are disseminated to all sections.

1.2.3. Will, during training exercises when personnel wear the ground crew chemical defense ensemble, ensure all personnel are counseled concerning the early signs of heat stress and the

methods to be used to minimize the effects of heat stress.

1.3. Supervisors:

1.3.1. Will ensure all personnel under their control know the meaning of the WBGT/equivalent temperature, temperature ranges (Figure 1 and Figure 2) and understand measures to prevent heat and cold stress disorders.

1.3.2. Will plan training activities to meet the requirements of paragraph 3.

1.3.3. Will disseminate the WBGT index to workers when informed through the notification procedures.

1.3.4. Should ensure workers working outside in hot environments increase their fluid intakes as stated in paragraph 3.3.1.

1.3.5. Will ensure workers wear the proper clothing and protection devices for the weather.

1.3.6. Will plan work/rest cycles for personnel occupationally exposed to hot environments using Figure 1 unless waived IAW paragraph 1.2. 2. If unsure of work category contact BES for assistance.

Figure 1. Permissible Heat Exposure Threshold Limit Values

[Values are given in Fahrenheit (°F) WBGT]

Work/Rest Regiment	Workload		
	Light	Moderate	Heavy
Continuous Work	86	80	77
75% Work 25% Rest, Each Hour	87	82	79
50% Work 50% Rest, Each Hour	88	85	82
25% Work 75% Rest, Each Hour	90	88	86

1.3.7. Will plan work during cold weather using Figure 2.

Figure 2. Permissible Cold Exposure Limits (Given in Equivalent Temperatures).

Equivalent Temp	Above -15° F	No restrictions
	-15°F to -24°F	45 min on/15 min off in heated vehicle, two man system.
	-25°F to -40°F	A heated vehicle available nearby. Two man system, 30 min on/30 min off in heat.
	- 41°F to -75°F	Out-of-doors work will continue only with approval of unit commander, 5 min on/30 min off/ buddy system.
	Below - 74°F	All out-of-doors work will cease unless approved by Wing/CC.

1.4. Bioenvironmental Engineering Service (BES):

1.4.1. Will use the WBGT formulas from the latest edition of the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLV's) and Biological Exposure Indices.

1.4.2. When the predicted or forecasted outside temperature reaches 80° Fahrenheit (F) as a daily high BES will perform WBGT measurements at least 2 times during the hottest part of the day.

1.4.3. When the WBGT index reaches 85°F, BES will initiate WBGT measurements at least 4 times a day, evenly spaced during the hottest part of the day.

1.4.4. When the WBGT index reaches 90°F BES will initiate WBGT measurements hourly during normal duty hours.

1.4.5. Will notify Command Post of WBGT for dissemination to the base.

1.5. Military Public/Occupational Health:

1.5.1. Will provide training to all supervisors and workers who are exposed to extreme weather

conditions.

1.5.2. Will do lesson plans and provide training information to all Base personnel.

1.5.3. Should be the point of contact for health related questions pertaining to this instruction.

1.5.4. Will provide WBGT as per paragraph 1.4 if BES is not available.

1.6. Command Post (CP):

1.6.1. CP will notify BES when forecast or actual temperature will require WBGT measurements.

1.6.2. Whenever the actual or forecasted temperature is 10°F or less, Command Post personnel will hourly enter the current temperature, wind velocity, and computed equivalent temperature (F°) in the Command Post Log.

1.6.3. Will notify the Base via Secondary Crash Phone or other established net of WBGT/equivalent temperature and recommended work rest cycle.

1.6.4. Whenever the WBGT is above 90°F or the computed equivalent temperature (°F) is below -15°F, the wing commander or his designated representative and the unit commanders will be notified.

2. Guidelines for Occupational Heat and Cold Exposures. Personnel who routinely perform their jobs while exposed to hot/cold environments (e.g., aircraft maintenance, ground maintenance, repair work in confined spaces) are occupationally exposed.

2.1. Cold Weather Procedures:

2.1.1. Supervisors will use the Wind Chill Chart in Attachment 2 to assess outside weather conditions prior to dispatching personnel for outside work. During normal duty hours confirmation of conditions may be coordinated by Command Post.

2.1.2. When necessary for the accomplishment of a given task, two or more details should be arranged to work.

2.2. Hot Weather Procedures:

2.2.1. Supervisors will use the chart in Attachment 3 to determine WBGT if no qualified BES or Public/Occupational Health personnel are available.

2.2.2. Supervisors of personnel occupationally exposed to heat should use Figure 1 to plan work rest cycles for individuals under their control. When the WBGT index reaches the temperature shown in Figure 1 for the category of workload, supervisors should initiate the appropriate work/rest regimen.

2.2.3. For inside workers, factors such as insufficient ventilation and broken air conditioning equipment should be considered. When the actual temperature reaches 95°F inside work should be curtailed with all but essential work suspended. Commanders and supervisors should use discretion concerning ventilation effectiveness.

2.2.4. Exposures above 90°F WBGT should be allowed only when performing mission essential duties, and only then with caution.

2.2.5. When necessary for the accomplishment of a given task, two or more details should be

arranged to work in sequence to ensure each crew receives the appropriate work/rest cycle.

3. Prevention of Heat/Cold Stress Disorders. The following paragraphs discuss actions to help prevent heat/cold stress disorders. Additional information on these topics may be obtained by calling the Public Health/ Occupational Health Office.

3.1. The Base Commander makes the decision on AFI 36-2903 (*Dress and Personal Appearance of Air Force Personnel*) issues pertaining to the Base.

3.2. Education. Personnel working and training in hot/cold environments will be educated on the causes, symptoms, first aid treatment, and prevention of heat/cold disorders. Personnel will also be educated on the factors which may contribute to heat/cold injury.

3.3. Heat Stress Prevention:

3.3.1. Water. Drink large quantities of cold 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, coffee, and soda do not make up for water loss and are not considered substitutes for water. Juices are considered a good source for fluid intake. Juices can help maintain the bodies electrolytes which is important during extreme weather condition.

3.3.2. 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 a competent medical authority.

3.3.3. Clothing. Wear loose-fitting clothing, especially at the neck and wrist, to allow air circulation. Wear appropriate headgear. When exposed to the sun's ray, cover yourself with light clothing or sunscreen to prevent sunburn. When not exposed to the sun, ration should be consider given to wearing the least allowable amount of clothing.

3.3.4. Work Schedules: Modify work schedules to perform the heaviest work in the coolest parts of the day. When working in hot environments establish work/rest/cycles as shown in Figure 1. Take rest breaks in cool, shaded areas.

3.3.5. Food - Avoid eating greasy, fatty or heavy foods.

3.4. Cold Stress Prevention. Guidelines from ACGIH recommended procedures and work practices include:

3.4.1. For work in cold outdoor environments sufficient rest periods in heated shelter should be provided. Supervisor's should follow work plans as shown in Figure 2.

3.4.2. Work at a rate to prevent profuse sweating. Remove excess layers of clothing before perspiration starts so that clothing does not become wet. Wear clothing and footgear loose enough to permit layers or air to provide good insulation and to permit good circulation of blood to all parts of the body. Tight fitting uniforms are dangerous in cold conditions.

3.4.3. Educate and closely monitor new employees in jobs at risk for cold related disorders.

3.4.4. Protect the extremities, with gloves and/or boots.

3.4.5. Use protective clothing for cold environments sufficient to maintain necessary warmth.

3.4.6. During cold conditions keep hands well protected. Avoid lengthy exposure of bare hands and wrists that will cause suffering and reduce circulation. Do not touch metal, snow or other cold objects with bare hands. Do not put any unapproved chemical on skin.

3.4.7. Design the job to prevent, whenever possible, extreme coldness of the hands.

3.4.8. Pain in the extremities may be the first warning of danger due to cold stress. Maximum severe shivering develops when the body temperature has fallen to 95°F. This must be taken as a sign of danger to any personnel and immediately terminate exposure to cold for that individual. When severe shivering becomes evident useful physical or metal work is limited.

4. Recognition and First Aid Treatment for Heat Stress. Attachment 4 should be used to recognize the common heat disorders and as a quick reference for first aid.

5. Recognition and First Aid Treatment for Cold Stress. Attachment 5 should be used to recognize common cold stress disorders.

6. Walk/Run Requirements During Extreme Weather Conditions:

6.1. When the WBGT index is at or above 85°F personnel may walk but not run.

6.2. When the WBGT index is at or above 90°F PT will not be performed outdoors.

6.3. When the outdoor temperature or wind chill factor is at or below 32°F no PT will be performed outdoors.

6.4. Personnel responsible for PT requirements in their squadrons must contact the Command Post to get WBGT index/equivalent temperature readings prior to having exercise performed outdoors.

7. Guidelines for Personnel Wearing the Ground Crew Chemical:

7.1. Personnel performing ground crew operations and training while wearing the charcoal impregnated overgarment and associated protective equipment of the chemical defense ensemble are at increased risk of injury from heat stress. Maximum work times, tolerated by personnel while they are wearing the protective ensemble are affected by factors such as an individuals physical condition, state of thermal acclimatization, degree of hydration; the work load associated with a given task, and environmental factors including air velocity, radiant heat, air temperature, and humidity. Wet bulb globe temperature criteria incorporate many of these variables. While WBGT criteria are useful to experienced medical personnel as an aid in advising commanders concerning the impact of the ensemble under actual operating conditions, they are not readily usable by line supervisors when conducting small unit training exercises.

7.2. Measures to minimize heat casualties in personnel while they are accomplishing their mission, estimates of increases in task performance times, “maximum” and “safe” work times, and recovery rest times while personnel are wearing Mission-Oriented Protective Postures (MOPP) 4 equipment are discussed in AFMAN 32-4005 (Personnel Protection and Attach Actions). Commanders and supervisors should use these attachments when planning and conducting exercises to avoid heat injuries in their personnel.

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Commander

Attachment 1

EXPLANATION OF TERMS

Mandatory, Preferred, and Acceptable Requirements:

May- Indicates an acceptable or satisfactory method of accomplishment.

Should- Indicates a preferred method of accomplishment.

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

Curtailment -vs- Suspension of Activities - Curtailment means reducing the level of exertion, reducing the pace of the activity, and increasing the number and length of the rest periods. Suspension means to stop all strenuous activities temporarily until favorable environmental conditions return.

Heat Stress - Heat stress is the combination of environment and physical work factors that constitute the total heat load imposed on the body. The environmental heat stress factors are air temperature, radiant heat exchange (sunlight), air movement, and relative humidity. Physical work contributes to total heat stress through the body's production of heat (metabolic heat) as it burns energy to sustain the work. The production of metabolic heat depends on the intensity of the physical effort which is affected in turn by body size, muscular development, physical condition and age.

Heat Stress Disorders - Heat stress or heat disorders are general terms used to describe any type of adverse health problems related to heat. Heat syncope, cramps, exhaustion, and stroke are all forms of heat stress disorders. Heat disorders may be recognized by one or more of the following symptoms: nausea, vomiting, fever, dizziness, headache, faintness, abnormal sweating, convulsions, lack of coordination, mental confusion, and abdominal or extremity cramps. The personnel most likely to be affected by heat are those working directly outside who are

overweight, or in poor condition. Heat stress disorders are expressed as:

Heat Syncope - Fainting while standing and immobile in heat. Caused by pooling of the blood in dilated vessels and the lower parts of the body.

Heat Cramps - Painful intermittent spasms of the muscles used during work (arms, legs, or abdominal); may occur during or after work hours. Cramps may result from exposure to high temperature for a relatively long time, particularly if accompanied by hard physical work. Cramps usually occur in personnel after heavy sweating and are the result of excessive loss of salt from the body. Even if the moisture is replaced by drinking water, the loss of salt by sweating may provoke heat cramps

Heat Exhaustion - The signs of heat exhaustion are profuse sweating, weakness, rapid pulse, dizziness nausea, and headache. The skin is cool and sometimes pale and clammy with sweat, however, the body temperature is normal or below normal. Heat exhaustion is caused by a deficiency of water and/or salt intake and circulatory strain from competing demands for blood flow to the skin and to active muscles.

Heat Stroke - Heat stroke is a medical emergency and is caused by exposure to a hot environment in which the body is unable to cool itself sufficiently. This results in the body temperature rising rapidly. The skin is hot, dry, and flushed. Increased body temperature, if not controlled, may lead to delirium, convulsions, coma, and even death. Heat stroke is a much more serious condition than either heat cramps or heat exhaustion.

Wet Bulb Globe Temperature (WBGT) Index - The WBGT index is a combination of temperature measurements which considers dry air temperature, relative humidity, and radiant heating. The equation for the WBGT index uses Dry Bulb (DB), Natural Wet Bulb (NWB), and Black Globe (BG) temperatures.

Cold Stress Disorders - A general term used to describe any type of adverse health problems related to the cold. Hypothermia, frostbite, trench foot and immersion foot are all forms of cold stress disorders. Workers at risk include personnel working in cold climates, and in cold and wet environments.

Cold Injury - Defined as tissue trauma produced by exposure to cold. Types of injuries produced depends upon the degree of cold to which the body (or its parts) is exposed, the duration of exposure, and certain concurrent environmental factors.

Frostbite - This condition results from the freezing of tissues in the affected part of the body.

Damage can range from mild, superficial, and reversible to severe damage with gangrene. At low temperatures in the presence of wind, freezing of exposed skin can occur within a few seconds.

Trench Foot - Results from prolonged exposure to wet, cold foot gear or outright immersion of the feet at temperatures usually below 50°F. At the upper range of temperature exposure of 12 hours or more will cause injury. Shorter duration's near 32°F will cause the same injury.

Hypothermia - A progressive decrease in body temperature to 80°F or below, at which point unconsciousness and death occur. Body heat is lost quickly when an individual becomes wet and even more quickly when that individual is exhausted. When the body core temperature drops below 86°F physiological mechanisms to reduce heat loss become ineffective.

Light Work Load - (Up to 200 K cal/hr or 800 Btu/hr) Sitting, moderate arm and leg movements. Standing at a machine or bench using mostly arms. Example: Desk work or driving a vehicle.

Moderate Work Load -(200-350 K cal/hr or 800-1400 Btu/hr) Standing, light to moderate work at machines or bench. Some walking about. Example: Machine shop or flightline work.

Heavy Work Load - (350-500 K cal/hr or 1400-2000 Btu/hr) Intermittent heavy lifting, pushing, or pulling or hard sustained work. Example: Bomb loading or sheet metal work.

Attachment 2

WIND CHILL CHART

Attachment 3

HEAT INDEX CHART

Attachment 4

SYMPTOMS AND FIRST AID TREATMENT FOR HEAT INJURIES

Attachment 5

SYMPTOMS AND FIRST AID TREATMENT FOR COLD INJURIES