



# Heat Stress

**A Fact Sheet prepared by the National Telecommunications Safety Panel**

## Introduction

Operations involving high air temperatures, radiant heat sources, high humidity, direct physical contact with hot objects, or strenuous physical activities have a high potential for inducing heat stress in employees engaged in such operations. Excessive heat conditions that affect human health are commonly grouped together and called "Heat Stress".

## What Are The Different Types Of Heat Stress?

### Heat Stroke

Heat stroke occurs when the body is unable to regulate its temperature. The body's temperature rises rapidly, the sweating mechanism fails, and the body is unable to cool down.

Symptoms	First Aid
<ul style="list-style-type: none"> <li>An extremely high body temperature (above 103°F, orally)</li> <li>Red, hot, and dry skin (no sweating)</li> <li>Rapid, strong pulse</li> <li>Throbbing headache</li> <li>Dizziness</li> <li>Nausea</li> <li>Confusion</li> <li>Unconsciousness</li> </ul>	<p>Heat stroke is a life-threatening situation. Help is needed fast. Have someone call for immediate medical assistance while you begin cooling the victim.</p> <p>Do the following:</p> <ul style="list-style-type: none"> <li>Get the victim to a cooler place</li> <li>Cool the victim rapidly using whatever methods you can. Immerse victim in a cool bath, or wrap wet sheets around the body and fan it</li> <li>Monitor body temperature, and continue cooling efforts until the body temperature drops to 101–102°F</li> <li>Watch for signals of breathing problems</li> <li>If the victim refuses water, is vomiting, or there are changes in the level of consciousness, do not give anything to eat or drink</li> </ul>

### Heat Exhaustion

Heat exhaustion can develop after several days of exposure to high temperatures and inadequate replacement of fluids. It is the body's response to an excessive loss of the water and salt contained in sweat.

Symptoms	First Aid
<ul style="list-style-type: none"> <li>The skin may be cool and moist</li> <li>The pulse rate will be fast and weak</li> <li>Breathing will be fast and shallow</li> </ul>	<p>If heat exhaustion is untreated, it may progress to heat stroke. Seek medical attention immediately if:</p> <ul style="list-style-type: none"> <li>Symptoms are severe</li> <li>The victim has heart problems or high blood pressure</li> </ul> <p>Otherwise, help the victim to cool off, and seek medical attention if symptoms worsen or last longer than 1 hour.</p>

### Heat Cramps

Heat cramps usually affect people who sweat a lot during strenuous activity. This sweating depletes the body's salt and moisture. The low salt level in the muscles causes painful cramps.

Symptoms	First Aid
Pain or spasms in muscles—usually in the abdomen, arms, or legs	<p>If you have heart problems or are on a low-sodium diet, get medical attention for heat cramps.</p> <p>If medical attention is not necessary, take these steps:</p> <ul style="list-style-type: none"> <li>Stop all activity, and sit quietly in a cool place</li> <li>Drink clear juice or a sports beverage</li> <li>Do not return to strenuous activity for a few hours after the cramps subside, because further exertion may lead to heat exhaustion or heat stroke</li> <li>Seek medical attention for heat cramps if they do not subside in 1 hour</li> </ul>

## What Environmental Conditions Increase the Risk of Heat Stress?

Extremely hot weather and high humidity (sweat will not evaporate as quickly, preventing the body from releasing heat quickly).

## What Human Conditions Increase The Risk Of Heat Stress?

Age, obesity, fever, degree of physical fitness, degree of acclimatization, dehydration, high blood pressure, heart disease, mental illness, poor circulation, sunburn, and prescription drug and alcohol use.

## What are some other Types of Heat Related Medical Conditions?

### Sunburn

Sunburn should be avoided because it damages the skin. Although the discomfort is usually minor and healing often occurs in about a week, more severe sunburn may require medical attention.

## Heat Stress, continued

### Sunburn (continued)

Symptoms	First Aid
The skin becomes red, painful, and abnormally warm after sun exposure.	<p>Consult a doctor if these symptoms are present:</p> <ul style="list-style-type: none"> <li>• Fever</li> <li>• Fluid-filled blisters</li> <li>• Severe pain</li> </ul> <p>Also, remember these tips when treating sunburn:</p> <ul style="list-style-type: none"> <li>• Avoid repeated sun exposure</li> <li>• Apply cold compresses or immerse the sunburned area in cool water</li> <li>• Apply moisturizing lotion to affected areas</li> <li>• Do not use salve, butter, or ointment</li> <li>• Do not break blisters</li> </ul>

### Heat Rash

Heat rash is a skin irritation caused by excessive sweating during hot, humid weather.

Symptoms	First Aid
<ul style="list-style-type: none"> <li>• Heat rash looks like a red cluster of pimples or small blisters.</li> <li>• It is more likely to occur on the neck and upper chest, in the groin, under the breasts, and in elbow creases.</li> </ul>	<ul style="list-style-type: none"> <li>• The best treatment for heat rash is to provide a cooler, less humid environment.</li> <li>• Keep the affected area dry. Dusting powder may be used to increase comfort, but avoid using ointments or creams—they keep the skin warm and moist and may make the condition worse.</li> <li>• Treating heat rash is simple and usually does not require medical assistance.</li> </ul>

## What are Some Things That Can Be Done to Prevent Heat Related Illnesses?

### Heat Safety Tips

- **Slow down.** Strenuous activities should be reduced, eliminated, or rescheduled to the coolest time of the day. Individuals at risk should stay in the coolest available place, not necessarily indoors.
- **Dress for the heat.** Lightweight light-colored clothing reflects heat and sunlight, and helps your body maintain normal temperatures.
- **Eat Light.** Heavy foods (such as those high in protein and fat, e.g. – fried food, meats etc.) can increase your body’s heat production when trying to digest.
- **Drink plenty of water or other non-alcohol fluids.** Your body needs water to keep cool. Drink plenty of fluids even if you don’t feel thirsty. Cool (50°-60°F) water or any cool liquid should be made available to workers to encourage them to drink small amounts frequently, e.g., one cup every 20 minutes. Don’t drink liquids that contain caffeine, alcohol, or large amounts of sugar— these actually cause you to lose more body fluid. Also avoid very cold drinks, because they can cause stomach cramps.
- **Do not take salt tablets** unless specified by a physician.

- **Cool Off.** Spend more time in air-conditioned places.
- **Don’t get too much sun.** Sunburn makes the job of dissipation that much more difficult.
- **Schedule hot jobs** for the cooler part of the day.

## What Is Probably The Most Important Action An Employee Can Take When Suddenly Engaged In Emergency Work In A Hot Environment?

Acclimatization is the answer.

- Generally, individuals in good physical condition acclimatize more rapidly than those in poor condition.
- Acclimatization. Involves gradually increasing the workload and time spent in the hot environment.
- First day: perform 50% of the normal workload and spend 50 % of the time in the hot environment.
- Each day an additional 10 percent of the normal workload and time is added, so that by day six, the worker is performing the full workload for an entire day.
- After a one week absence, a worker needs to reacclimatize again. This will occur more rapidly, so increases in workload and time can increase by approximately 20 percent each day.

## About the Heat Index

The **Heat Index (HI)** is the temperature the body feels when heat and humidity are combined. The following shows how the “HI” is derived and the possible disorders that may ensue associated with various “HI” levels.

HEAT INDEX °F													
	RELATIVE HUMIDITY (%)												
Temp.	40	45	50	55	60	65	70	75	80	85	90	95	100
110	136												
108	130	137											
106	124	130	137										
104	119	124	131	137									
102	114	119	124	130	137								
100	109	114	118	124	129	136							
98	105	109	113	117	123	128	134						
96	101	104	108	112	116	121	126	132					
94	97	100	103	106	110	114	119	124	129	135			
92	94	96	99	101	105	108	112	116	121	126	131		
90	91	93	95	97	100	103	106	109	113	117	122	127	132
88	88	89	91	93	95	98	100	103	106	110	113	117	121
86	85	87	88	89	91	93	95	97	100	102	105	108	112

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NTSP does not ensure that adherence to these recommendations will protect the safety or health of any persons or preserve property.

## Heat Stress, continued

HEAT INDEX °F													
RELATIVE HUMIDITY (%)													
Temp.	40	45	50	55	60	65	70	75	80	85	90	95	100
84	83	84	85	86	88	89	90	92	94	96	98	100	103
82	81	82	83	84	84	85	86	88	89	90	91	93	95
80	80	80	81	81	82	82	83	84	84	85	86	86	87

Category	Heat Index	Possible heat disorders
Extreme Danger	130°F or higher	Heat stroke or sunstroke likely.
Danger	105 - 129°F	Sunstroke, muscle cramps, and/or heat exhaustion likely. Heatstroke possible with prolonged exposure and/or physical activity.
Extreme Caution	90 - 105°F	Sunstroke, muscle cramps, and/or heat exhaustion possible with prolonged exposure and/or physical activity.
Caution	80 - 90°F	Fatigue possible with prolonged exposure and/or physical activity.

### Additional Information

NOAA Office of Climate, Water, and Weather Services

<http://www.nws.noaa.gov/om/heat/index.shtml>

OSHA

<http://www.osha.gov/SLTC/heatstress/index.html>

NIOSH/CDC

<http://www.cdc.gov/niosh/topics/heatstress/>

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