

***PUBLIC EMPLOYEE
FEDERATION
HEALTH AND SAFETY
CONFERENCE
HEAT ILLNESS AND
STRESS PREVENTION
WORKSHOP***



AGENDA

Learning Topics

- **To understand how to work safely in the sun and in high temperatures**
- **Types of heat injuries/illnesses and who is affected**
- **Serious heat related injuries/illnesses**
- **Other common heat related injuries/illnesses**
- **Dehydration**
- **Prevention Tips**
- **Who is affected**
- **Methods of prevention**



FROM 1999 TO 2023, 21 518 DEATHS WERE RECORDED AS HEAT-RELATED UNDERLYING OR CONTRIBUTING CAUSE OF DEATH, WITH AN AAMR OF 0.26 PER 100 000 PERSON-YEARS.

SOURCE: JAMA JOURNAL OF AMERICAN MEDICINE.

HEAT-RELATED DEATHS IN THE US HAVE RISEN SIGNIFICANTLY, EXCEEDING 2,300 IN 2023, WITH STUDIES SHOWING A OVER 50% INCREASE IN ANNUAL DEATHS OVER THE PAST TWO DECADES. WHILE OFFICIAL CDC DATA OFTEN REPORTS 600–700+ DEATHS ANNUALLY, RECENT RESEARCH SUGGESTS THE TRUE IMPACT IS HIGHER DUE TO UNDERREPORTING.

SOURCE: YALE SCHOOL OF PUBLIC HEALTH



SOURCE: NEW YORK STATE DEPARTMENT OF CORRECTION AND COMMUNITY SUPERVISION, GREAT MEADOW CORRECTIONAL FACILITY



SOURCE: NEW YORK STATE OFFICE OF PARKS, RECREATION AND HISTORIC PRESERVATION, MOREAU LAKE STATE PARK

GENERATION OF BODY HEAT

- ***Metabolic Heat*** – generated through the digestion of food, work, and exercise.
- ***Environmental Heat*** – absorbed from the surrounding environment.

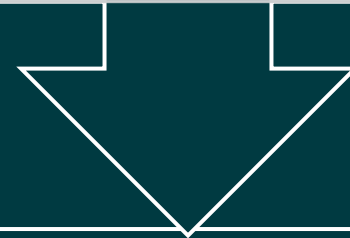
THE BODY'S COOLING SYSTEM

As the body's core temperature rises, several activities increase:

Sweating

Heart rate

*Blood flow
to the skin*



When the cooling system works well, the core temperature drops and can stabilize at a safe level.

HOW DOES HEAT STRESS OCCUR?



- **During warm weather, the body normally cools itself by perspiring.**
- **When the air temperature is the same or warmer than the body temperature, cooling the body is more difficult.**
-
- **When the humidity becomes higher, perspiration will not evaporate as quickly, preventing the body from releasing heat as fast as it normally would, causing various levels of heat stress.**
- **SOURCE: CORCRAFT**

Types of Heat Injuries/Illnesses



When working in the sun is necessary

- **Limit outdoor work in high temps**
- **Avoid working in direct sunlight between 10 am–4 pm**
- **Rest in the shade**
- **Use a hat with a brim**
- **Use suntan lotion SPF 30 or higher**
- **Use eye protection**
- **Drink plenty of water**



SOURCE: NEW YORK STATE DEPARTMENT OF TRANSPORTATION

WATER –
DRINK WATER (OR
“ELECTROLYTE”
BEVERAGES) OFTEN, EVEN
BEFORE YOU BECOME
THIRSTY

REST –
TAKE FREQUENT BREAKS
AWAY FROM THE SUN’S
RAYS; RECOMMENDED AIR-
CONDITIONED OR COOL,
WELL-VENTILATED AREA

SHADE –
ANYWHERE PEOPLE CAN
TAKE SHELTER FROM
THE SUN (TREE, CANOPY,
INDOORS); RECOVERY AREA



WATER. REST. SHADE.

The work can't get done without them.

PHYSIOLOGICAL CONSIDERATIONS

- **Acclimatization** refers to the physiological changes that occur in response to a succession of days of exposure to environmental heat stress and reduce the strain caused by the heat stress of the environment; and enable a person to work with greater effectiveness and with less chance of heat injury.

Acclimatization



For Everyone
AUGUST 14, 2024

WHAT TO KNOW

- Acclimatize new and returning workers to prevent heat-related illnesses.
- To acclimatize workers, gradually increase their exposure time in hot environmental conditions over a 7-14 day period.
- New workers will need more time to acclimatize than workers who have already had some exposure.



PREVENTION



- **Drink plenty of fluids**
- **If you're thirsty: it's too late**
- **No caffeine**
- **No alcohol**
- **No large amounts of sugar**
- **Avoid very cold drinks**

ABILITY TO COOL DOWN: FACTORS



- **Acclimation**
- **Physical condition**
- **Environment**
- **High heat**
- **Humidity**
- **Proper hydration**
- **Asset management**
- **SOURCE: CORCRAFT**

Heat Index

Heat Index	Risk Level	Protective Measures
Less than 91°F	<u>Lower</u> (Caution)	Basic heat safety and planning
91°F to 103°F	Moderate	Implement precautions and heighten awareness
103°F to 115°F	<u>High</u>	Additional precautions to protect workers
Greater than 115°F	<u>Very High to Extreme</u>	Triggers even more aggressive protective measures

The heat index is based on being in the shade

Work considerations	Degrees to add
Heavy work gear	Add 10
Work in direct sunlight	Add 15



HEAT EXHAUSTION

HEAT EXHAUSTION IS THE BODY'S RESPONSE TO AN EXCESSIVE LOSS OF THE WATER AND SALT, USUALLY THROUGH EXCESSIVE SWEATING. WORKERS MOST PRONE TO HEAT EXHAUSTION ARE THOSE THAT ARE ELDERLY, HAVE HIGH BLOOD PRESSURE, AND THOSE WORKING IN A HOT ENVIRONMENT.

**SOURCE: NEW YORK STATE OFFICE OF PARKS,
RECREATION HISTORIC PRESERVATION**

SIGNS AND SYMPTOMS OF HEAT EXHAUSTION

- **Weakness**
- **Heavy sweating**
- **Extreme weakness or fatigue**
- **Dizziness, confusion**
- **Nausea**
- **Clammy, moist skin**
- **Pale or flushed complexion**
- **Muscle cramps**
- **Slightly elevated body temperature**
- **Fast and shallow breathing**

**Heat Exhaustion is considered a Medical
Emergency!**

FIRST AID FOR HEAT EXHAUSTION

- **Call 911 and notify their supervisor.**
- **Have them rest in a cool, shaded or air-conditioned area.**
- **Have them drink plenty of water, electrolyte drinks or other cool, nonalcoholic beverages.**
- **Use cold packs in a first aid kit to cool them down**

Heat Exhaustion	Heat Stroke
ACT FAST <ul style="list-style-type: none">• Move to a cooler area• Loosen clothing• Sip cool water• Seek medical help if symptoms don't improve	ACT FAST CALL 911 <ul style="list-style-type: none">• Move person to a cooler area• Loosen clothing and remove extra layers• Cool with water or ice
<i>Dizziness</i> <i>Thirst</i> <i>Heavy Sweating</i> <i>Nausea</i> <i>Weakness</i>	<i>Confusion</i> <i>Dizziness</i> <i>Becomes Unconscious</i>
<i>Heat exhaustion can lead to heat stroke.</i>	<i>Heat stroke can cause death or permanent disability if emergency treatment is not given.</i>

Stay Cool, Stay Hydrated, Stay Informed!

Logos: NIOSH, CDC, MOSH, NHHHS

Heat Exhaustion is considered a Medical Emergency!

HEAT STROKE

- **Is the most serious heat-related disorder.**
- **Occurs when the body becomes unable to control its temperature.**
- **Body's temperature rises rapidly, sweating mechanism fails, body is unable to cool down.**
- **When heat stroke occurs, body temperature can rise to 106 degrees Fahrenheit or higher within 10 to 15 minutes.**
- **Heat stroke can cause death or permanent disability if emergency treatment not given.**



HEAT STRESS

SYMPTOMS



RAPID HEARTBEAT



NO SWEATING
HOT / RED SKIN



DIZZINESS & HEADACHE



UNCONSCIOUSNESS



VOMITING

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HEAT STROKE SIGNS AND SYMPTOMS

- **Hot, dry skin or profuse sweating**
- **Hallucinations**
- **Chills**
- **Throbbing headache**
- **High body temperature**
- **Confusion/dizziness**
- **Slurred speech**

FIRST AID FOR HEAT STROKE

- **Call 911 and notify their supervisor.**
- **Move the sick worker to a cool shaded area.**
- **Cool the worker using methods such as:**
 - ✓ **Soaking and applying a cooling towel**
 - ✓ **Spraying, sponging, or showering them with water.**
 - ✓ **Applying cold packs.**



Heat Stroke is considered a Medical Emergency!

FIRST AID FOR HEAT STROKE

• This is a medical emergency

• Never allow the person to return to work or go home without medical attention & clearance

• Return to work will vary depending on individual's physical fitness & timing of first aid treatment



HEAT SYNCOPE

• This is a medical emergency

- **Symptoms:**

- Fainting
- Dizzy
- Lightheaded

- **Treatment:**

- Sit or lie down in cool place when they begin to feel symptoms.
- Slowly drink water, clear juice, or a sports beverage.



The poster features the OSHA logo (Occupational Safety and Health Administration) and a 'Heat Illness Prevention' graphic with a thermometer icon. The main title is 'Work Safely in Heat'. Below it, text states 'Indoor and outdoor workers are at risk for heat illness.' The illustration shows a worker in a green vest and cap handling a box, and a worker in a dark apron and white cap standing by a rack of trays. The bottom text reads 'Heat illness is preventable'.

OSHA[®]
Occupational Safety
and Health Administration

**Heat Illness
Prevention**

Work Safely in Heat

Indoor and outdoor workers are at risk
for heat illness.

Heat illness is preventable

HEAT CRAMPS

Symptoms

- **Muscle pain or spasms usually in the abdomen, arms, or legs.**

First Aid

- **Stop all activity and sit in a cool place.**
- **Drink water, clear juice or a sports beverage.**
- **Do not return to strenuous work for a few hours after the cramps subside because further exertion may lead to heat exhaustion or heat stroke.**
- **Seek medical attention if any of the following apply:**
 - **The worker has heart problems.**
 - **The worker is on a low-sodium diet.**
 - **The cramps do not subside within one hour.**



HEAT RASH

Symptoms:

- **Red cluster of pimples or small blister**
- **Can happen anywhere on body**
 - **Neck**
 - **Back**
 - **Groin**

First Aid:

- **Work in a cooler area if possible**
- **Keep area dry**
- **Powders may be used for comfort**

HEAT-RELATED ILLNESSES

WHAT TO LOOK FOR	WHAT TO DO
HEAT STROKE	
<ul style="list-style-type: none">• High body temperature (103°F or higher)• Hot, red, dry, or damp skin• Fast, strong pulse• Headache• Dizziness• Nausea• Confusion• Losing consciousness (passing out)	<ul style="list-style-type: none">• Call 911 right away—heat stroke is a medical emergency• Move the person to a cooler place• Help lower the person's temperature with cool cloths or a cool bath• Do not give the person anything to drink
HEAT EXHAUSTION	
<ul style="list-style-type: none">• Heavy sweating• Cold, pale, and clammy skin• Fast, weak pulse• Nausea or vomiting• Muscle cramps• Tiredness or weakness• Dizziness• Headache• Fainting (passing out)	<ul style="list-style-type: none">• Move to a cool place• Loosen your clothes• Put cool, wet cloths on your body or take a cool bath• Sip water <p>Get medical help right away if:</p> <ul style="list-style-type: none">• You are throwing up• Your symptoms get worse• Your symptoms last longer than 1 hour
HEAT CRAMPS	
<ul style="list-style-type: none">• Heavy sweating during intense exercise• Muscle pain or spasms	<ul style="list-style-type: none">• Stop physical activity and move to a cool place• Drink water or a sports drink• Wait for cramps to go away before you do any more physical activity <p>Get medical help right away if:</p> <ul style="list-style-type: none">• Cramps last longer than 1 hour• You're on a low-sodium diet• You have heart problems
SUNBURN	
<ul style="list-style-type: none">• Painful, red, and warm skin• Blisters on the skin	<ul style="list-style-type: none">• Stay out of the sun until your sunburn heals• Put cool cloths on sunburned areas or take a cool bath• Put moisturizing lotion on sunburned areas• Do not break blisters
HEAT RASH	
<ul style="list-style-type: none">• Red clusters of small blisters that look like pimples on the skin (usually on the neck, chest, groin, or in elbow creases)	<ul style="list-style-type: none">• Stay in a cool, dry place• Keep the rash dry• Use powder (like baby powder) to soothe the rash

CDC

SOURCE: CENTER FOR DISEASE CONTROL AND PREVENTION

SUNBURN

Sunburn is the sun's ultraviolet radiation, which can significantly retard the skin's ability to shed excess heat.

Must apply sunscreen (SPF 30 or higher) to avoid redness and pain. Severe cases could be swelling of skin, blisters, fever, and headaches.

Ointments may be used for blisters, sterile dressing if blisters break. If serious, seek medical attention.



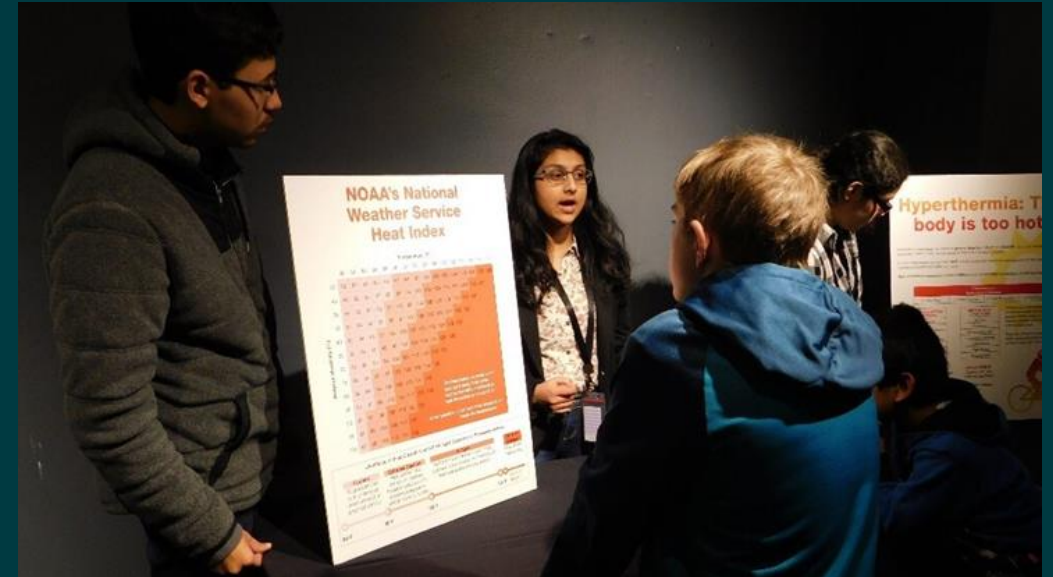
SOURCE: NEW YORK STATE DEPARTMENT OF TRANSPORTATION

HEAT STRESS PREVENTION TRAINING

How to control heat stress.

How to recognize, treat, and prevent heat illness.

The role of weather, workload, PPE, and the individual's physical condition.



SOURCE: NATIONAL WEATHER SERVICE

WORKLOAD

Workload determines the amount of heat generated by the body

Light and moderate work = less heat

Heavy work = more heat



**SOURCE: NEW YORK STATE OFFICE OF PARKS,
RECREATION HISTORIC PRESERVATION**

CLOTHING

The more clothing worn, the longer it takes evaporation to cool the skin.

Lightweight, light-colored clothing reflects heat and sunlight and helps your body maintain normal temperatures.

Wear loose-fitting clothes such as cotton.

Wide brimmed hats block sun from head, neck and shoulders.



SOURCE: FEDERAL EMERGENCY MANAGEMENT AGENCY

PPE SELECTION

Use lightest weight garments and respirators available.

If cooling vests are used, they must be selected carefully and washed daily.

Coated and non-woven personal protective garments block evaporation of sweat.



SOURCE: NEW YORK STATE DEPARTMENT OF TRANSPORTATION

EMPLOYEE RESPONSIBILITIES

Follow instructions and training for controlling heat stress.

Pay attention to symptoms of self and others.

Avoid dehydration by drinking plenty of water.

Get adequate rest and sleep.

Avoid alcohol, drugs, and excessive caffeine.



SOURCE: NEW YORK STATE DEPARTMENT OF TRANSPORTATION

DEHYDRATION

Fluid loss of 2%

- Impaired cognitive and physical performance

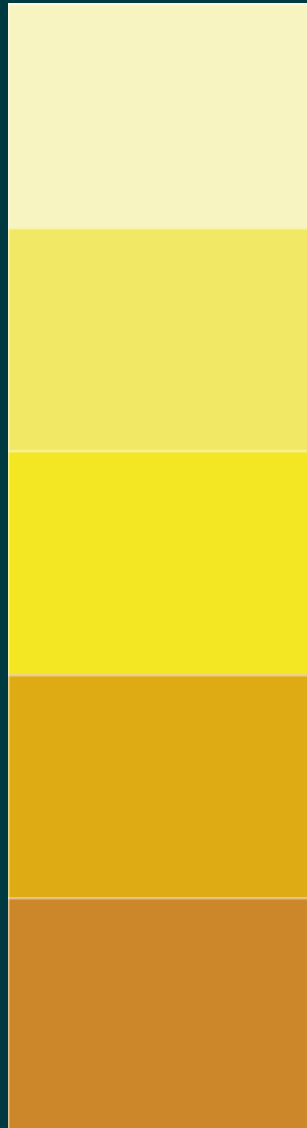
Fluid loss of 5-7%

- Shortness of breath, headaches, dizziness and apathy



SOURCE: OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

HYDRATION CHECK



Good, probably well hydrated; drink water normally

OK/fine; drink a little water now

Warning: Drink about ½ bottle of water within the hour, or whole btl if you're outside and/or sweating

Caution: Drink about ½ bottle of water immediately or drink a whole bottle of water if you're outside & sweating

STOP: Drink 2 bottles of water immediately; if your urine is darker than this red or brown, there may be another medical condition, seek medical advice

GROUP ACTIVITY

EACH TABLE WILL HAVE AN OPPORTUNITY TO PARTICIPATE IN A HEAT STRESS ACTIVITY

Relative Humidity Experiment (Homemade Psychrometer)

Equipment Needed:

- 2 identical thermometers: Preferably red spirit type (non-mercury)
- Cotton gauze or cotton ball.
- Small Rubber bands.
- Small eyedropper bottle.
- Water.
- Portable Fans

Experiment Steps:

1. Take one of the thermometers and place a piece of gauze or cotton ball around the base bulb. Fasten it to the thermometer using the small rubber bands.
2. Use the eyedropper bottle to drip water onto the cotton wrapped around the bulb of the thermometer until the material is fully saturated with water.
3. Lay both thermometers next to each other (leave approximately 2 inches of space between them) on a level surface with bulbs extending past the edge.
4. Allow temperatures to equalize.
5. Take portable fan and place it so that it blows across both thermometers perpendicularly
6. After two minutes (or less if notable difference in temperature is apparent) record the temperatures for both thermometers. Record them below:

Dry Bulb Temperature (DBT): _____ ° F

Wet Bulb Temperature (WBT): _____ ° F

7. Calculate the temperature difference (TD) between the Wet Bulb and Dry Bulb Temperatures using the formula below:

$$\begin{array}{r} - \\ \text{DBT} \end{array} \quad \begin{array}{r} = \\ \text{WBT} \end{array} \quad \text{TD}$$

GROUP ACTIVITY(Continued)
EACH TABLE WILL HAVE AN OPPORTUNITY
TO PARTICIPATE IN A HEAT STRESS ACTIVITY

RELATIVE HUMIDTY PERCENTAGE REFERENCE CHART Dry Bulb Temp (°F)								
Difference between dry bulb (DBT) and wet bulb (WBT)								
1°	2°	3°	4°	5°	6°	7°	8°	
64°	95	90	84	79	74	70	65	60
66°	95	90	85	80	75	71	66	61
68°	95	90	85	80	76	71	67	62
70°	95	90	86	81	77	72	68	64
72°	95	91	86	82	77	73	69	65
74°	95	91	86	82	78	74	69	65
76°	96	91	87	82	78	74	70	66
78°	96	91	87	83	79	75	71	67
80°	96	91	87	83	79	75	72	68
82°	96	92	88	84	80	76	72	69
84°	96	92	88	84	80	76	73	69
86°	96	92	88	84	81	77	73	70

TIPS FOR PREVENTION

Stay indoors and utilize AC Fans

Cool shower

Wear lightweight, light colored & loose fitting clothes.

Limit your outdoor activity to morning and evening hours.

Protect yourself from the sun by wearing a wide-brimmed hat, sunglasses and by putting on sunscreen of SPF 30 or higher.

Drink more fluids (nonalcoholic)



Prevent Heat Illness at Work

Outdoor and indoor heat exposure can be dangerous.

Ways to Protect Yourself and Others

Nearly 3 out of 4 fatalities from heat illness happen during the first week of work.

- ✓ **Ease into Work**: New and returning workers need to build tolerance to heat (acclimatize) and take frequent breaks. Follow the 20% Rule. On the first day, work no more than 20% of the shift's duration at full intensity in the heat. Increase the duration of time at full intensity by no more than 20% a day until workers are used to working in the heat.
- ✓ **Drink Cool Water**: Drink cool water even if you are not thirsty – at least 1 cup every 20 minutes.
- ✓ **Take Rest Breaks**: Take enough time to recover from heat given the temperature, humidity, and conditions.
- ✓ **Find Shade or a Cool Area**: Take breaks in a designated shady or cool location.
- ✓ **Dress for the Heat**: Wear a hat and light-colored, loose-fitting, and breathable clothing if possible.
- ✓ **Watch Out for Each Other**: Monitor yourself and others for signs of heat illness.
- ✓ **If Wearing a Face Covering**: Change your face covering if it gets wet or soiled. Verbally check on others frequently.

First Aid for Heat Illness

The following are signs of a medical emergency!

- Abnormal thinking or behavior
- Slurred speech
- Seizures
- Loss of consciousness

- 1 > CALL 911 IMMEDIATELY
- 2 > COOL THE WORKER RIGHT AWAY WITH WATER OR ICE
- 3 > STAY WITH THE WORKER UNTIL HELP ARRIVES



Watch for any other signs of heat illness and act quickly. When in doubt, call 911.

If a worker experiences: <ul style="list-style-type: none">Headache or nauseaWeakness or dizzinessHeavy sweating or hot, dry skinElevated body temperatureThirstDecreased urine output		Take these actions: <ul style="list-style-type: none">> Give water to drink> Remove unnecessary clothing> Move to a cooler area> Cool with water, ice, or a fan> Do not leave alone> Seek medical care if needed
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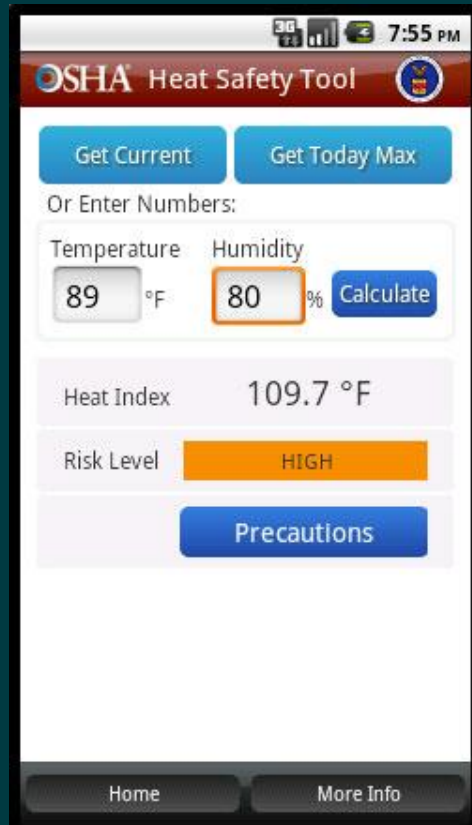
For more information: 1-800-321-OSHA (6742) TTY 1-877-889-5627 www.osha.gov/heat

Occupational Safety and Health Administration

Federal law entitles you to a safe workplace. You have the right to speak up about hazards without fear of retaliation. See <https://www.osha.gov/whistleblowers> for information about how to file a confidential complaint with OSHA and ask for an inspection.

OSHA HEAT SAFETY TOOL

<https://www.osha.gov/heat/heat-app>



HEAT SAFETY REGULATIONS

PESH SUN SAFETY LAW

www.labor.ny.gov

§ 218-a. Sun safety education for state employees. 1. Any state employee who spends more than a total of five hours per week outdoors shall be provided information about (a) the potential dangers of diseases caused by over-exposure of the sun, such as skin cancer, (b) the existence of available protections and their proper uses, and (c) any other information necessary to afford an employee his or her best opportunity to protect themselves from the sun.

OSHA Proposed Heat Safety Standard

www.osha.gov

PART 1910—OCCUPATIONAL SAFETY AND HEALTH STANDARDS

Part 1910 of title 29 of the code of Federal Regulations is hereby amended as follows: Subpart J — General Environmental Controls § 1910.148 Heat Injury and Illness Prevention. (a) Scope and application. (1) Except as otherwise provided in this paragraph, this standard applies to all employers.

REVIEW

Heat Stroke & Heat Exhaustion

- Most dangerous-**seek medical attention**
- **Watch for signs & symptoms**

Heat Syncope

- **Can lead to Heat stroke or exhaustion-Monitor**
- **Remove from heavy workload**

Heat Cramps

- **Increase fluids, be aware of other conditions**

Heat Rash

- **Wearing lightweight clothing made of fabrics that "breathe" and limiting physical activity**

Protecting Workers from Heat Stress

Heat Illness

Exposure to heat can cause illness and death. The most serious heat illness is heat stroke. Other heat illnesses, such as heat exhaustion, heat cramps and heat rash, should also be avoided.

There are precautions that can be taken any time temperatures are high and the job involves physical work.

Risk Factors for Heat Illness

- High temperature and humidity, direct sun exposure, no breeze or wind
- Heavy physical labor
- No recent exposure to hot workplaces
- Low liquid intake
- Waterproof clothing

Symptoms of Heat Exhaustion

- Headache, dizziness, or fainting
- Weakness and wet skin
- Irritability or confusion
- Thirst, nausea, or vomiting

Symptoms of Heat Stroke

- May be confused, unable to think clearly, pass out, collapse, or have seizures (fits)
- May stop sweating

To Prevent Heat Illness:

- Establish a complete heat illness prevention program.
- Provide training about the hazards leading to heat stress and how to prevent them.
- Provide a lot of cool water to workers close to the work area. At least one pint of water per hour is needed.



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