

SAFE WORK PRACTICES
HEAT RELATED ILLNESS (SIGNS AND PREVENTION)

PURPOSE

The purpose of this section is to provide ORC employees with the signs, symptoms, and ways to prevent heat related illnesses.

SCOPE

This program applies to all ORC employees, temporary employees and subcontractors.

INTRODUCTION

ORC employees who are exposed to hot and humid conditions are at risk of heat-related illness. The risk of heat-related illness becomes greater as the weather gets hotter and more humid. This situation is particularly serious when hot weather arrives suddenly early in the season, before workers have had a chance to adapt to warm weather.

For people working outdoors in hot weather, both air temperature and humidity affect how hot they feel. The "heat index" is a single value that takes both temperature and humidity into account. The higher the heat index, the hotter the weather feels, since sweat does not readily evaporate and cool the skin. The heat index is a better measure than air temperature alone for estimating the risk to workers from environmental heat sources.

ABOUT the HEAT INDEX

The U.S. National Oceanographic and Atmospheric Administration (NOAA) developed the heat index system. The heat index combines both air temperature and relative humidity into a single value that indicates the apparent temperature in degrees Fahrenheit, or how hot the weather will feel. The higher the heat index, the hotter the weather will feel, and the greater the risk that outdoor workers will experience heat-related illness. NOAA issues heat advisories as the heat index rises.

NOAA's National Weather Service

Heat Index
Temperature (°F)

	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110
40	80	81	83	85	88	91	94	97	101	105	109	114	119	124	130	136
45	80	82	84	87	89	93	96	100	104	109	114	119	124	130	137	
50	81	83	85	88	91	95	99	103	108	113	118	124	131	137		
55	81	84	86	89	93	97	101	106	112	117	124	130	137			
60	82	84	88	91	95	100	105	110	116	123	129	137				
65	82	85	89	93	98	103	108	114	121	128	136					
70	83	86	90	95	100	105	112	119	126	134						
75	84	88	92	97	103	109	116	124	132							
80	84	89	94	100	106	113	121	129								
85	85	90	96	102	110	117	126	135								
90	86	91	98	105	113	122	131									
95	86	93	100	108	117	127										
100	87	95	103	112	121	132										

Likelihood of Heat Disorders with Prolonged Exposure or Strenuous Activity

- Caution
- Extreme Caution
- Danger
- Extreme Danger

Why humidity matters: Relative humidity is a measure of the amount of moisture in the air. Sweat does not evaporate as quickly when the air is moist, as it does in a dry climate. Since evaporation of sweat from the skin is one of the ways the human body cools itself on a hot day, high humidity reduces our natural cooling potential and we feel hotter. Low humidity can also be a problem for outdoor workers in hot, desert-like climates. Sweat evaporates very rapidly in low humidity, which can lead to severe dehydration if a person does not drink enough water throughout the day.

IMPORTANT NOTE: The heat index values were devised for shady, light wind conditions, **and exposure to full sunshine can increase heat index values by up to 15° Fahrenheit.** To account for solar load, added precautions are recommended.

NOAA issues extreme heat advisories to indicate when excessive, extended heat will occur. The advisories are based mainly on predicted heat index values:

- **Excessive Heat Outlook:** issued when the potential exists for extended excessive heat (heat index of 105-110°F) **over the next 3-7 days.** This is a good time to check on supplies, such as extra water coolers, and refresh worker training.
- **Excessive Heat Watch:** issued when excessive heat could occur within the **next 24 to 72 hours,** but the timing is uncertain.
- **Excessive Heat Warning:** issued when the heat index will be high enough to be **life threatening in the next 24 hours.** This warning indicates that the **excessive heat is imminent or has a very high probability of occurring.**
- **Excessive Heat Advisory:** like an Excessive Heat Warning, but less serious. This is issued when the heat index could be **uncomfortable or inconvenient but is not life threatening if precautions are taken.**

USING the HEAT INDEX to PROTECT WORKERS

The heat index can be used to help determine the risk of heat-related illness for outdoor workers, what actions are needed to protect workers, and when those actions are triggered. Depending on the heat index value, the risk for heat-related illness can range from lower to very high to extreme. As the heat index value goes up, more preventive measures are needed to protect workers. Heat index values are divided into four bands associated with four risk levels. These bands differ from those appearing in the NOAA Heat Index chart, which was developed for the public. The NOAA bands have been modified for use at worksites:

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

Important consideration: NOAA devised the heat index values for shaded conditions and light winds. **Full sunshine can increase heat index values by up to 15° Fahrenheit.** Strenuous work and the use of heavy or specialized protective clothing also have an additive effect. As a result, the risk at a specific heat index could be higher than that listed in the table above if the work is in direct sunlight without a light breeze, or if work involves strenuous tasks or the use of heavy or specialized protective clothing. Extra measures, including implementing precautions at the next risk level, are necessary under these circumstances.

The steps each ORC project should take in response to an elevated heat index are the same type of steps that the project would follow to address other hazards in the workplace:

- Develop an illness prevention plan for outdoor work based on the heat index
- Train employees how to recognize and prevent heat-related illness
- Track the worksite heat index daily; communicate it and the required precautions to workers
- Implement the project plan; review and revise it throughout the summer

STEP 1: Develop a heat-related illness prevention plan before heat index levels rise.

Use the Protective Measures to Take at Each Risk Level to inform your planning. The plan should address:

Plan Element	Heat Index Risk Level			
	Lower (Caution)	Moderate	High	Very High/Extreme
Supplies (ensuring adequate water, provisions for rest areas, and other supplies)	✓	✓	✓	✓
<u>Emergency planning and response</u> (preparing supervisors and crews for emergencies)	✓	✓	✓	✓
<u>Worker acclimatization</u> (gradually increasing workloads; allowing more frequent breaks as workers adapt to the heat)	✓	✓	✓	✓
<u>Modified work schedules</u> (establishing systems to enable adjustments to work schedules)		✓	✓	✓
<u>Training</u> (preparing workers to recognize heat-related illness and preventive measures)	✓	✓	✓	✓
<u>Physiological, visual, and verbal monitoring</u> (using direct observation and physiological monitoring to check for signs of heat-related illness)		✓	✓	✓

Protective Measures to Take at Each Risk Level

Drinking Water

Water should have a palatable (pleasant and odor-free) taste and water temperature should be 50° F to 60°F, if possible.

Other Drinks

Encourage employees to choose water over soda and other drinks containing caffeine and high sugar content. These drinks may lead to dehydration. Drinks with some flavoring added may be more palatable to workers and thereby improve hydration. Encourage employees to avoid drinking alcohol after work shifts, during hot weather events.

Use protective measures described for each risk level to help plan, and schedule and train employees so that everyone is prepared to work safely as the heat index rises.

Summary of Risk Levels and Associated Protective Measures

The most critical actions ORC Project staff should take to help prevent heat-related illness at each level:

Heat Index	Risk Level	Protective Measures
<91°F	<u>Lower</u> <u>(Caution)</u>	<ul style="list-style-type: none"> ▪ Provide drinking water ▪ Ensure that adequate medical services are available ▪ Plan for times when heat index is higher, including worker heat safety training ▪ Encourage workers to wear sunscreen ▪ Acclimatize workers <p>If workers must wear heavy protective clothing, perform strenuous activity or work in the direct sun, additional precautions are recommended to protect workers from heat-related illness.*</p>
91°F to 103°F	<u>Moderate</u>	<p>In addition to the steps listed above:</p> <ul style="list-style-type: none"> ▪ Remind workers to drink water often (about 4 cups/hour)** ▪ Review heat-related illness topics with workers: how to recognize heat-related illness, how to prevent it, and what to do if someone gets sick ▪ Schedule frequent breaks in a cool, shaded area ▪ Acclimatize workers ▪ Set up buddy system/instruct supervisors to watch workers for signs of heat-related illness <p>If workers must wear heavy protective clothing, perform strenuous activity or work in the direct sun, additional precautions are recommended to protect workers from heat-related illness.*</p> <ul style="list-style-type: none"> ▪ Schedule activities at a time when the heat index is lower ▪ Develop work/rest schedules ▪ Monitor workers closely

103°F to 115°F	<u>High</u>	<p>In addition to the steps listed above:</p> <ul style="list-style-type: none"> ▪ Alert workers of high-risk conditions ▪ Actively encourage workers to drink plenty of water (about 4 cups/hour)** ▪ Limit physical exertion (e.g. use mechanical lifts) ▪ Have a knowledgeable person at the worksite who is well-informed about heat-related illness and able to determine appropriate work/rest schedules ▪ Establish and enforce work/rest schedules ▪ Adjust work activities (e.g., reschedule work, pace/rotate jobs) ▪ Use cooling techniques ▪ always Watch/communicate with workers <p>When possible, reschedule activities to a time when heat index is lower</p>
>115°F	<u>Very High to Extreme</u>	<p>Reschedule non-essential activity for days with a reduced heat index or to a time when the heat index is lower</p> <p>Move essential work tasks to the coolest part of the work shift; consider earlier start times, split shifts, or evening and night shifts.</p> <p>Strenuous work tasks and those requiring the use of heavy or non-breathable clothing or impermeable chemical protective clothing should not be conducted when the heat index is at or above 115°F.</p> <p>If essential work must be done, in addition to the steps listed above:</p> <ul style="list-style-type: none"> ▪ Alert workers of extreme heat hazards ▪ Establish water drinking schedule (about 4 cups/hour)** ▪ Develop and enforce protective work/rest schedules ▪ Conduct physiological monitoring (e.g., pulse, temperature, etc.) ▪ Stop work if essential control methods are inadequate or unavailable.

*The heat index is a simple tool and a useful guide for Project Staff making decisions about protecting employees in hot weather. It does not account for certain conditions that contribute additional risk, such as physical exertion. Consider taking the steps at the next highest risk level to protect workers from the added risks posed by:

- Working in the direct sun (can add up to 15°F to the heat index value)
- Wearing heavy clothing or protective gear

**Under most circumstances, fluid intake should not exceed 6 cups per hour or 12 quarts per day. This makes it particularly important to reduce work rates, reschedule work, or enforce work/rest schedules.