

Using the Heat Index: A Guide for Employers

Protective Measures to Take at Each Risk Level

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

Actions for Low Risk Conditions: Heat Index Less Than 91°F

Actions for Moderate Risk Conditions: Heat Index is 91°F to 103°F

Actions for High Risk Conditions: Heat Index is 103°F to 115°F

Actions for Very High to Extreme Risk Conditions: Heat Index Greater Than 115°F

Summary of Risk Levels and Associated Protective Measures

The most critical actions employers should take to help prevent heat-related illness at each risk level:

Heat Index	Risk Level	Protective Measures
<91°F	Lower (Caution)	<ul style="list-style-type: none"> ▪ Provide drinking water ▪ Ensure that adequate medical services are available ▪ Plan ahead 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</p>
91°F to 103°F	Moderate	<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 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>

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Actions for Lower (Caution) Risk Conditions: Heat Index is Less Than 91°F

Most people can work safely when the heat index is <91°F with only basic measures for worker safety and health, as required by the OSH Act. As minimum measures, employers have a duty to:

- **Provide adequate amounts of drinking water** in convenient, visible locations close to the work area.
- **Ensure that adequate medical services are available.** Where medical services (e.g., emergency medical services, clinic, hospital) are not available within 3-4 minutes, have appropriately trained personnel and adequate medical supplies on site. The trained personnel should have a valid certificate in first aid training from the American Red Cross or equivalent training. (A first aid certificate is required at maritime and construction worksites.)

Additional precautions are advisable based on site conditions, work load, and protective clothing use:

- **Take actions described for Moderate Risk Conditions (91°F - 103°F) if heat index is close to 91°F OR work is being conducted in direct sunshine or without a light breeze.**
- **Follow additional precautions for workers wearing heavy or non-breathable clothing or impermeable chemical protective clothing** because they are at greater risk even when the risk to other workers is lower. Workers in heavy, non-breathable or "impermeable" protective clothing can experience heat-related illness at temperatures as low as 70°F. Monitor them closely for signs of heat-related illness and see the section on Taking Added Precautions for High Risk Conditions.
- **Acclimatize new and returning workers performing strenuous work. These individuals may be at high risk for heat-related illness, even when the heat index is low.**
- **Check the weather forecast regularly** in warm seasons to learn if more extreme hot weather conditions are predicted. Make sure your hot weather plans are in place and that workers are trained *before*

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

hot outdoor work begins. **Train workers** on how to recognize symptoms of heat-related illness, individual risk factors for heat-related illness, how to prevent it, and what to do if someone has symptoms so they are prepared when hotter, higher-risk work conditions arise.

- **Encourage workers to wear sunscreen and use other protections from direct sunlight.** Provide shade, hats, and sunscreen, when possible. Sunburn reduces the skin's ability to release excess heat, making the body more susceptible to heat-related illness.

Drinking Water

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

Sanitation standard 29 CFR 1910.141 requires that employers provide "potable water" at work sites, which is water that meets the drinking water standards of the state or local authority having jurisdiction, or water that meets the quality standards prescribed by the U.S. EPA's drinking water regulations (40 CFR Part 141).

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Actions for Moderate Risk Conditions: Heat Index is 91°F to 103°F

At the moderate risk level some precautions in addition to those already mentioned are needed to prevent heat-related illness. Review heat-related illness signs and precautions with workers. Remind workers to drink water. Provide workers opportunities to rest in cool, shaded areas. Be aware of conditions that could increase risk.

- **Alert workers to the heat index anticipated for the day and identify each precaution in place at the work site to reduce the risk of heat-related illness.**
- **Provide adequate amounts of cool water and disposable cups** in convenient, visible locations close to the work area.
- **Remind workers to drink small amounts of water often** (before they become thirsty). A good rule of thumb is to drink about 4 cups of water every hour when the heat index suggests a moderate risk level.
- **Ensure that adequate medical services are available.** Where medical services (e.g., emergency medical services, clinic, hospital) are not available within 3-4 minutes, you must have appropriately trained personnel and adequate medical supplies on site. The trained personnel should have a valid certificate in first aid training from the American Red Cross or equivalent training. (A first aid certificate is required at maritime and construction worksites.)
- **Respond to heat-related illness and medical emergencies without delay. Workers who show symptoms of heat-related illness need immediate attention. Treating milder symptoms (headache, weakness) early by providing rest in a shaded area and cool water to drink can prevent a more serious medical emergency. Call 911 immediately if a worker loses consciousness or appears confused or uncoordinated. These are signs of possible heat stroke. *Heat stroke is fatal if not treated immediately.***
- **Review heat-related illness signs and symptoms and site-specific precautions during daily meetings or toolbox talks.** Be sure everyone knows procedures for responding to possible heat-related illness.
 - What steps to follow if a worker exhibits signs and symptoms of heat-related illness

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

- Who to call for medical help
- Who will provide first aid until the ambulance arrives

The resources under Educational Resources are useful training tools for daily meetings and toolbox talks.

- **Schedule frequent rest breaks in cool, shaded areas.**

Provide air conditioned or shaded areas close to the work area.

Set up temporary shade when working in open fields or areas without easy access to shade or air conditioning.

- **Acclimatize new and returning workers.** Gradually increase the workload or allow more frequent breaks to help new and returning workers build up a tolerance for hot conditions over time. **If the heat index increases suddenly, allow all workers more frequent breaks for a few days while they become accustomed to the warmer conditions.**
- **Implement actions for the High Risk Conditions (103°F - 115°F) if heat index approaches 103°F OR work is strenuous, in direct sunlight, or involves the use of heavy or non-breathable clothing or impermeable chemical protective clothing.**
- **Set up a buddy system**, if possible, to enable workers to look out for signs and symptoms of heat-related illness in each other. Often, a worker will not recognize his own signs and symptoms.
- **Instruct supervisors to watch workers for signs of heat-related illness.** Check routinely to make sure workers are making use of water and shade and not experiencing heat-related symptoms.
- **Encourage workers to wear sunscreen and use other protections from direct sunlight.** Provide shade, hats, and sunscreen, when possible. Sunburn reduces the skin's ability to release excess heat, making the body more susceptible to heat-related illness. Repeated overexposure to sunlight also leads to skin cancer.

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 workers 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 workers to avoid drinking alcohol during hot weather.

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Actions for High Risk Conditions: Heat Index is 103°F to 115°F

As the heat index rises above 103°F, there is a **high risk** for heat-related illness, so additional measures to protect workers are needed. Increase rest periods and designate a knowledgeable person (well-informed on heat-related illness) at the worksite to determine appropriate work/rest schedules. Reduce work load and pace strenuous work tasks. Remind workers to drink plenty of water every 15 to 20 minutes.

- **Alert workers to the heat index anticipated for the day and identify each precaution in place at the work site to reduce the risk of heat-related illness.** Review heat-related illness signs and symptoms during daily meetings or toolbox talks.

Be sure everyone knows procedures for responding to possible heat-related illness.

- What steps to follow if a worker exhibits signs and symptoms of heat-related illness
- Who to call for medical help
- How to give clear directions to the worksite
- Who will provide first aid until the ambulance arrives

The resources under Educational Resources are useful training tools for daily meetings and toolbox talks.

- **Provide plenty of cool drinking water and disposable cups** in convenient, visible locations close to the work area.

- **Actively encourage workers to drink small amounts of water often** (before they become thirsty). They should drink about 4 cups of water every hour while the heat index is 103 to 115°F. Workers will need the greatest amount of water if they must work in direct sunshine, during peak exertion, and during the hottest part of the day.

Under most circumstances extended hourly fluid intake should not exceed 6 cups per hour or 12 quarts per day. To maintain worker hydration, it is particularly important to reduce work rates, reschedule work for a time when the heat index is lower, or enforce work/rest schedules when work must continue during periods of extreme risk for heat-related illness.

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

- **Ensure that adequate medical services are available.** Where medical services (e.g., emergency medical services, clinic, hospital) are not available within 3-4 minutes, have appropriately trained personnel and adequate medical supplies on site. The trained personnel should have a valid certificate in first aid training from the American Red Cross or equivalent training. (A first aid certificate is required at maritime and construction worksites.)
- **Respond to heat-related illness and medical emergencies without delay. Workers who show symptoms of heat-related illness need immediate attention. Treating milder symptoms (headache, weakness) early by providing rest in a shaded area and cool water to drink can prevent a more serious medical emergency. Call 911 immediately if a worker loses consciousness or appears confused or uncoordinated. These are signs of possible heat stroke. *Heat stroke is fatal if not treated immediately.***
- **Have a knowledgeable person onsite** who is well-informed about heat-related illness and authorized to modify work activities and the work/rest schedule as needed.
- **Establish and enforce work/rest schedules** to control heat exposure and allow workers to recover. Take into account the level of physical exertion and type of protective equipment being used.
 - Advise workers of the work/rest schedule and make sure supervisors enforce rest breaks.
 - Provide air conditioned or cool, shaded areas close to the work area for breaks and recovery periods.
 - Set up temporary shade when working in open fields or areas without easy access to shade or air conditioning.
- **Adjust work activities** to help reduce worker risk:
 - **Schedule heavy tasks** earlier in the day or at a time during the day when the heat index is lower. Consider adjusting the work shift to allow for earlier start times, or evening and night shifts.
 - Where possible, **set up shade canopies** over work areas in direct sunshine or **move jobs** that can be moved to naturally shaded areas.
 - **Permit only those workers acclimatized to heat to perform the more strenuous tasks.** Rotate physically demanding job tasks among acclimatized workers.

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 workers 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 workers to avoid drinking alcohol during hot weather events.

- **Decrease the physical demands and pace of jobs.** If heavy job tasks cannot be avoided, change work/rest cycles to increase the amount of rest time.
 - **Add extra personnel to physically demanding tasks** so that the shared work load is less intense. This will lower the workers' risk of heat-related illness.
 - **Rotate workers to job tasks that are less strenuous or in cooler/air conditioned setting** for part of the work shift.
- **Acclimatize workers.** Take steps that help all workers become acclimatized to the heat, particularly if the weather turns hot suddenly. Gradually increase workloads and allow more frequent breaks during the first week of work. Closely supervise new employees for the first 14 days, until they are fully acclimatized.
- **Take actions described for the Very High to Extreme Risk Conditions (>115°F) if heat index approaches 115°F AND the work is being conducted in direct sunshine.**
- **Take added precautions** if workers are wearing heavy or non-breathable clothing or impermeable chemical protective clothing. These circumstances put workers at even greater risk of heat-related illness.
 - Reschedule activities for when the heat index is lower. Consider adjusting the work shift to allow for earlier start times, or evening and night shifts.
 - Modify the site **work/rest schedules** to make sure they are protective for workers using protective clothing.
 - Physiologically monitor workers by establishing a routine to periodically check workers for physical signs (e.g., body temperature, heart rate) of possible over exposure to heat.
 - When possible, rotate workers to job tasks that do not require this type of protective clothing for part of the work shift.
 - Encourage workers to remove protective equipment that is not needed while they are on rest breaks (e.g., if the rest area is free of hazards, remove hard hat, gloves, high visibility vest, respirator, and protective suit).
- When possible, **provide workers with personal cooling measures** (e.g., water-dampened clothing, cooling vests with pockets that hold cold packs, reflective clothing, or cool mist stations), especially for workers wearing heavy or non-breathable clothing or impermeable chemical protective clothing.
 - **Set up a buddy system** to enable workers to look out for signs and symptoms of heat-related illness in each other. Often, a worker will not recognize his own signs and symptoms.

Workers are at an increased risk of heat stress from personal protective equipment (PPE), especially from wearing semi-permeable (penetrable) or impermeable clothing (such as Tyvek or rubber), when the outside temperature exceeds 70°F, or while working at high energy levels. These types of clothing materials trap heat close to a worker's body. Workers should be monitored by establishing a routine to periodically check heart rate, temperature, and other physiological signs of overexposure.

- **Instruct supervisors to watch workers for signs of heat-related illness.** Check routinely (several times per hour) to make sure workers are making use of water and shade and not experiencing heat-related symptoms.
- **Maintain effective communication with your crew** at all times (by voice, observation, or electronic communications). Confirm that communication methods are functioning effectively.
- **Encourage workers to wear sunscreen and use other protections from direct sunlight.** Provide shade, hats, and sunscreen, when possible. Sunburn reduces the skin's ability to release excess heat, making the body more susceptible to heat-related illness. Repeated overexposure to sunlight also leads to skin cancer.

		<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	High	<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 ▪ Watch/communicate with workers at all times <p>When possible, reschedule activities to a time when heat index is lower</p>
>115°F	Very High to Extreme	<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. 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.
<p>*The heat index is a simple tool and a useful guide for employers making decisions about protecting workers 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:</p> <ul style="list-style-type: none">▪ Working in the direct sun (can add up to 15°F to the heat index value)▪ Wearing heavy clothing or protective gear <p>**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.</p>		

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Actions for Very High to Extreme Risk Conditions: Heat Index Greater Than 115°F

Very hot and humid conditions put an extra strain on workers and greatly increase the risk of developing heat-related illness. It can develop faster and be more serious and widespread among workers. Even previously acclimatized workers are at risk for heat-related illness without protective measures. The situation is even more serious when hot weather arrives suddenly (e.g., heat wave early in the season), because the body has not had enough time to adjust to the sudden, abnormally high temperature or other extreme conditions.

In addition to the precautions already identified, extra measures are needed to protect workers under this highest risk level. Re-schedule non-essential work activities and move essential work tasks to a time during the work shift when the heat index is lower. If this is not possible, establish a water drinking schedule, enforce work/rest schedules, and be extra vigilant in monitoring workers for heat-related illness symptoms, including by using physiological monitoring and systems to enable effective communications. This requires a knowledgeable person on site who can assess heat-related safety concerns.

- **Reschedule all non-essential outdoor work for days with reduced heat index.**
- **Move essential outdoor work to the coolest part of the work shift. As able, alter the work shift to allow for earlier start times, split shifts, or evening and night shifts. Prioritize and plan essential work tasks carefully – 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.**
- **Stop work if essential control methods are inadequate or unavailable when the risk of heat illness is very high.**

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

For emergency work and essential work that cannot be rescheduled:

- **Alert workers to the heat index for the day and identify all of the precautions in place at the work site to reduce the risk of heat-related illness.** Review heat-related illness signs and symptoms during daily meetings or toolbox talks.

Be sure everyone knows procedures for responding to possible heat-related illness.

- What steps to follow if a worker exhibits signs and symptoms of heat-related illness
- Who to call for medical help
- How to give clear directions to the worksite
- Who will provide first aid until the ambulance arrives

The resources under Educational Resources are useful training tools for daily meetings and toolbox talks.

- **Provide plenty of cool drinking water and disposable cups** in convenient, visible locations close to the work area.
- **Establish a clear drinking schedule to ensure that workers are drinking enough water throughout the day.** Remind workers to drink small amounts of water often (before they become thirsty). A good rule of thumb at this risk level is to drink about 4 cups of water every hour during the hottest periods. Workers will need the greatest amount of water if they must work in direct sunshine, during peak exertion, and during the hottest part of the day.

Under most circumstances extended hourly fluid intake should not exceed 6 cups per hour or 12 quarts per day. To maintain worker hydration, it is particularly important to reduce work rates, reschedule work for a time when the heat index is lower, or enforce work/rest schedules when work must continue during periods of extreme risk for heat-related illness.

- **Ensure that adequate medical services are available.** Where medical services (e.g., emergency medical services, clinic, hospital) are not available within 3-4 minutes, have appropriately trained personnel and adequate medical supplies on site. The trained personnel should have a valid certificate in first aid training from the American Red Cross or equivalent training. (A first aid certificate is required at maritime and construction worksites.) Consider having medical services on site for an emergency and to conduct physiological monitoring.

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 workers 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 workers to avoid drinking alcohol during hot weather events.

- **Respond to heat-related illness and medical emergencies without delay. Workers who show symptoms of heat-related illness need immediate attention. Treating milder symptoms (headache, weakness) early by providing rest in a shaded area and cool water to drink can prevent a more serious medical emergency. Call 911 immediately if a worker loses consciousness or appears confused or uncoordinated. These are signs of possible heat stroke. Heat stroke is fatal if not treated immediately.**

- **Have a knowledgeable person onsite** who is well-informed about heat-related illness, authorized to determine appropriate work/rest schedules, and can conduct physiological monitoring.
- **Establish and enforce a work/rest schedule** to control heat exposure and allow workers to recover. Take into account the level of physical exertion and type of protective equipment being used.
 - Advise workers of the work/rest schedule and make sure supervisors enforce rest breaks.
 - Provide air conditioned or cool, shaded areas close to the work area for breaks and recovery periods.
 - Set up temporary shade when working in open fields or areas without easy access to shade or air conditioning.
 - Encourage workers to remove protective equipment that is not needed while they are on rest breaks (e.g., if the rest area is free of hazards, remove hard hat, gloves, high visibility vest, respirator, and protective suit).
- **Adjust work activities** to help reduce worker risk:
 - **Set up shade canopies** over work areas in direct sunshine or **move jobs** that can be moved to naturally shaded areas.
 - **Permit only those workers acclimatized to heat to perform the more strenuous tasks.** Rotate physically demanding job tasks among acclimatized workers.
 - **Decrease the physical demands and pace of jobs.** If heavy job tasks cannot be avoided, change work/rest cycles to increase the amount of rest time.
 - **Add extra personnel to physically demanding tasks and those requiring the use of heavy or non-breathable clothing or impermeable chemical protective clothing** so that the shared work load is less intense. This will lower the workers' risk of heat-related illness.
 - **Rotate workers to job tasks that are less strenuous or in cooler/air conditioned setting** for part of the work shift.
- **Acclimatize workers.** Take steps that help all workers become acclimatized to the heat, particularly if the weather turns hot suddenly. Gradually increase workloads and allow more frequent breaks during the first week of work. Closely supervise new employees for the first 14 days, until they are fully acclimatized.
- **Physiologically monitor all workers** by establishing a routine to periodically check heart rate, temperature, or other physiological signs that may indicate overexposure. Use monitoring results to adjust work/rest periods. This is especially critical for workers wearing heavy or non-breathable clothing or impermeable chemical protective clothing or using other personal protective equipment.
- **Provide workers with personal cooling measures** (e.g., water-dampened clothing, cooling vests with pockets that hold cold packs, reflective clothing, or cool mist stations). This is especially critical for workers wearing heavy or non-breathable clothing or impermeable chemical protective clothing.

- **Set up a buddy system** to enable workers to look out for signs and symptoms of heat-related illness in each other. Often, a worker will not recognize his own signs and symptoms.
- **Instruct supervisors to watch workers for signs of heat-related illness.** Check routinely (several times per hour) to make sure workers are making use of water and shade and not experiencing heat-related symptoms. Extra vigilance is needed when the HI reaches very high levels.
- **Maintain effective communication with your crew** at all times (by voice, observation, or electronic communications). Confirm that communication methods are functioning effectively.
- **Encourage workers to wear sunscreen and use other protections from direct sunlight.** Provide shade, hats, and sunscreen, when possible. Sunburn reduces the skin's ability to release excess heat, making the body more susceptible to heat-related illness. Repeated overexposure to sunlight also leads to skin cancer.