

Managing the risks of working in heat

Guidance material

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Working in heat

This Guide provides practical guidance for a person conducting a business or undertaking (PCBU) on how to manage the risks associated with working in heat and information on what to do if a worker begins to suffer from a heat-related illness.

This Guide addresses heat that poses a direct risk to a worker's health and safety. For information on thermal comfort, where a worker is comfortable at a particular temperature, see the [Code of Practice: Managing the work environment and facilities](#).

What are some common effects of working in heat?

Working in heat can be hazardous and can cause harm to workers. The human body needs to maintain a body temperature of approximately 37 degrees Celsius.

If the body has to work too hard to keep cool or starts to overheat, a worker can suffer from a heat-related illness. This is a general term to describe a range of progressive heat-related conditions including fainting, heat rash, heat cramps and heat stroke.

Some common effects of working in heat include:

- Heat rash, leading to skin irritation and discomfort.
- Heat cramps resulting from heavy sweating without replacing salt and electrolytes.
- Fainting, particularly when workers stand or rise from a sitting position.
- Dehydration from increased sweating if workers aren't drinking enough water.
- Heat stroke occurs when the body can no longer cool itself. This can be fatal.
- Burns can occur if a worker comes into contact with hot surfaces or tools.
- Slips, as a worker will sweat more in hot conditions which can increase the risk of slips - for example, a worker might slip when using sharp tools if their hands are damp.
- Reduced concentration, as heat can make it more difficult to concentrate, leading to confusion. This means workers may be more likely to make mistakes, such as forgetting to guard machinery.
- Increased chemical uptake into the body may occur as the heat causes the body to absorb chemicals differently and can increase the side effects of some medications.

Who has health and safety duties?

Everyone in the workplace has health and safety duties.

Person conducting a business or undertaking

WHS Act section 19

Primary duty of care

WHS Act section 49

Duty to consult

WHS Regulation 40

Duty in relation to general workplace facilities

PCBUs must ensure, so far as is reasonably practicable, that workers, including volunteers, and other people are not exposed to health and safety risks arising from the business or undertaking. This duty requires the person to manage health and safety risks by eliminating them so far as is reasonably practicable, and if this is not reasonably practicable, by minimising those risks so far as is reasonably practicable. Consult workers:

- when identifying hazards and assessing risks to health and safety arising from the work carried out or to be carried out by the business or undertaking
- when making decisions about ways to eliminate or minimise those risks
- when making decisions about the adequacy of facilities for the welfare of workers, and
- when monitoring the conditions at any workplace under the management or control of the PCBU.

A PCBU must ensure, so far as is reasonably practicable, the following:

- ventilation enables workers to carry out work without risk to health and safety
- workers carrying out work in extremes of heat or cold are able to carry out work without risk to health and safety.

Officers

WHS Act section 27

Duty of officers

Officers must ensure, so far as is reasonably practicable, workers, including volunteers, and other people are not exposed to health and safety risks arising from the business or undertaking. This duty requires the person to manage health and safety risks by eliminating them so far as is reasonably practicable, and if this is not reasonably practicable, by minimising those risks so far as is reasonably practicable. Consult workers:

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Officers

WHS Act section 27

Duty of officers

An officer (for example a company director) must exercise due diligence to ensure the business or undertaking complies with the WHS Act and WHS Regulations. This includes taking reasonable steps to ensure the business or undertaking has and uses appropriate resources and processes to eliminate or minimise risks to health and safety.

Workers

WHS Act section 28

Duties of workers

Workers have a duty to take reasonable care for their own health and safety and to not adversely affect the health and safety of other persons. Workers must comply with reasonable instructions, as far as they are reasonably able, and cooperate with reasonable health and safety policies or procedures that have been notified to workers. If personal protective equipment (PPE) is provided by the business or undertaking, the worker must, so far as they are reasonably able, use or wear it in accordance with the information, instruction and training provided.

Others

WHS Act section 29

Duties of other persons at the workplace

Other persons at the workplace, like visitors, must take reasonable care for their own health and safety and must take care not to adversely affect other people's health and safety. They must comply, so far as they are reasonably able, with reasonable instructions given by the PCBU to allow that person to comply with the WHS Act. If PPE is provided by the business or undertaking, other persons at the workplace must, so far as they are reasonably able, use or wear it in accordance with the information, instruction and training provided.

Managing the risks of heat

The following steps should be used, so far as is reasonably practicable, to ensure that workers and other people are not exposed to harm from working in heat.

You must consult your workers and their health and safety representatives (if any) when deciding how to manage the risks of working in heat. If there is more than one business or undertaking at your workplace you must consult each one to find out who is doing what and work together so risks are eliminated or minimised, so far as is reasonably practicable.

Further information on consultation requirements is in the [Code of Practice: Work health and safety consultation, co-operation and co-ordination](#).

More information on the risk management process is in the [Code of Practice: How to manage work health and safety risks](#).

1. Identify the hazard

Heat is a hazard in many Australian workplaces, whether work is performed indoors or outdoors. To find out if it is a hazard in your workplace, consider:

- air temperature
- air flow
- humidity
- radiant heat sources
- work requirements
- the workers, and
- the workplace.

To help you identify hazards in your workplace you should talk to workers, including any health and safety representatives, and other duty holders. You can also talk to businesses similar to yours and find out whether heat is a hazard in that workplace. Additionally, you should review near misses, incidents and injury records to help identify risks at your workplace.

The checklist at [Appendix 2 – risk management checklist](#) can be used to record identified hazards.

2. Assess the risk

A risk assessment can help you determine:

- how severe the risk is
- whether existing control measures are effective
- what action you should take to control the risk, and
- how urgently you need to take action.

To assess the risk you should consider:

- what is the impact of the hazard, and
- how likely is the hazard to cause harm.

How hot a worker feels will be different in every situation, depending on the individual worker, the work they are doing and the environment in which they are working.

When assessing heat risks, consider the following:

- Where the work is being done:
 - Working near heat sources and in confined spaces with minimal air flow (such as a roof cavity) can increase the risk of heat related illness.
 - Radiant temperatures may be high when working in the sun, particularly on a concrete or metal roof, or near hot machinery or processes (for instance a furnace, kitchen or manufacturing workshop).
 - Working in high levels of humidity can make it more difficult for a person to cool down.
- The type of work:
 - Physical exertion, particularly over long periods, increases the risk of heat-related illness, even in moderate conditions.
 - Some workers may also not be able to pace their work and may be at greater risk from the heat. Workers on performance-based salaries are generally less likely to reduce their work rate to prevent over exertion.
 - Concentration may also be affected by heat, particularly for complex or difficult tasks.
- Clothing, including PPE, uniforms and standard dress, as they may impair the evaporation of sweat and increase the risk of heat-related illness.
- The individual workers:
 - An apprentice may take longer to do a task or might not know how to work safely. Their supervisor might also be at increased risk if they are also exposed to heat for a longer time.
 - Physical fitness and acclimatisation to current working conditions.
- Whether a worker has disclosed anything which indicates they are susceptible to heat-related illness, for example:
 - Taking certain medications such as diuretics, or taking non-medical drugs
 - Pregnant
 - Suffering from a relevant condition or illness such as diabetes, obesity, heart disease or fever
 - Has previously suffered from a heat-related illness
 - At higher risk of dehydration or electrolyte depletion for example are on a fluid-restricted diet
 - Younger (aged 25 or under) or older (aged 55 or more)
 - Returning to work after an absence, such as a fly-in-fly-out worker, or someone returning to work after an incident.

Additionally, consider the potential impact of heatwaves. A heatwave occurs when the maximum and the minimum temperatures are unusually hot over at least a three-day period. Heatwaves may pose more risks to workers due to:

- warmer nights contributing to reduced sleep quality
- high temperatures being reached earlier in the day and lasting longer, and
- fatigue affecting workers' ability to perform work safely and effectively.

3. Control the risk

You must do everything that is reasonably practicable to eliminate the risks associated with working in heat. Where it is not possible to eliminate a risk, you must minimise it, so far as is reasonably practicable. You should work through the hierarchy of controls when managing risks.

. Use one or more of the following approaches:

- Substitute the hazard with something safer
- Isolate the hazard, and
- Use engineering control measures

If risks remain, you must minimise them so far as is reasonably practicable by applying administrative control measures.

Any remaining risks should be minimised with suitable personal protective equipment (PPE) where suitable.

Remember, heat that represents a hazard to workers may be generated by more than just weather conditions. You may find a combination of controls to be the most effective. Below are some examples of ways you could manage the risks associated with working in heat.

Elimination control measures

The first thing you must consider is whether a risk can be completely removed from the workplace. For example, consider cancelling work tasks or waiting for hot conditions to pass.

Consider whether it is possible to use automated equipment or processes to access hot locations. For example, it may be possible to use a drone to inspect a fire ground. Automated or remote-controlled machinery may also be used so workers don't have to do physically demanding work by hand.

If it is not reasonably practicable to completely eliminate the risk, then risks must be minimised, as far as is reasonably practicable.

Substitution

Substitution involves substituting or replacing a hazard or hazardous work practice with a safer one. Consider swapping physical work for work that can be done by a machine. For example, use a crane or forklift to lift heavy objects or use earthmoving plant for digging.

Where possible have workers do the work in a cooler environment. For example, prefabricate materials in air-conditioned factories.

Isolation control measures

Isolation involves physically separating the source of harm from people by distance or by using barriers.

For example, you should separate workers from hot machinery. Use physical barriers, such as cones and fencing to ensure it is clear where the hot machinery is located.

Engineering control measures

An engineering control is a control measure that is physical in nature, including a mechanical device or process.

For example:

- set up shade tents
- install artificial cooling such as air-conditioning
- insulate buildings and clad sources of radiant heat. Isolate hot machinery or surfaces by using shields, barriers and guards
- make sure your workspace has good air flow. For example, install fans or generate air movement via windows and vents, particularly in humid conditions

- remove heated air or steam from hot processes using local exhaust ventilation
- provide air-conditioned, shaded or cool break areas as close as possible to the work site
- reduce radiant heat for example by allowing plant to cool down before use, and
- provide accessible cool drinking water or, when necessary, electrolyte solutions.

The person with management or control of plant at a workplace must ensure, so far as is reasonably practicable, that any pipe or other part of the plant associated with heat or cold is guarded or insulated so that the plant is without risks to the health or safety of any person.

Administrative control measures

If risks remain, they should be minimised by implementing administrative control measures, so far as is reasonably practicable. Administrative control measures include work methods or procedures that are designed to minimise exposure to a hazard as well as the information, training and instruction needed to ensure workers can work safely.

Administrative controls are less effective than other control measures because they do not control the hazard at the source and instead rely on human behaviour and supervision.

Some administrative measures will be necessary to ensure substitution, isolation and engineering control measures are implemented effectively, for example, following safe work procedures when using equipment.

An example of an administrative control measure is scheduling more physically demanding activities to be completed in the cooler parts of the day. However, it is important to remember that heat stress is still possible even in cooler conditions, such as early in the morning. Additionally, you should consider organising work to minimise physically demanding tasks, for example through conducting work at ground level to avoid climbing up and down stairs or ladders. You may also wish to modify targets and work rates to make the work easier and reduce physical exertion.

If possible, ensure workers will not be working alone, or if not possible, ensure you are able to monitor them. Young workers and those new to the workplace must be supervised where required to prevent unsafe work practices. Supervisors should be available to answer questions and provide guidance.

The severity of heat-related illness is impacted by ease-of-access to support services such as first aiders and emergency services, ensure remote or isolated workers can easily call for help.

You must ensure that your emergency plan is suitable for the work and workplace. For example, if a worker collapses in a confined space, ensure there are procedures in place to rescue them without delay.

Training, information and supervision

When you have identified heat risks at your workplace, you should monitor and supervise employees closely, and encourage them to pace themselves. Workers must be trained to be able to carry out their work safely. For example, workers should be trained to:

- identify and report hazards associated with heat and heat-related illness
- understand how to prevent heat-related illness
- recognise symptoms and signs of heat-related illness in themselves and others
- call for assistance if necessary
- look out for each other's wellbeing
- modify work intensity and take more regular breaks when working in heat
- drink sufficient water to stay hydrated
- recognise the dangers of diuretic drinks

- be aware of individual risk factors
- understand acclimatisation, and recognise the potential dangers associated with the use of alcohol and/or drugs when working in heat.

PPE

PPE can be effectively used in conjunction with higher level controls to minimise residual risks associated with working in heat. If practicable, modify uniforms or required dress codes so workers can wear cooler, more breathable clothing. Consider providing the following:

- loose fitting, lightweight clothing
- wearable personal cooling systems, such as water-cooled garments, air-cooled garments, cooling vests and wetted garments

It is important to consider how the PPE that is needed for some tasks can increase the risk of heat-related illness. For example, heavy protective clothing and masks can trap heat close to the body. You should consider the type of PPE being provided as well as the length of time an individual is wearing PPE, their work rate, acclimatisation level and environmental conditions. Additional control measures, such as increase in break times, should be considered when workers are required to wear PPE that increases the risk of heat related illness.

Solar ultraviolet radiation protection

Although exposure to solar ultraviolet radiation (UVR) and heat illness are separate hazards, the PPE for sun protection can also protect against heat-related illness. You should ensure PPE is used to minimise the risk of solar UVR exposure when outdoor work is being carried out. The design should balance sun protection with the need to stay cool in hot conditions.

PPE used for sun protection includes:

- sun protective work clothing
- sun protective hats
- sunglasses, and
- sunscreen

For information on how you can manage the risks of working in the sun see Safe Work Australia's [Guide on exposure to solar ultraviolet radiation](#).

Acclimatisation

Acclimatisation means that the body is starting to adapt to heat. An acclimatised worker may begin to sweat more efficiently and can more easily maintain a normal body temperature. Remember, there is a limit to how far a person's body can adapt and this is not a reliable control. If you plan to introduce an acclimatisation program to manage the risks associated with working in heat in your workplace, consult a professional like an occupational hygienist.

Hydration

When working in heat, dehydration is a major risk. Dark or reduced urine output can indicate dehydration. You must ensure workers have access to cool drinking water and encourage workers to stay hydrated. Remember that thirst is satisfied before fluid loss is replaced.

If a person is experiencing dehydration, the use of oral electrolyte replacement therapy, such as sports drinks that contain salt and potassium should be used. If dehydration is severe or you are unsure what to do, seek medical assistance.

4. Review the control measures

You must review control measures to ensure that they are working as planned and that they do not introduce new uncontrolled risks. For example, removing PPE to cool a worker down may introduce new hazards such as exposure to chemicals or solar UVR.

Consulting with workers and their representatives, if any, can help determine if the control measures are effective. You should also consider:

- if the workers are actively involved in identifying hazards or controls
- if incidents are occurring more or less frequently, and
- if any new information or equipment has been developed that may be effective.

If issues with the risk management controls are found, the risk management process should be repeated to effectively manage the risks.

What can you do if someone develops a heat-related illness?

Heat-related illness is a progressive condition and if left untreated it can be fatal. If you think someone has severe heat exhaustion, or heat stroke, you should call an ambulance immediately and perform first aid until an ambulance arrives.

For the early stages of heat-related illness first aid can often be effective, but you should always seek medical assistance if in doubt, or if the person's symptoms are severe.

Appendix 1 – First aid fact sheet provides information on recognising and treating the most common forms of heat-related illness. You can find further information in the Code of Practice: First aid in the workplace.

Further resources

For more information on controlling the risk see the Code of Practice: How to manage work health and safety risks provides information on risk management and the hierarchy of risk control.

Workplace Health and Safety Queensland has also published a Heat Stress basic calculator that may assist you in assessing the risk of working in heat.

The Bureau of Meteorology (BOM) is also useful source of up to date information, particularly if your workers will be working outdoors or somewhere where environmental conditions can affect temperature and humidity. BOM's Heatwave Service for Australia forecasts the location and severity of heatwaves and information on climate zones of Australia, which can help you identify the likelihood of high temperatures and high humidity. BOM also publishes a range of local forecasts and current observations.

You can use simple indices such as apparent temperature, which is calculated using ambient temperature and relative humidity, to help you estimate how hot conditions feel to your workers.

Where necessary, you may engage an occupational hygienist to perform a professional risk assessment and devise a management plan for your business.

Appendix 1 – First aid fact sheet

You have a duty to provide first aid equipment and facilities, and access to trained first aid officers, for sick or injured workers. Heat-related illness is progressive. If the worker is not treated or remains in a hot environment, it can be fatal.

Note on pre-existing medical conditions and medications. Previous heat-related illness, certain medications and medical conditions can make a worker more susceptible to heat related illness and can affect how the worker can be treated. You should alert workers to this risk and monitor them closely as far as is reasonably practicable.

Dehydration – Seek medical advice if symptoms don't improve or are severe

Symptoms	First aid for dehydration
Mild to severe thirst (remember that thirst is satisfied before fluid loss is fully replaced). Dry lips and tongue. Slowed mental function and lowered performance. Reduced or dark urine output.	Drink water. Avoid caffeinated, carbonated and alcoholic drinks, and salt tablets. Loosen tight clothing and remove unnecessary clothing, including PPE. In cases of extreme heat or dehydration, replace electrolytes.

Heat rash – Seek medical advice if symptoms don't improve

Symptoms	First aid for heat rash
Itchy rash with small raised red spots on the face, neck, back, chest or thighs.	Move to a cooler, less humid environment. Keep the affected area dry and remove unnecessary clothing, including PPE. Apply a cold compress.

Heat cramps – Seek medical advice if symptoms don't improve

Symptoms	First aid for heat cramps
Painful and often incapacitating cramps in muscles, particularly when undertaking demanding physical work.	Stop activity and rest quietly in a cool place until recovered. Drink an electrolyte solution.

Fainting – Seek medical advice

Symptoms	First aid for fainting
Fainting (heat syncope) can occur while standing or rising from a sitting position.	Lie the worker flat immediately with their legs slightly raised. Do not raise the head. Treat as for heat stroke and follow medical advice.

Heat stroke – Call an ambulance immediately

Symptoms (not all will be present)**First aid for heat stroke**

Dehydration, thirst, and reduced or dark urine output.
Sweating.
The person stops sweating.
Skin can be pink, warm and dry, or cool and blue.
High body temperature above 39 degrees Celsius.
Weakness or fatigue.
Cramps.
Pounding, rapid pulse.
Headache, dizziness and visual disturbances.
Muscle cramps.
Nausea and/or vomiting.
Clumsiness or slower reaction times.
Disorientation or impaired judgement.
Tingling or numbness in fingers or toes.
Rapid or short breathing.
Rapid weak pulse or heart palpitations.
Vomiting or an unwillingness to drink.
Irritability and mental confusion.
Collapse, seizures and unconsciousness.
Cardiac arrest. Can be characterised by unconsciousness, stopped breathing and no pulse

Call 000 and evacuate by ambulance immediately.
Ensure that the ambulance is updated if the worker experiences seizures or becomes unconscious.
Follow all directions given by the ambulance operator.
If cardiac arrest occurs follow [DRSABCD action plan](#)
While waiting for the ambulance:
Move the worker to a cool place with circulating air.
Remove unnecessary clothing, including PPE
Loosen tight clothing.
If practicable and safe to do, immersion in a bath of cold water is the most effective means for cooling a person.
Immerse the worker (whole-body from the neck down) in a bath of cold water (preferably 1–7°) for 15 minutes.
Continuously observe the worker to ensure an open airway in case of any change in their level of consciousness.
If a cold bath is not available, or is not reasonably practicable or safe to use, use a combination of the following as available: Cool the worker by splashing cool or cold water on their skin or sponging their skin with a damp cloth.
Make a wind tunnel by suspending sheets around, not on, the worker's body. Use a fan to direct gentle airflow over the worker's body.
Apply cold packs or wrapped ice to the worker's neck, groin and armpits.
If the worker is fully conscious sit them up to facilitate drinking and provide cool fluid to drink.
Provide an electrolyte solution with sugar. Do not attempt to give oral fluid if the worker is not fully conscious.
Shivering is an automatic muscular reaction which warms the body. It will make the body temperature rise even further.
If the worker starts shivering, stop cooling immediately and cover them until they stop. Once they have stopped recommence first aid treatment.

Appendix 2 – Risk management checklist

Table 1 Risk Management checklist

Risk factors to consider	Why this is important	Is the risk present? Is it controlled?
Are ambient conditions hot?	This contributes to incidents such as heat-related illness and burns.	
Are days and nights hotter than usual?	A heatwave can make it harder to sleep and workers may become fatigued.	
Is it humid?	High humidity makes it harder for the body to cool itself.	
When is work done?	Certain times of the day and year will be hotter.	
How often can workers take breaks somewhere cool?	Working in heat for long periods of time is very dangerous.	
Is there air movement or a breeze?	This can help cool workers.	
Is the work intense or long?	The harder the body is working the more heat it needs to lose.	
Are workers physically fit and acclimatised?	Fit and acclimatised workers generally have higher heat tolerances.	
Do workers wear hot clothing (including PPE)?	Some clothing can prevent the evaporation of sweat or prevent air movement.	
Are the workers qualified, trained and experienced?	Experienced workers may be more efficient and use less energy for the same work. They may also be more aware of the hazards, health effects and controls.	
(If known) do workers have medical conditions?	Some conditions and medications can make workers less able to cope with heat.	
Is there cool drinking water or electrolyte drinks on hand?	Dehydration can be dangerous and contributes to heat-related illness.	