safe work australia

Managing the risks of working in heat

Guidance material

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Contact information

Safe Work Australia | info@swa.gov.au | www.swa.gov.au

Contents

Contents **3**
Managing the risks of working in heat **4**
What are some common effects of working in heat? 4
Who has legal duties under the WHS laws to manage the risks of working in heat? 5
Who is involved? 6
How can you manage risks? 6
What can you do if someone develops a heat-related illness? 10
Appendix 1 – First aid fact sheet **11**
Appendix 2 – Risk management checklist **13**

Managing the risks of 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, such as heat which may cause heat-related illness. For information on thermal comfort – that is, whether 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 begins to suffer from **heat-related illness**.

This is a general term to describe a range of progressive heat related conditions including fainting, heat rash, heat cramps, heat exhaustion, and heat stroke.

Some other common effects of working in heat include:

- **Heat rash**. Skin can become irritated and cause discomfort when working in heat.
- **Heat cramps**. Muscles can cramp as a result of heavy sweating without replacing salt and electrolytes.
- **Fainting**. Can occur when workers stand or rise from a sitting position.
- **Dehydration**. Increased sweating can lead to dehydration if workers aren't drinking enough water.
- **Heat exhaustion**. Occurs when the body is working too hard to stay cool.
- **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**. 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**. When working in heat it is more difficult to concentrate and a worker may become confused. This means workers may be more likely to make mistakes, such as forgetting to guard machinery.
- **Increased chemical uptake into the body**. Heat can cause the body to absorb chemicals differently and can increase the side effects of some medications.

Who has legal duties under the WHS laws to manage the risks of working in heat?

Table 1 Who has legal duties under the WHS laws?

Who	Duties	Provisions
Person Conducting a Business or Undertaking (PCBU)	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.	WHS Act s 19
	Consult workers a. 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 b. when making decisions about ways to eliminate or minimise those risks c. when making decisions about the adequacy of facilities for the welfare of workers, and d. when monitoring the conditions at any workplace under the management or control of the PCBU.	WHS Act s 49
	A person conducting a business or undertaking at a workplace must ensure, so far as is reasonably practicable, the following: a. ventilation to enable workers to carry out work without risk to health and safety b. workers carrying out work in extremes of heat or cold are able to carry out work without risk to health and safety.	WHS Regulations regs 40(e) and (f)
	The person with management or control of the 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.	WHS Regulations reg 209
Designers, manufacturers, importers, suppliers or installers of plant or structures	Ensure that buildings, plant and equipment are, so far as is reasonably practicable, designed, manufactured, imported, supplied and installed so as not to expose people to risks to health and safety. Provide users with information about what it is designed or manufactured for, the results of any tests, and how to use it safely.	WHS Act s 22-26

Who	Duties	Provisions
Officers such as company directors	Must exercise due diligence to ensure the business or undertaking complies with the WHS Act and 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.	WHS Act s 27
Workers	Must take reasonable care for their own health and safety and not adversely affect the health and safety of other people. Workers must comply with reasonable instruction and co-operate with any reasonable policy or procedure relating to health and safety at the workplace that has been notified to them.	WHS Act s 28
Other persons at the workplace	Must take reasonable care for their own health and safety and take reasonable care not to adversely affect other people's health and safety. Other persons at the workplace must comply, so far as they are reasonably able, with reasonable instructions.	WHS Act s 29

Who is involved?

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*.

How can you manage risks?

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.

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, and
- the workplace itself.

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, or to review near misses, incidents and injury records. This can help you identify risks in 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.

The work

- Where is the work being done? Working near heat sources (for example, hot plant or hot surfaces) or in the sun increases exposure to heat.
- Is the work physically demanding? How long will the worker be doing physically demanding work? Physical effort increases the risk of heat-related illness, even in moderate conditions.
- How long will the worker be exposed to heat? When and where can they take breaks? Extended exposure to heat makes it harder for the body to stay cool.
- Could anything prevent a worker from pacing their work? For example, pieceworkers or workers with performance-based salaries may not want to reduce their work rate in hot conditions.
- When is work being done? For example, working in a roof cavity or outside is most hazardous during the hottest parts of the day and year.
- Is the work complex or difficult? Concentration may be affected by heat.

The worker

- What is the worker's capability? Are they trained, qualified and competent for the work they are doing? An apprentice may take longer to do a task or might not know how to work safely, and their supervisor might also be at increased risk if he or she is exposed to heat for a longer time.
- Is the worker physically fit and are they acclimatised to the current environment?
- Are workers required to wear clothing such as personal protective equipment (PPE), standard dress or a uniform? Clothing that impairs the evaporation of sweat increases the risk of heat-related illness.
- Keeping in mind your obligations under other legislation including privacy and discrimination laws, consider whether a worker has disclosed anything which indicates they are susceptible to heat-related illness. For example, is the worker:
    - Taking certain medications such as diuretics, antidepressants or anticholinergics?
    - Taking non-medical drugs such as ecstasy?
    - Suffering from a condition such as diabetes, obesity, a skin disorder, febrile illness or heart disease?

- A previous sufferer of heat-related illness?
- Pregnant?
- At risk of dehydration or electrolyte depletion for example they have diarrhoea, vomiting, or are on a fluid-restricted diet?
- Younger (aged 25 or less) 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?

Note on 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, a person's body can only adapt so much 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 business, consult a professional like an occupational hygienist.

Workers who are not acclimatised, or are returning to work after an absence of a week or more, are at a higher risk of experiencing a heat-related illness.

The working environment

- What is the air temperature? Work being done outside or in a roof cavity will be hotter during the day and in summer.
- What is the radiant temperature? Radiant temperatures may be high when working in the sun such as on a concrete or metal roof, or near hot machinery or processes, such as in a furnace, kitchen or manufacturing workshop.
- Is there air movement or wind? Confined spaces or poorly ventilated spaces have minimal air movement making them hotter.
- Is it humid? Humidity makes it more difficult for a person to cool down.
- Is there access to cool drinking water? Dehydration can occur if a worker isn't taking in enough water.
- Is the work space well ventilated or air-conditioned or are there air-conditioned break rooms?
- Are workers working alone? A worker may not be able to seek help in an emergency.
- Is there quick access to support services such as first aiders and emergency services? Heat-related illness can be fatal if left untreated.
- Is there an emergency plan? If a worker collapses in a confined space, for example, an emergency plan can help get them out and into treatment without delay.
- Can the worker get to and from work safely? Exposure while travelling can make workers more vulnerable to heat-related illness.
- Is there a heatwave? Hot days and nights can contribute to worker fatigue.

Note on useful resources
Workplace Health and Safety Queensland has 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.

If you assess that the risk to your workers associated with working in heat are too high to be controlled by taking steps like the examples listed in the following section, you could engage an occupational hygienist to perform a professional risk assessment and devise a management plan for your business.

3. Control the risk

You must do everything that is reasonably practicable to eliminate the risks associated with working in heat. This may include cancelling certain work tasks, rescheduling tasks to cooler parts of the day or waiting for hot conditions to pass. If you cannot eliminate the risk, you must minimise it as much as reasonably practicable. 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:

The work

- Use automated equipment or processes to access hot locations. For example, use a drone to inspect a fire ground.
- Where possible, have workers do the work elsewhere. Prefabricate materials in air conditioned factories.
- Install automated or remote-controlled machinery so that workers don't have to do physically demanding work by hand.
- Use plant or other equipment to reduce manual labour. Use a crane or forklift to lift heavy objects, or use earthmoving plant for digging.
- Organise work to minimise physically demanding tasks, for example conduct work at ground level to minimise climbing up and down stairs or ladders.
- Schedule heavy or strenuous work for cooler times of the day or year.
- Modify targets and work rates to make the work easier and reduce physical exertion.
- Modify uniforms or required dress codes so workers can wear cooler, more breathable clothing.
- Ensure workers are not working alone, or if they must work alone, monitor them and make sure that they can easily call for help.
- Establish work-rest schedules.

The worker

- Encourage workers to pace themselves.
- Monitor and supervise workers.
- Ensure workers and supervisors are 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
    - identify and use appropriate first aid procedures
    - 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
    - recognise the potential dangers associated with the use of alcohol and/or drugs when working in heat, and
    - use appropriate PPE correctly.

The working environment

- Install artificial cooling such as air-conditioning.
- Insulate buildings and clad sources of radiant heat.
- Make sure your workspace has good air flow. Install fans or generate air movement for example 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.
- Isolate hot machinery or surfaces by using shields, barriers and guards for example around a furnace.
- Insulate or enclose hot processes, surfaces or plant.
- Reduce radiant heat for example by allowing plant to cool down before use.
- Provide shade to reduce radiant heat from the sun.
- Provide accessible cool drinking water or when necessary electrolyte solutions.
- Provide information such as warning signs at the workplace to reinforce training.

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*.

Note on hydration

When working in heat, dehydration is a major risk. Dark or reduced urine output can indicate dehydration. You can manage the risk of dehydration by providing accessible cool drinking water and encouraging workers to stay hydrated. Water is the best way to keep hydrated. Remember that thirst is satisfied before fluid loss is replaced.

Hyponatraemia is a rare condition where a person's blood sodium levels become dangerously low. Salt tablets are not recommended.

Note on further resources

For more information on controlling the risk see How to determine what is reasonably practicable to meet a health and safety duty, and the Interpretive guideline – model Work Health and Safety Act – the meaning of 'reasonably practicable'. The Code of Practice: *How to manage work health and safety risks* provides information on risk management and the hierarchy of risk control.

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 ultraviolet radiation.

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 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*.

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 exhaustion.

Heat exhaustion – Call an ambulance immediately

Symptoms (not all will be present)	First aid for heat exhaustion
– Dehydration, thirst, and reduced or dark urine output. – Sweating. – Elevated body temperature. – Weakness or fatigue. – Headaches and dizziness. – Nausea. – Muscle cramps. **Severe symptoms:** – The worker stops sweating. – Cold, pale or clammy skin. – Clumsiness or slower reaction times. – Disorientation or impaired judgement. – Rapid or short breathing. – Rapid weak pulse or heart palpitations. – Tingling or numbness in fingers or toes. – Visual disturbance. – Vomiting or an unwillingness to drink.	– Move the worker to a cool place with circulating air. – Lie the worker flat. – Remove unnecessary clothing, including PPE. – Loosen tight clothing. – If the worker is fully conscious sit them up to facilitate drinking and provide cool – not cold – fluid to drink. – Provide an electrolyte solution or water. – Cool the worker with cold compresses or apply cold water to skin. – Observe the worker and obtain medical advice if symptoms don't improve. – Seek medical assistance if there is no improvement or the first aider is in doubt.

Heat stroke – Call an ambulance immediately

Symptoms (not all will be present)	First aid for heat stroke
– The person stops sweating. – Skin can be pink, warm and dry, or cool and blue. – High body temperature above 39 degrees Celsius. – Cramps. – Pounding, rapid pulse. – Headache, dizziness and visual disturbances. – Nausea and/or vomiting. – Clumsiness or slower reaction times. – Disorientation or impaired judgement. – 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. – If cardiac arrest occurs follow DRSABCD action plan – Move the worker to a cool place with circulating air. – Remove unnecessary clothing, including PPE – Loosen tight clothing. – Cool the worker by splashing room temperature 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 – not cold – 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.	