



Working safely in hot conditions

This bulletin provides practical advice for employers and workers on heat illness, related health and safety problems and actions and measures to take to prevent or minimise the likelihood of heat illness.

Heat stress may affect people in all parts of Western Australia during our summer months and may affect workers at some workplaces throughout the year. The effects of heat stress range from discomfort to life threatening illnesses such as heat stroke.

In Western Australia, hot workplaces are common. Heat may come from:

- hot climatic conditions;
- heavy work in moderately hot conditions;
- hot work processes (such as welding or working in foundries);
- radiant heat from the surroundings;
- work where heavy protective clothing must be worn; or
- any combination of these factors.

The *Occupational Safety and Health Act 1984* requires employers to provide and maintain, so far as is reasonably practicable, a working environment in which workers are not exposed to hazards. This applies to any risk to safety and health, including illness from working in heat.

What is heat stress?

Heat stress is the total heat burden to which the body is subjected by both external and internal factors. Heat stress causes increased blood flow to the skin, which allows release of heat. Blood is diverted to the muscles if physical work is being performed, resulting in a lower release of heat through the skin.

The body must balance the heat transferred into the body, heat generated in the body and heat coming out of the body.

Heat illness

If the body can't balance heat inputs, heat stress may lead to heat illness (or heat strain), a physical response designed to reduce body temperature.

Types of heat illness include:

- discomfort - flushed skin, increased sweating, heat rashes (prickly heat);
- mild heat illness - feeling tired, weak or dizzy, cramps, reduced work capacity, reduced attention span, irritability;
- heat exhaustion - fainting, headache, low blood pressure, nausea, clammy, pale or flushed skin, normal to high body temperature (up to 39C);
- heat stroke - irritability, confusion, speech problems, hot dry skin, convulsions, unconsciousness, body temperature above 40C, cardiac arrest - potentially fatal, a life threatening condition that requires immediate first aid and medical attention.

Are some people more prone to heat illness?

Some people are less tolerant of heat than others and working in hot conditions may aggravate pre-existing illnesses and conditions.

People who are medically unfit, are on certain medications, overweight, have heart disease, are pregnant, abuse alcohol, or are not acclimatized, are at a greater risk of heat illness and should heed medical advice. Acclimatisation takes 7-14 days to take effect, and can be reduced after three days away from hot work and acclimatisation is entirely lost after four weeks away from hot work.

Managing the risk of heat illness

In identifying, assessing and controlling risks associated with heat illness, employers should consult with workers likely to be exposed to heat as well as with any elected health and safety representatives.

Identifying risk factors

The key risk factors to take into account are:

- air temperature;
- humidity (high humidity limits the evaporation of sweat – a key cooling mechanism for the body);
- radiant heat (from the sun or other sources such as furnaces, ovens and hot vessels);
- air movement or wind speed;
- workload (intensity and duration of the work);
- physical fitness of the worker, including acclimatisation and any pre-existing conditions such as obesity, heart/circulatory diseases, skin diseases or use of certain medicines that can effect the body's ability to manage heat (eg diuretics, antidepressants and anticholinergics); and
- clothing (including protective clothing that may restrict air flow across the skin and hinder evaporation of sweat).

Assessing the risk of heat illness

The risk assessment should be carried out by a person competent in heat assessment and may include use of an appropriate heat stress index. A commonly used and recognised index is the Wet Bulb Globe Temperature (WBGT). This takes into account air temperature, radiant heat, humidity and air movement. Adjustments can take into account such things as physical workload, clothing and work organisation.

The Thermal Work Limit (TWL) is an alternative approach being used increasingly in Australian workplaces, particularly in the resource industry. It accounts for all of the major factors mentioned above and provides guidance on managing workloads and fluid intake.

If the assessment indicates a risk of heat illness occurring, employers need to put control measures in place. Workers considered at risk due to factors such as pre-existing medical conditions should be medically assessed.

Where the employer has implemented practical controls, but is not sure whether there is still a health risk, various forms of risk assessment are available, for example:

- [Heat Stress basic calculator](#) – Worksafe Queensland (does not need WBGT)
- [ACGIH TLVs and BEIs, 2016](#) (available for purchase from ACGIH)
- [Heat Stress Checklist - Risk Assessment Work Sheet](#) Health and Safety Executive (UK)

Some of these assessments require information such as the Wet Bulb Globe Temperature (WBGT).

This should preferably be measured in the work area, however as a guide, the [Bureau of Meteorology](#) provides WBGT values for major centres. An occupational hygienist can assist with such assessments. In some cases (eg when full impermeable suits are worn), direct physiological monitoring of each worker may be required to monitor heat stress.

Reducing the risk of heat stress

There is a recommended order of control measures that eliminate or reduce the risks of injury or harm. Often a combination of controls will be necessary. Examples of these are:

Engineering

Engineering controls are an effective way of reducing heat stress and preventing or minimising occurrence of heat illness. Examples include:

- increasing air movement using fans;
- installing shade cloth to reduce radiant heat from the sun;
- installing shields or barriers to reduce radiant heat from sources such as furnaces or hot vessels;
- removing heated air or steam from hot processes using local exhaust ventilation;
- installing air conditioners or coolers to reduce air temperature;
- locating hot processes away from people; and
- insulating/enclosing hot processes or plant.

Organisation of work

Heat stress can be reduced by attention to the way work is organised. Examples include:

- rescheduling work so the hot tasks are performed during the cooler part of the day or in cooler times of the year;
- reducing the time an individual spends doing the hot tasks eg by job or task rotation;
- arranging for more workers to do the job;
- providing additional rest breaks in cool, shaded areas; and
- using mechanical aids to reduce physical exertion.

Providing training and information

Training and information will enable workers to:

- identify hazards associated with heat stress;
- recognise symptoms of heat stress and heat illness;
- identify appropriate first aid procedures;
- understand how to avoid heat illness;
- recognise the potential dangers associated with the use of alcohol and/or drugs; and
- use appropriate protective clothing and equipment.

Toolbox meetings and pre-start meetings present opportunities to reinforce the actions needed to avoid heat illness.

Providing personal protective clothing

Providing personal protective equipment (PPE) such as reflective aprons and face shields can reduce exposure to radiant heat. Ice vests and liquid and air circulating systems can be worn under PPE where appropriate. Outdoor workers should be provided with protection against ultraviolet exposure, such as a wide brim hat, loose fitting, long sleeved collared shirt and long pants, sunglasses and sunscreen.

Preventing heat illness

- Replace lost fluids (drink more water). Drinks of approximately 250ml every 15 to 20 minutes should be encouraged during hot work conditions. The Western Australian Occupational Safety and Health Regulations 1996 require that a supply of clean, cool drinking water is provided and is readily accessible to workers. Workers should be encouraged to start their shift fully hydrated. Keeping well hydrated is a critical factor in avoiding heat illness. Information on keeping well hydrated should be provided as part of workplace inductions;
- Minimise caffeine, carbonated drinks, alcohol and tobacco use;
- Have rest breaks in a cool place;
- Do not take salt tablets unless your doctor has specifically advised you to do so;
- Inform your employer if you have an underlying health condition that may increase your risk of heat illness;
- Maintain a healthy lifestyle (healthy diet and regular exercise);
- Wear cool clothing, a wide brimmed hat and use sunscreen; and
- Take a break and tell your boss if feeling tired, dizzy or weak or you're having trouble concentrating.

Although water is generally adequate for fluid replacement, low joule cordials and electrolyte replacement solutions may be provided to encourage fluid intake. High sugar cordials and sports drinks are not recommended.

Allowing for acclimatisation

Workers, in particular those with fly-in fly-out contracts, may experience significant differences in climatic conditions between the workplace and their off-work location, especially after an extended absence.

Suitable acclimatisation procedures should be considered for workers who are subject to hot work conditions. Such procedures should be developed in consultation with workers and consider the particular shift roster schedules used.

Other preventative measures

Providing:

- adequate supervision of workers; and
- first aid facilities, instruction and training and access to medical help.

Employers should plan ahead and ensure all the necessary measures for preventing heat illness can be implemented when hot weather is predicted.

How should heat illness be treated?

Have the person rest in the coolest available place and drink cool but not cold fluids. Provide an electrolyte supplement or sports drink if available.

Contact a doctor, nurse, ambulance service or first aid officer if the symptoms do not reduce quickly or if symptoms of heat stroke are present.

Heat exhaustion

Symptoms: fainting, headache, low blood pressure, nausea, clammy, pale or flushed skin, normal to high body temperature (up to 39C).

Treatment:

- Move person to a cooler environment with good air movement;
- Loosen clothing and if necessary remove unnecessary clothing;

- Provide cool not cold fluid to drink if the person is conscious;
- Sponge the person with cold water/iced water;
- Seek medical attention if the person does not recover quickly or vomits.

Heat stroke

Symptoms: irritability, confusion, speech problems, hot dry skin, convulsions, unconsciousness, body temperature above 40C, cardiac arrest - potentially fatal, a life threatening condition that requires immediate first aid and medical attention.

Treatment:

- Follow **DRSABCD** action plan;
- Immerse the person in a bath of cold/iced water. If immersion is not practical, dip towels in iced water and place them on the person;
- Apply cold packs/wrapped icepacks to neck, groin and armpit areas;
- Call 000 for an ambulance;
- If the person is fully conscious and able to swallow, provide water;
- Urgent medical attention should be sought if the person becomes unconscious or has a seizure.

Make the job safe - talk about safety and health at work

If you believe there are problems with heat stress at your workplace you should discuss them with your employer and your safety and health representative.

Other sources of information

- [Occupational Safety and Health Act 1984](#) and the [Occupational Safety and Health Regulations 1996](#)
- [Heat stress basic calculator](#) – WorkCover Queensland
- Poster – [Work safely in the heat](#)
- [Skin cancer and outdoor work](#) WorkSafe/Department of Health (WA)/Cancer Council WA
- [Guidance Note for the protection of workers from UV radiation in sunlight, 2008](#) Safe Work Australia
- [ACGIH TLVs and BEIs, 2016](#) (available for purchase from ACGIH)
- [Heat Stress Checklist - Risk Assessment Work Sheet](#) Health and Safety Executive (UK)
- [Protecting Workers in Hot Environments](#) 1995 Occupational Safety and Health Administration (OSHA, USA)
- [Protecting workers from heat illness](#) National Institute for Occupational Safety and Health (NIOSH, USA)
- [A Guide to Managing Heat Stress: Developed for Use in the Australian Environment – AIOH](#) (available for purchase)
- [Working safely in hot conditions](#) - Print version

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