



BOULIA SHIRE COUNCIL

HEAT STRESS

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Keyword Classification:	Heat Stress
Summary:	The Boulia Shire Council recognises its obligations and responsibilities, and is committed to achieving and maintaining a work environment which promotes and protects the health, safety and welfare of all staff, contractors and visitors, safeguards the natural environment, and ensures the delivery of quality products and services to all customers.
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Related documents:	Nil
Responsible Section:	Executive
Responsible Officer:	Workplace Health and Safety Advisor
Legislation:	Work Health and Safety Act 2011 Work Health and Safety Regulation 2011 Codes of Practice Regulations and Policies under the EP Act

TO SUPPORT THIS POLICY, COUNCIL WILL:

- Develop & implement an effective system to encompass all operational functions, which protects the health, safety and welfare of all people affected by our workplace activities by identifying, assessing, eliminating where possible and controlling all hazards arising from our work activities; a measurement of achievement will include a higher percentage of hazards corrected against those outstanding for a specified period;
- Reduce the incidence of lost-time injuries, environmental damage and product non-conformance by applying pro-active risk management and injury prevention techniques and control systems in the planning, implementation & review of workplace activities;
- Create a culture of commitment to the principles of continuous improvement & to strive for the achievement of best practice standards by consulting with, and involving employees and contractors in the development, implementation and review of health, safety, environmental and quality management programs; progress of monthly action plans will aid in determining achievement of these objectives, for example higher percentage of monthly actions completed compared to percentage of monthly carry over items;
- Maintain effective hazard, incident, and non-conformance reporting and analysis, to protect staff, contractors, visitors, customers and the environment, and to provide adequate mechanisms for reviewing the effectiveness of these measures;
- Provide adequate resources to ensure that our health, safety, environmental and quality objectives are being achieved, and that our performance is regularly reviewed as part of our continuous improvement process, to this end results obtained in audits or annual WHSA assessment reports will be utilised as a performance indicator.

COUNCILLORS AND EXECUTIVE OFFICERS HAVE AN OBLIGATION TO:

- Please refer to our safe plan work health and safety procedure WH&S obligations and responsibility statements

SUPERVISORS AND TEAM LEADERS HAVE AN OBLIGATION TO:

- Observe, implement & fulfil their responsibilities under the relevant Acts & Regulations, and will ensure compliance with Codes of Practice, and the WHSE&Q Management System and programs;
- Adopt a risk management approach in consultation with staff to determine the risks associated with identified workplace hazards, and implement appropriate controls to protect the health & safety of staff, contractors and visitors;
- Encourage pro-active staff participation & contribution to the decision-making processes of WHSE&Q matters affecting them at work, including the identification, assessment & control of workplace risks.

EMPLOYEES, CONTRACTORS AND VISITORS HAVE AN OBLIGATION TO:

- Carry out their activities in accordance with all WHSE&Q management system policies, programs, procedures & standards;
- Report any unsafe conditions or practices, injuries, accidents, incidents and non-conformances which come to their attention, and provide feedback on any matters which may affect WHSE&Q performance;

COLLECTIVELY, WE WILL:

- Comply with or exceed the spirit and intent of the WHS Act, Environmental Protection Act, and other relevant statutory requirements, Australian Standards, codes of practice, guidance notes, and industry standards, and commit to the Continuous Improvement process;
- Develop & implement Standard Work Procedures which address and promote health, safety, environmental & quality assurance issues, in consultation with relevant employees and other identified stakeholders;
- Establish & maintain a physical work environment which does not adversely affect the health & safety of employees, contractors, visitors or the natural environment, by implementing a risk management approach and eliminating or controlling risks;
- Undertake regular training in the areas of Workplace Health & Safety, Environmental Management & Quality Assurance applicable to our duties, to assist us in achieving 'best practice' standards in all facets of our operations, and promote our WHSE&Q policy and programs to all contractors & visitors;
- Encourage, support and commit to the rehabilitation of injured staff through established rehabilitation and injury management procedures;
- Maintain & comply with reporting requirements for all accidents, incidents, hazards/risks & non-conformances, and where appropriate, participate in the analysis and corrective action of such events.

Radiant temperature

Workers need to maintain a constant body temperature if they are to stay healthy. Working in high radiant temperature locations will induce heat stress when more heat is absorbed into the body than can be dissipated out. Heat illness such as fainting from heat stress, heat exhaustion, prickly heat, or heat cramps are visible signs that Council workers are working in an unsafe working environment. This policy includes all workers but aimed more directly at workers who have direct exposure to the radiant heat. (Example, labourers, traffic controllers)

In the most severe cases, the body's temperature control system breaks down altogether and your body temperature rises rapidly. This is heat stroke, which can be fatal. It is important for all workers to be able to recognise the symptoms and be able to provide basic first aid to workers who maybe suffering from heat related illnesses.

Some Symptoms that Indicate Heat Stroke include:

- ▶ 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.

Some Warnings Signs of Heat Exhaustion are:

- ▶ Clammy Skin;
- ▶ Rapid Pulse;
- ▶ Confusion;
- ▶ Vomiting and or Nausea;
- ▶ Light headedness;
- ▶ Weakness;
- ▶ Fainting;
- ▶ Irritability;
- ▶ Slurred speech;
- ▶ Fatigue;
- ▶ Loss of concentration.

Is there an upper temperature limit at which workers should stop work?

There is no agreed temperature limit for working outdoors however, under Section 19 of the WHS Act, Council has an obligation to ensure the health & safety of workers whilst at work. If workers are suffering from any of the above symptoms, then workers need to immediately cease work and seek first aid.

The responsible supervisor on site must immediately commence a full review of the working environment to determine whether the illness has been caused by an increase in radiant temperature at the site. In the event any worker/s has been identified as being at risk, seek medical advice about a person's fitness for work in hot environments if you know they have predisposing medical conditions.

Where preventive action to address radiant heat hazards is not implemented and monitored, the WHS Regulation under Section 28, 40 (F) and 314, clearly identifies what penalties can be imposed if workers are placed at risk at the workplace by various types radiant heat hazard/s impacting the work environment.

What helps to prevent heat stress?

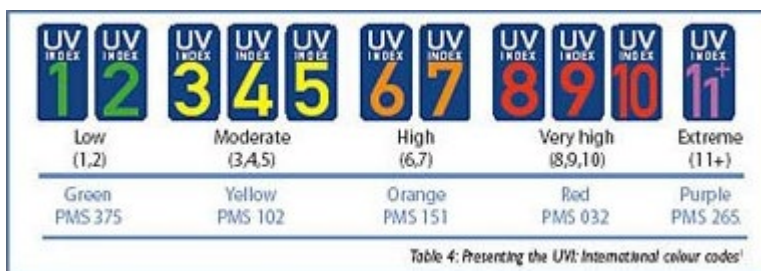
It is more difficult for Council to control an increase in radiant temperature conditions for outdoor work, than for indoor work. However, if work has to be done outdoors then Council, through its responsible managers and supervisors, takes the necessary steps to implement safe systems of work to prevent the exposure of workers to radiant heat related hazard/s.

These may include:

- ▶ Providing canopies or awnings over sections of the site where work is currently being carried out to shield workers from the ultra-violet rays of the sun, as well as from the direct heat of the sun.
- ▶ Ensuring sufficient suitable drinking water is available at all sites.

Providing regular rest breaks

- ▶ When radiant temperature UV Index increases pass 5 rating (See chart below) consideration for a ten minute break every hour, in a cooler area, helps the body to cool off, especially where the work is hard, physical work. The length of the break should be increased if the temperature and radiant heat is very high.
- ▶ Workers who are required to work out in the sun continue to regularly monitor radiant heat conditions via the SunSmart phone App (Free download apple and google stores) that provides regular updates during the day on UV radiations. The information available from the app will assist Managers/Supervisors/Workers to make decisions whether to continuing to work in the weather conditions is placing workers at risk of heat related illnesses.



UV Index	Suggested Actions
0 to 2	You can safely enjoy being outside!
3 to 7	Seek shade during midday hours! Slip on a shirt, slop on sunscreen and slap on hat!
8 plus	Avoid being outside during midday hours! Make sure you seek shade! Shirt, sunscreen and hat are a must!

- ▶ Provide shaded areas located as near as possible to the work area where work is being done, the nearer the shade, the more likely it is to be used by workers.
- ▶ Provision of cool, not cold, water. Frequent small drinks of cooled water will help replace the water lost to your body through sweat, before dehydration begins. This is better than infrequent large drinks. Again, the cool water supplies should be near each working position, to encourage frequent drinks. Large drink vessels distributed through the site to supplement the hard-wired water coolers will also be a requirement in hot weather.

Alcoholic drinks should not be taken- as replacement fluids. Alcohol stimulates the body to eliminate fluids, and will increase your risk of dehydration. For example, if you drink one can of beer, you will lose more than that volume of urine.

Salt tablets should not be taken - more water will be required by the body to help it get rid of the salt - this will increase the amount of work the kidneys must do and increase the risk of dehydration. Salt tablets also increase the risk of high blood pressure. Drinking water will not give you stomach cramps, as some people believe.

What action should be taken if someone has symptoms of heat stroke?

Symptoms (not all will be present)

- ▶ 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.

First aid for heat stroke

- ▶ Call 000 and if possible 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 (see Appendix A)
- ▶ 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, or manually fan with a towel, 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.

What actions should be taken if someone has symptoms of heat exhaustion?

Lower Body Temperature

- ▶ Relocate the affected worker to a cooler area (for example, an air-conditioned shed, first aid room).
- ▶ Remove excess clothing (hard hat, boots, and shirt).
- ▶ Attempt to lower the body temperature by cool shower, water misting the body, applying cool compresses.
- ▶ 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.
- ▶ Rehydrate, if the worker is fully conscious sit them up to facilitate drinking and provide cool – not cold – fluid to drink.
- ▶ Monitor the worker and seek medical advice/assistance if there is no improvement or the first aider is in doubt.

Workplace action to prevent heat stress:

- ▶ Site supervisors to regularly check with workers exposed to high temperatures, if they find conditions too hot or have any heat stress symptoms, implement all necessary first aid processes to control the radiant temperature heat hazard.
- ▶ In hot environments, to determine appropriate exposure levels to high temperatures, management should consider measuring and recording the temperature from the start of November to the end of February each year, preferably with an automatic Wet-Bulb Globe temperature instrument.
- ▶ Use the information from the Wet-Bulb Globe temperature instrument to determine the exposure levels of severe weather event to determine what actions must be taken to protect workers at that site
- ▶ Ensure all workers or supervisor report incidents of high temperatures and symptoms suffered onto the incident reporting form.
- ▶ Where ever possible negotiate exposure reduction by frequent rests away from the source of heat and job rotation, charging working hours to start early etc.
- ▶ Ensure the provision of suitable clothing and footwear - clothing which increases body heat or prevents sweat evaporating is not suitable (for example, nylon).
- ▶ Ensure all workers received information, instruction and training on the need for adequate water, recognition of heat symptoms, acclimatization to heat, and exposure build-up for new workers after holidays and types of work which increase exposure to radiant temperature heat hazard.
- ▶ Ensure that first-aiders and workers are trained in the recognition of heat symptoms and first aid treatment of heat stress.
- ▶ Hold regular toolbox or pre-start to discuss severe weather conditions and agreed controls measures.

WHS does not have a specific **standard** that covers working in hot environments. Nonetheless, under the WHS Act, employers have a duty to protect workers from recognized serious hazards in the workplace, including **heat**-related hazards. Workers new to outdoor jobs are generally most at risk for **heat**-related illnesses.

Wet Bulb Globe Temperature (WBGT) is a measure of heat stress caused by a variety of factors and is often referred to as **Environmental Heat**. Environmental heat is more than just temperature and is a combination of four factors:

1. Air temperature.
2. Humidity. High relative humidity makes it difficult for the body to cool itself through sweating.
3. Radiant heat from sunlight or artificial heat sources such as furnaces.
4. Air movement. In most situations, wind helps workers cool off.

All of these factors contribute to the heat stress perceived by the body while subject to the conditions in question and an environmental heat assessment should account for all of these factors. **The recommended measurement of environmental temperature is by the use of WBGT meters to monitor and measure workplace environmental heat.**

WBGT meters contain three different thermometers:

- A dry bulb thermometer to measure the ambient air temperature.
- A natural wet bulb thermometer to measure the potential for evaporative cooling.
- A black globe thermometer to measure radiant heat.

WBGT has important advantages over other environmental heat measurements. One major advantage is that WBGT accounts for all four major environmental heat factors — temperature, humidity, radiant heat, and wind. In contrast, standard thermometers only assess one factor (air temperature).

Workplace environmental heat should be measured on-site using WBGT meters. Use of heat index is a less desirable substitute. While local weather reports based on meteorological data from observation stations can be useful, the readings from these stations may not reflect the conditions at the specific worksite. Heat conditions at the worksite may be different for multiple reasons, from cloud cover and humidity to local heat sinks. The potential error increases with distance from the weather station.

In addition to possible distance-based errors, weather reports can be inaccurate if the worksite has features that affect heat conditions. These features include:

- Indoor work — A weather report cannot gauge conditions inside a building.
- Direct sunlight — Weather services measure temperature and Heat Index in the shade. Work in the sun may be considerably hotter. Direct sunlight can increase Heat Index by up to 7.5°C.
- Heat sources — Weather reports cannot account for the heat generated by fires, hot tar, hot equipment or heat-absorbing surfaces such as roads and roof surfaces.
- Wind blockage — Some worksites may be hotter than surrounding areas because of structures that block air movement; e.g., trenches, enclosed spaces.
- Reflective material — Water, metal, or other materials can reflect sunlight onto workers.

At worksites, with the above features, weather reports are unlikely to provide accurate estimates of environmental heat. Employers should use an on-site measurement such as WBGT.

To prevent a hazardous combination of environmental and metabolic heat, **employers should be aware of workers' activity level**. Workload can be classified as light, moderate, heavy, or very heavy.

- **Light:** Sitting or standing with minimal arm and leg work.
- **Moderate:** Continuous modest intensity, such as light pushing/pulling or normal walking.
- **Heavy:** Intense upper body work such as carrying loads or sawing.
- **Very heavy:** Intense activity at an almost maximum pace.

Examples of Work at Different Intensity Levels:

Light work

- Operating equipment
- Inspection work
- Walking on flat, level ground
- Using light hand tools. However, this may be moderate work depending on the task
- Travel by conveyance

Moderate work

- Jack-leg drilling
- Installing ground support
- Loading explosives
- Carrying equipment/supplies weighing 10–20 kgs
- Using hand tools (shovel, hoe, crowbar) for short periods

Heavy/very heavy (maximum pace) work

- Climbing
- Carrying equipment/supplies weighing 20 kgs or more
- Installing utilities
- Using hand tools (shovel, hoe, crowbar) for extended periods

Heavy and very heavy work carry the highest risk of heat-related illness.

Estimating each worker's workload is important. More protections are necessary for workers who do intense labour (e.g. activities that elevate a worker's heart rate and respiration rate through exertion). These workers should be given frequent rest breaks and work should be scheduled in the cooler part of the day. When in doubt about a worker's physical activity level, assume a higher workload.

To assess if heat stress is too high, employers should consider the job, the environment, and the worker.

1. First estimate the workload as shown above.
2. Next measure the environmental heat using WBGT or a similar method.
3. If the worker is wearing clothes or protective equipment that can impair heat dissipation, then add clothing adjustment factors to the measured WBGT. This process yields an "effective WBGT."
4. Determine whether the worker is acclimatised to heat or not. In general, assume that workers are not acclimatised if they have been doing the job for less than 1-2 weeks.
5. Use the following tables to determine whether the total heat stress is hazardous.

A sustained environmental heat exceeding 35 °C is likely to be fatal even to fit and healthy people as at this **temperature** our bodies switch from shedding **heat** to the environment, to gaining **heat** from it.

The heat index is the body’s sensation of heat caused by the combination of air temperature and humidity and is the reverse of the “wind chill factor”.

Use the chart below to assess the potential severity of heat stress:

- Across the top of the chart, locate the **AIR TEMPERATURE,**
- Down the left side of the chart, locate the **HUMIDITY.**
- Follow across and down to find the **HEAT INDEX.**

		Air Temperature (°C)										
		21.1°	23.9°	26.7°	29.4°	32.2°	35°	37.8°	40.6°	43.3°	46.1°	48.9°
Humidity		Heat Index										
0%		17.8°	20.5°	22.8°	25.6°	28.3°	30.6°	32.8°	35°	37.2°	39.4°	41.7°
10%		18.3°	21.1°	23.9°	26.7°	29.4°	32.2°	35°	37.8°	40.6°	43.9°	46.7°
20%		18.9°	22.2°	25°	27.8°	30.6°	33.9°	37.2°	40.6°	44.4°	48.9°	
30%		19.4°	22.8°	25.6°	28.9°	32.2°	35.6°	40°	45°	50.6°		
40%		20°	23.3°	26.1°	30°	33.9°	38.7°	43.3°	50.6°			
50%		20.6°	23.9°	27.2°	31.1°	35.6°	41.7°	48.9°				
60%		21.1°	24.4°	27.8°	32.2°	37.8°	45.6°					
70%		21.1°	25°	29.4°	33.9°	41.1°	51.1°					
80%		21.7°	25.6°	30°	36.1°	45°						
90%		21.7°	26.1°	31.1°	38.9°	50°						
100%		22.2°	26.7°	32.8°	42.2°							

HEAT INDEX	HEAT STRESS RISK WITH PHYSICAL ACTIVITY AND/OR PROLONGED EXPOSURE
32.2°-40°	Heat cramps or heat exhaustion possible Modify work practices - take water breaks every 15 to 20 minutes.
40.6°-51.1°	Heat cramps or heat exhaustion likely. Heatstroke possible Modify work practices - frequent (every 15 minutes) water and rest breaks.
51.7°+	Heat stroke highly likely Recommend <u>NO WORK!</u>

This Heat Index chart is designed to provide general guidelines for assessing the potential severity of heat stress. Individual reactions to heat will vary. It should be remembered that heat illness can occur at lower temperatures than indicated on the chart. In addition, studies indicate that susceptibility to heat disorders tends to increase with age.

Combined index of heat and humidity. What it “feels like” to the body. Source: National Oceanic and Atmospheric Administration.

The most effective way to prevent heat-related illness and fatality is to reduce heat stress in the workplace.

The following are some engineering controls that may reduce heat stress:

- Use air conditioning
- Increase general ventilation
- Provide cooling fans in hot, enclosed areas (e.g. workshop)
- Use reflective shields to block radiant heat
- Insulate hot surfaces
- Provide shade for outdoor work sites

Administrative controls are another way to prevent a worker's core body temperature from rising. Some administrative controls that may reduce heat stress include:

- Acclimatise workers starting the first day working in the heat
- Re-acclimatise workers after extended absences
- Schedule work earlier or later in the day
- Use work/rest schedules
- Limit strenuous work (e.g., carrying heavy loads)
- Use relief workers when needed

PPE is a way to provide supplemental protection. PPE that can reduce heat stress include:

- Water-cooled garments
- Air-cooled garments
- Cooling vests
- Wetted over-garments
- Sun hats
- Light colored clothing
- Sunscreen

An effective heat-related illness prevention programme should include a worker acclimatisation and should also establish an effective training programme that includes how to recognize heat-related illness symptoms and what to do when there is a heat-related illness emergency. It may not always be feasible to implement all elements in all workplaces; however, implementing as many elements as possible will make the programme as effective as possible.

APPENDIX A

DRSABCD action plan

In an emergency call triple zero (000) for an ambulance



D **DANGER**
Ensure the area is safe for yourself, others and the patient.

R **RESPONSE**
Check for response—ask name—squeeze shoulders

No response	Response
<ul style="list-style-type: none">• Send for help.	<ul style="list-style-type: none">• make comfortable• check for injuries• monitor response.



S **SEND for help**
Call Triple Zero (000) for an ambulance or ask another person to make the call.

A **AIRWAY**
Open mouth—if foreign material is present:

- place in the recovery position
- clear airway with fingers.

Open airway by tilting head with chin lift.



B **BREATHING**
Check for breathing—look, listen and feel.

Not normal breathing	Normal breathing
<ul style="list-style-type: none">• Start CPR.	<ul style="list-style-type: none">• place in recovery position• monitor breathing• manage injuries• treat for shock.



C **CPR**
Start CPR—30 chest compressions : 2 breaths
Continue CPR until help arrives or patient recovers.



D **DEFIBRILLATION**
Apply defibrillator if available and follow voice prompts.

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