



OCCUPATIONAL EXPOSURE TO HEAT AND HOT ENVIRONMENTS

JUSTICE AND COMMUNITY SAFETY
DIRECTORATE

DOCUMENT INFORMATION

Date approved/effective:	24 February 2021
Date last reviewed:	24 February 2021
Approved by:	Richard Glenn, Director-General
Policy Custodian:	Chief Human Resources Officer
Review date:	Two years from date of effect/last review

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CONTENTS

1. PURPOSE.....	8
2. SCOPE	8
3. SPECIFIC RESPONSIBILITIES	9
4. GUIDELINE STATEMENT.....	10
5. INFORMATION TRAINING AND INSTRUCTION	10
6. WORKING IN THE HEAT	11
7. ROLES AND RESPONSIBILITIES	11
8. FACTORS INFLUENCING HEAT STRESS.....	12
9. RISK MANAGEMENT	13
10. PERSONAL PROTECTIVE CLOTHING AND EQUIPMENT.....	14
11. HEAT ACCLIMATION AND ACCLIMATISATION	14
12. HYDRATION.....	14
13. COOLING STRATEGIES	15
14. PASSIVE COOLING TECHNIQUES.....	15
15. EMERGENCY RESPONSE TO HEAT-RELATED ILLNESSES	16
16. HEAT EXHAUSTION	16
17. EXTERNAL HEAT STROKE (EHS).....	17
18. PRESCRIBED OR OVER THE COUNTER MEDICINE.....	18
19. REPORTING HEAT-RELATED HAZARDS, NEAR MISSES, AND INCIDENTS.....	18
20. ANNEX 1.....	18
21. ANNEX 2.....	19
22. ANNEX 3.....	21
23. REVIEW	24
24. ENQUIRIES	24

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DEFINITION OF TERMS

Term	Definition
Apparent temperature (AT) - Heat Index	The heat index takes into consideration temperature and humidity and is calculated for shady areas.
Acclimatisation	The physiological changes that occur in response to a succession of days of exposure to environmental heat stress and reduce the strain caused by the heat stress of the environment; and enable a person to work with greater effectiveness and with less chance of heat injury.
Consultation	<p>A PCBU must consult, so far as is reasonably practicable on the following:</p> <ul style="list-style-type: none"> • 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.
Duty holders	<p>Primary duty - A person who conducts a business or undertaking (PCBU) owes a duty of care to all workers carrying out work in the business or undertaking. They must ensure the health and safety of all workers, so far as is 'reasonably practicable'.</p> <p>A PCBU also has duties to other persons who may be put at risk from work carried out as part of the conduct of the business or undertaking.</p> <p>Officer's duty - An officer of a PCBU has a duty to exercise 'due diligence' to ensure that the PCBU complies with its duty.</p> <p>Worker's duty - A worker must take 'reasonable care' for themselves and others to comply with reasonable instructions and cooperate with reasonable policies and procedures of the PCBU.</p>
Exertional heat stress	Imposed by the combination of workload/task, through exposure to high environmental temperatures. Lack of acclimatisation to hot environments, poor physical fitness, or the wearing of excessive amounts of clothing or personal

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Term	Definition
	protective equipment (PPE) in high temperatures.
Electrolyte supplementation	Electrolyte replacements are powders, tablets or ready to drink products which allow targeted replacement of the electrolytes (in particular, sodium and potassium) lost through sweat or other body fluids. Typical uses include: – As an alternative to standard sports drinks when it deemed of value to replace large electrolyte losses during and after exercise with a more aggressive approach. – To restore fluid/electrolyte deficits caused by other factors such as the dehydration techniques undertaken to “make weight” for competition or gastrointestinal upsets (vomiting/diarrhea etc.)
Heat exhaustion (core temperature 37°C – 40°C)	A systemic reaction to heat stress, where the depletion of body fluids and electrolytes occurs without adequate replacement. Heat exhaustion may progress rapidly to heat stroke. Workers who are hypo hydrated can also become heat exhausted.
Heat acclimation	Is a broad term that can be defined as a complex series of changes or adaptations that occur in response to heat stress in a controlled environment between 7 – 14 days.
Heat acclimatisation	Is a process that occurs when living and working in hot or humid environments.
Heat stroke (core temperature >40°C)	Is a potentially life threatening condition that can result in multi-organ failure, neuromuscular failure, system shutdown and death.
Heat stress	The net heat load to which a worker is exposed from the combined contributions of metabolic heat, environmental factors, and clothing worn which results in an increase in heat storage in the body.
Hydration	Hydration is important because the body is comprised mostly of water, and the proper balance between water and electrolytes in our bodies determines how most of our systems function, including nerves and muscles.
Hyponatremia	Hyponatremia refers to a low level of sodium in the blood. Hyponatremia may result from excess fluid in the body relative to a normal amount of sodium, or it may be due to a loss of sodium and body fluid. Symptoms are nonspecific and can include mental changes, headache, nausea and vomiting, tiredness,

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Term	Definition
	muscle spasms, and seizures. Severe hyponatremia can lead to coma and can be fatal.
Hyperthermia	Results from thermoregulation failure and occurs when the body produces or absorbs more heat than it can dissipate, exceeding the normal limits required to maintain homeostasis. Extreme hyperthermia >40°C is a medical emergency and requires immediate treatment to prevent disability or death. Is elevated body temperature due to failed thermoregulation?
Hyperthermic	Characterised by abnormally high body temperature.
Management of risk	The WHS Act and Regulations require persons who have a duty to ensure health and safety to 'manage risks' by eliminating health and safety risks so far as is reasonably practicable, and if it is not reasonably practicable to do so, to minimise those risks so far as is reasonably practicable.
Must	'Must' indicates a legal requirement exists that must be complied with.
Person Conducting a Business or Undertaking (PCBU)	Primary duty - A person who conducts a business or undertaking (PCBU) owes a duty of care to all workers carrying out work in the business or undertaking. They must ensure the health and safety of all workers, so far as is 'reasonably practicable'.
Personal Protective Equipment (PPE & PPC)	PPE refers to anything used or worn to minimise risk to workers' health and safety.
Rhabdomyolysis	A medical condition associated with heat stress and prolonged physical exertion, resulting in the rapid breakdown of muscle and the rupture and necrosis of the affected muscles.
Risk	The possibility of suffering harm or loss.
Thermal Strain	The sum of physiologic responses of the individual to thermal stress.
Wet Bulb Global Temperature (WBGT)	WBGT is a measure of the heat stress in direct sunlight, which takes into account: temperature, humidity, wind speed, sun angle and cloud cover (solar radiation).
Work	Physical efforts performed using energy from the metabolic rate of the body.

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Term	Definition
Worker	<p>A person is a worker if the person carries out work in any capacity for a person conducting a business or undertaking, including work as any of the following:</p> <ul style="list-style-type: none">• an employee• a contractor or subcontractor an employee of a contractor or subcontractor• an employee of a labour hire company who has been assigned• to work in the person’s business or undertaking• an outworker• an apprentice or trainee• a student gaining work experience• a volunteer• a person of a prescribed class
Workplace	<p>A place where work is carried out for a business or undertaking and includes any place where a worker goes or is likely to be, while at work (including in vehicles).</p>

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1. PURPOSE

- 1.1 The purpose of this guideline is to provide the Justice and Community Safety Directorate (JACS) Work Health and Safety (WHS) duty holders with practical guidance on how to manage the risks associated with occupational exposure to heat and hot environments and to provide information on what to do if a worker begins to suffer from a heat-related illness.
- 1.2 This guideline addresses heat that poses a direct risk to a worker's health and safety, such as a heat-related illness.
- 1.3 Both personal and environmental factors must be considered when assessing the risk to workers' health from working in the heat. For information on thermal comfort – that is whether a worker is comfortable at a particular temperature, refer to the [Code of Practice Managing the Work Environment and Facilities](#).
- 1.4 This guideline will assist supervisors and managers with managing the health and safety of workers undertaking work in the heat.
- 1.5 This guideline outlines:
 - Assessment of heat risk
 - fluid replacement
 - work/rest guide
 - managing workers deployed to hot environments
 - management of heat related conditions when they occur
 - information, training, and instruction for workers
 - risk management and reporting hazards, near misses and incidents.

2. SCOPE

- 2.1 Working when it's hot puts stress on the body's cooling system. When ignored, it can lead to heat-related illness, disability and even death if first aid or emergency treatment is not given.
- 2.2 Heat stress can get worse when combined with:
 - physical work
 - loss of fluids
 - fatigue
 - a pre-existing medical condition
 - wearing PPE/PPC or respiratory equipment
 - deployments to hot climates during Canberra winters e.g. international bushfires and natural disaster response.

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- 2.3 Workers carrying out work in extreme heat **must** be able to carry out work without risk to their health and safety so far as is reasonably practicable.
- 2.4 This guideline addresses occupational exposure to heat and hot environments that poses an immediate 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, [Work Health and Safety \(Managing the Work Environment and Facilities Code of Practice\)](#) provides further guidance.
- 2.5 This guideline does not apply to workplaces where workers are not exposed to direct sunlight (solar radiation) for example:
 - office based workers
 - officer posts (Correctional Facility)
 - accommodation units
 - internal prison service areas including but not limited to:
 - industry areas
 - programs room and facilities
 - education and health centres
 - recreation buildings
 - stores facilities.

3. SPECIFIC RESPONSIBILITIES

- 3.1 Persons conducting a business or undertaking (PCBUs) have a duty under the *Work Health and Safety Act 2011* (WHS Act) to ensure the health and safety of their workers. JACS is a PCBU.
- 3.2 JACS supervisors/managers must brief workers on the introduction and availability of the guideline through team meetings or other modes of communication.
- 3.3 All workers must do all that is reasonable to assist officers, managers, and supervisors in meeting their health and safety obligations. Workers must take reasonable care for his or her own health and safety and take care that his or her acts or omissions do not adversely affect the health and safety of other persons.
- 3.4 Workers must comply with any reasonable instruction and co-operate with any reasonable policy or procedure relating to health and safety at the workplace.
- 3.5 Visitors must take reasonable care for their own health and safety and ensure that their acts or omissions do not adversely affect the health and safety of other persons. Visitors must also comply with any reasonable WHS instructions.

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4. GUIDELINE STATEMENT

- 4.1 Before undertaking work or training activities in the heat, a risk assessment **must** be carried out to mitigate the likely impacts of elevated body temperatures of workers. Increased risk of heat-related illness is expected during summer, periods of sustained and elevated heat and on deployment to hot climates during Canberra winters (e.g. international bushfires and natural disaster response).
- 4.2 A risk assessment must also be conducted prior to the purchase of PPE, equipment and vehicles that are likely to be used in hot work environments.

5. INFORMATION TRAINING AND INSTRUCTION

- 5.1 A person conducting a business or undertaking is to ensure that information, training, and instruction¹ provided to a worker is suitable and adequate having regard to:
- the nature of the work carried out by the worker
 - the nature of the risks associated with the work at the time the information, training or instruction is provided
 - the control measures implemented.
- 5.2 All new and current workers who work in areas where there is a reasonable likelihood of heat-related illness, and their managers/supervisors, must be provided with information, training, and instruction of the following:
- Heat stress hazards
 - Recognising signs of heat-related illness
 - Potential health effects of excessive heat stress
 - General first aid as well as worksite-specific first aid procedures
 - Proper precautions for work in heat stress areas
 - Importance of Hydration
 - Use of personal protective equipment
 - Workers' responsibilities for following proper work practices and control procedures to help protect their health and provide for the safety of other workers
 - The effects of prescribed medications, over-the-counter medications, alcohol, or caffeine that may increase the risk of heat injury or illness by reducing heat tolerance
 - Importance of acclimation
 - Heat prevention training may be reinforced on hot days
 - Conducting a risk assessment.
- 5.3 Business units **must** provide training and or information sessions for workers regarding the risks of dehydration and also over-hydration before predicted periods of hot weather, e.g. bushfire season or overseas deployments.

¹ WHS Regulation 2011 section 39

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6. WORKING IN THE HEAT

- 6.1 When workers work in the heat, workers experience increased body temperatures as a result of the physical work carried out in a hot environment, and also due to the PPE/PPC worn and types of equipment and vehicles used.
- 6.2 Increased body temperatures can result in elevated heart rates, increased sweat rates, reduced strength, and decline in cognitive function. Increased body temperatures can also increase the risk of workers suffering from heart attacks and stroke events.
- 6.3 When body temperatures become, extreme (>40°C) workers are at risk of heat stroke, a potentially fatal condition.
- 6.4 Managers and supervisors must ensure that heat prevention mitigation strategies are in place to protect the health and safety of workers working in heat by:
 - Hydration
 - appropriate work/rest cycles
 - acclimation
 - PPE/PPC selection has been considered
 - Access to cooling mechanisms.

7. ROLES AND RESPONSIBILITIES

Role	Responsibilities
Business Unit Heads	<p>To eliminate risks to health and safety, so far as is reasonably practicable and if not reasonably practicable to eliminate risks to health and safety, to minimise those risks so far as is reasonably practicable.</p> <p>To manage and assess all risks associated with working in the heat.</p> <p>Ensure appropriate workplace specific working in the heat procedures and or guidelines are developed.</p> <p>To provide workers with appropriate cooling and hydration resources.</p> <p>To provide workers with fit for purpose PPE for the performance of their standard work and for use during potential deployments.</p>

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<p>Managers and Supervisors</p>	<p>Conducting risk-assessments prior to work or training in the heat and in accordance with Fluid Replacement and Work Rest Guide (Annex 1).</p> <p>Pre-planning for appropriate resources during emergency and operational work tasks.</p> <p>Providing workers with appropriate cooling and hydration resources (Annex 2).</p> <p>Ensuring that workers store, maintain, use/wear and dispose of PPE correctly.</p>
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Workers

To take reasonable care for his or her own health and safety and take reasonable care that his or her acts or omissions do not adversely affect the health and safety of other persons

Complying, so far as the worker is reasonably able, with any reasonable instruction that is given by the PCBU

Managing their hydration prior to attending work, during work tasks and following work tasks.

Wearing appropriate levels of personal protective clothing to balance protection and heat management.

- 7.1 During emergency operations where practical limitations will occur, such as during small scale urban or wildland firefighting, consideration of the conditions should be undertaken based on an overall risk assessment. In this case, the work/rest table should be considered to be a guide only.

8. FACTORS INFLUENCING HEAT STRESS

- 8.1 Figure 1 provides examples of the factors² influencing heat-related illness.

² Workers should consider discussing pregnancy with their health care provider

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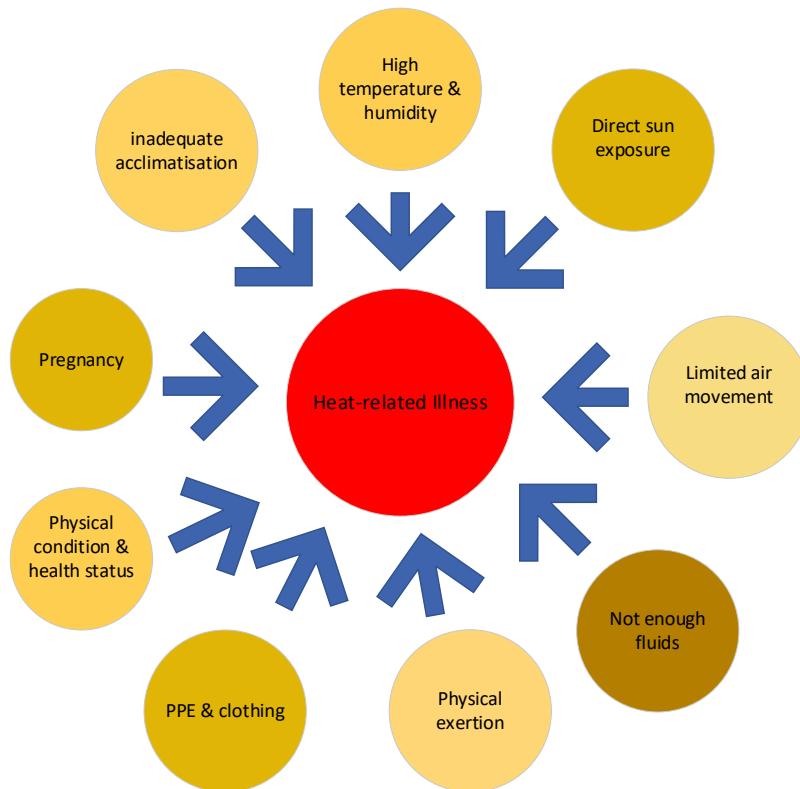


Figure 1 Examples of heat-related illness risk factors

9. RISK MANAGEMENT

- 9.1 To minimise the risk of illness or injury arising from work in hot environments, managers and supervisors must undertake risk assessments that consider both personal, environmental factors and PPE/PPC being worn. A risk assessment must be carried out prior to engaging in training activities or to ensure appropriate resources are available at emergency incidents.
- 9.2 Administrative controls can be applied to limit heat-related illness through limiting the exposure time of workers to hot environments and temperatures, e.g. work/rest schedules. Reducing metabolic heat load and enhancing heat tolerance by acclimatisation.
- 9.3 Risk management strategies may include the use of a Wet-Bulb Globe Thermometer (WBGT) measurement device. The WBGT³ is a measure of heat stress in direct sunlight, which takes into account: temperature, humidity, wind speed, sun angle and cloud cover (solar radiation).
- 9.4 Localised weather will be different from that reported by the Bureau of Meteorology (BOM), temperatures must reflect where the work is conducted.

³ WBGT measurement is used by the Australian Defence Force and military agencies and the United States Occupational Safety and Health Administration (OSHA) as a guide for managing workload in direct sunlight.

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10. PERSONAL PROTECTIVE CLOTHING AND EQUIPMENT

- 10.1 Any level of protective clothing will increase the risk of workers sustaining a heat illness or event. PPE increases risk in two ways:
- reducing the body's natural ability to dissipate heat through sweating
 - increasing metabolic heat production due to increased weight and reduced mobility from restrictive clothing.
- 10.2 In mitigating the risk of a heat illness event occurring, selection of PPE must be considered as part of an overall risk assessment process by managers, supervisors, incident controllers and workers. A risk assessment must be conducted prior to the procurement of PPE.
- 10.3 The level of PPE worn must match the risk presented at each incident or training activity and also taking into account conflicting risks (e.g.).
- 10.4 Removing PPE as soon as practical must occur during hot weather or when work rates are high to allow for natural cooling to occur as the risk of sustaining a heat-related illness may be more significant.

11. HEAT ACCLIMATION AND ACCLIMATISATION

- 11.1 Workers deployed to hot environments during Canberra's winter managers and supervisor must consider heat acclimation as part of the overall risk assessment. Complete acclimation can take between 7 – 14 days dependant of the current environmental conditions and fitness status of the worker.
- 11.2 Heat acclimatisation describes the same process but occurs naturally as living and working in hot environments. In either case, the positive adaptations that occur include reductions in:
- heart rate
 - body temperature responses
 - skin temperature responses
 - perceived exertion.
- 11.3 A worker who is acclimated to heat will:
- have an increased sweating efficiency (earlier onset of sweating, greater sweat production, and reduced electrolyte loss in sweat)
 - be able to perform work with lower core temperature and heart rate
 - increased skin blood flow at a given temperature.

12. HYDRATION

- 12.1 Managers, supervisors must provide workers with access to water for cooling and rehydration during work and training in the heat. Managers, supervisors must also

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consider electrolyte supplementation when extended duration periods of work occurs in the heat.

13. COOLING STRATEGIES

13.1 Business units must:

- plan to cool hyperthermic workers following work tasks and training activities undertaken in the heat
- cooling protocols must be provided based on the nature of work, the level of encapsulation and environmental conditions
- cooling can be provided using either passive or active cooling methods based on the likely level of hyperthermia.

14. PASSIVE COOLING TECHNIQUES

14.1 In mild-moderate temperatures, passive cooling techniques such as removal of outer clothing layers, in addition to the use of air-conditioned vehicles, may be effective in attenuating elevated body temperatures (Colburn et al., 2011).

14.2 Passive cooling allows the body to self-regulate its own temperature more effectively. To maximise the

14.3 cooling of workers using passive methods, consideration of the following may be relevant:

- proper selection of clothes worn under PPE. Where appropriate, consideration should be given to clothing which aids in the evaporation of sweat from the body, while concurrently reducing further heat gain from the environment
- immediate removal of all PPE when entering rehabilitation sectors /rest and recovery. This must include over pants in addition to removing jackets
- where possible, consideration should be given to accessing air-conditioned environments such as that offered by vehicles and trucks. Where this is not possible, at a minimum, access to shade must occur
- access to cold water must be a priority. Warmer water temperatures can reduce compliance of individuals to drink. Consider providing electrolyte supplementation during prolonged incidents or when it is hot.

14.4 During work tasks where the risk of work-related heat-illness is high, such as in hot environments or where high levels of humidity are present, passive cooling can be ineffective at reducing elevated body temperatures. Managers and supervisors must plan for and provide active post-incident rehabilitation protocols.

14.5 These protocols should include cooling practices in addition to rehydration and can consist of the following strategies:

- whole body water immersion
- iced slush drinks/crushed ice
- fans.

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15. EMERGENCY RESPONSE TO HEAT-RELATED ILLNESSES

- 15.1 Heat exhaustion and heat stroke are two related health conditions that can lead to severe consequences if left untreated. Both heat exhaustion and heat stroke are caused by an elevation in body temperature, which is normally controlled by sweating. Sweating allows a person to cool through evaporation, but once a person becomes too dehydrated, the body temperature can rise rapidly and results in a heat-induced illness.
- 15.2 PPE create an environment that causes the body core temperature to rise more significant than the ability to cool due to impaired sweating.

Heat Induced Illness	Definition
Heat Exhaustion (core temperature 37°C – 40°C)	A systemic reaction to heat stress, where the depletion of body fluids and electrolytes occurs without adequate replacement. Heat exhaustion may progress rapidly to heat stroke.
Heat Stroke	The most serious form of heat related illnesses, with a body temperature (core temperature >40°C) with central nervous dysfunction.

16. HEAT EXHAUSTION

16.1 WHAT ARE THE SIGNS OF HEAT EXHAUSTION?

- heavy sweating
- pupils dilated
- rapid heart rate.

16.2 WHAT ARE THE SYMPTOMS OF HEAT EXHAUSTION?

16.3 Fatigue (extreme tiredness) as a result of decreased blood pressure and blood volume is a symptom of heat exhaustion. This is caused by a loss of body fluids and salts after being exposed to elevated body temperatures for a prolonged period of time. Other symptoms to look for include:

- faintness/dizziness
- headache
- nausea or vomiting
- possible collapse.

16.4 HOW DO YOU MANAGE HEAT EXHAUSTION?

- get the person to a cool area and lay them down

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- remove outer clothing
- wet skin with cool water or wet cloths.
- increase fluid intake (rehydration) if they are fully conscious
- seek medical advice.

17. EXTERNAL HEAT STROKE (EHS)

17.1 WHAT ARE THE SIGNS OF EHS?

- dry/hot skin
- rapid shallow breathing
- dilated pupils.

17.2 WHAT ARE THE SYMPTOMS OF HEAT STROKE?

- vertigo
- confusion
- delirium
- headache
- thirst
- nausea or vomiting
- muscle cramps
- coma
- seizure.

17.3 HOW DO YOU MANAGE HEAT STROKE?

- call 000 for an ambulance
- resuscitate following the Basic Life Support Flow Chart (ANZCOR Guideline 8)
- immerse worker in cold water if available¹ including PPE or clothing
- place the victim in a cool environment
- moisten the skin with a moist cloth or atomizer spray and fan repeatedly
- apply wrapped ice packs to neck, groin, and armpits.

17.4 ALTERNATIVE COOLING WHEN IMMERSION IS NOT AVAILABLE:

- remove all equipment and excess clothing
- bathe face and trunk with iced or tepid water
- move to shade or air conditioned area (facility, vehicle) if available
- maximise air movement by using fans if available.

17.5 It's important to understand that you cannot drink your way out of heat stress. As soon as you are experiencing symptoms of heat stress. More evasive actions need

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to be undertaken, which are listed above- the most effective being cold water immersion.

17.6 Heat Stress doesn't stop when the working day finishes- what's referred to as a heat hangover can be created, this can affect workers and wear them down with prolonged exposure to hot conditions. It's important to have appropriate actions in place to monitor workers who are expected to work in a hot environment for prolonged periods of time.

18. PRESCRIBED OR OVER THE COUNTER MEDICINE

18.1 Workers who are required to take prescribed or over the counter medicine that may impact on their own health and safety may consider speaking to their general medical practitioner to enquire whether the medication may impact on their ability to work in heat or hot environments.

19. REPORTING HEAT-RELATED HAZARDS, NEAR MISSES, AND INCIDENTS

19.1 All heat-related hazards, near misses and incidents must be reported in RiskMan as soon as practicable. Any heat-related incidents that are notifiable to the regulator must be communicated to WorkSafe ACT within 48 hours and must also be reported through RiskMan.

20. ANNEX 1

20.1 Fluid Replacement and Work/Rest Guide

Heat Category	WBGT Index °C	Easy Work		Moderate Work		Heavy Work	
		Work/rest (min)	Water intake (L/hr)	Work/rest (min)	Water intake (L/hr)	Work/rest (min)	Water intake (L/hr)
1	25.5 – 27.7	No Limit	0.5	No Limit	0.75	40/20 min	0.75
2 (Green)	27.8 – 29.4	No Limit	0.5	50/10 min	0.75	30/30 min	1
3 (Yellow)	29.5 – 31.1	No Limit	0.75	40/20 min	0.75	30/30 min	1
4 (Red)	31.2 – 32.2	No Limit	0.75	30/30 min	0.75	20/40 min	1
5 (Black)	> 32.2	50/10 min	1	20/40 min	1	10/50 min	1

Table 1- Fluid Replacement and Work/Rest Guide

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Note:

Work/rest and water consumption table for individuals conducting work in the heat. Applies to average sized, heat-acclimated workers in work wear or equivalent.

Note: add 7 °C to WBGT when wearing Level 2 or above PPE for moderate or hard work and 3 °C for easy work. Water consumption should NOT exceed 1.5 L/hr.

21. ANNEX 2

21.1 HYDRATION

WHY IS HYDRATION IMPORTANT?

21.2 Ensuring that you are properly hydrated will allow you to work more safely in the heat. Proper hydration ensures that you can continue to sweat in order to help dissipate heat when you are working. Being properly hydrated also helps you to work longer due to reduced perception of strain.

HOW CAN I ENSURE THAT I AM HYDRATED PROPERLY?

21.3 proper hydration starts before you come to work. Check your urine colour first thing in the morning. Urine should be of a 'straw' colour (refer urine chart colour chart) (1-3)

21.4 weigh yourself each morning or before and after an exercise/work session. Any changes will likely be due to sweat lost and should be replaced

21.5 drink small amounts of water during the day. Large volumes of water will generally pass through as urine and not be fully absorbed

21.6 you can sweat up to 3 L/hr. Your stomach can only process 1 – 1.5 L/hr. If you start work dehydrated, you cannot catch up.

21.7 DEHYDRATION

WHAT IS DEHYDRATION?

Dehydration leads to a reduction in plasma volume and:

21.8 restricts the body's ability to sweat – thicker blood slows down heat transfer and adds load to the cardiovascular system

21.9 restricts the body's ability to deliver O₂ and fuel to the cells.

WHAT CAN BE DONE TO PREVENT DEHYDRATION?

21.10 ensure appropriate hydration prior to shift/exercise

21.11 urine colour, refer [figure 1] on first void of the day

21.12 drink to thirst during work efforts

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21.13 reduce consumption of hypertonic⁴ drinks during shift

21.14 ensure that you don't over drink to avoid hyponatremia

21.15 monitor weight pre-post exercise and day-to-day.

21.16 URINE COLOUR CHART






Figure 1 - Urine colour chart 1





⁴ Contain a higher concentration of salt and sugar than the human body.

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22. ANNEX 3

22.1 DIFFERENT COOLING METHODS FOR HYPERTHERMIC WORKERS

COOLING METHOD	INSTRUCTION	NOTES
 <p><i>Figure 1 - Whole body immersion</i></p>	<ul style="list-style-type: none"> Remove all clothing /PPE as possible Enter a tub / container, submerging as much of the body as possible, all the way up to the neck Occasionally stir the water to create movement Remain submerged for a minimum of 15 minutes. 	<ul style="list-style-type: none"> Cool water will be more ideal to promote faster cooling, however room-temperature water is still effective/ Don't use water cooler than 10°C.
 <p><i>Figure 2- Ice slushies</i></p>	<ul style="list-style-type: none"> Remove as much clothing / PPE as possible Have pre-made ice slushy drinks ready While in a seated, cool area, consume between 150-200g of the slushy every 10 minutes Continue consuming the ice slushy for at least 15 minutes. 	<ul style="list-style-type: none"> Ice slushies must be maintained in a cool / freezing environment in field conditions Individuals should avoid eating the slushies too fast to avoid stomach pain or 'brain freeze' Avoid high sugar, pre-blended drinks - instead, consider the use of blenders, ice, and powdered sports drink.
 <p><i>Figure 3- Misting fans</i></p>	<ul style="list-style-type: none"> Remove as much clothing / PPE as possible Sit in a cool / shaded area close to a misting fan, ensuring you are contact with the moving air Remain in contact with the moving air for at least 15 minutes. 	<ul style="list-style-type: none"> Misting fans can only be set up where electricity and water supplies are available.

COOLING METHOD	INSTRUCTION	NOTES
 <p data-bbox="229 734 416 763"><i>Figure 4- Ice packs</i></p>	<ul style="list-style-type: none"> • Remove as much clothing / PPE as possible • Prepare several ice packs • Take a seat in a cool / shaded area • Apply ice packs to groin and under arms • Ensure ice packs remain in place for at least 15 minutes or until they are no longer cold. 	<ul style="list-style-type: none"> • Ice packs need to be maintained in a cold / freezing environment until the time when they are used in field environments.
 <p data-bbox="225 1171 475 1200"><i>Figure 5- Air conditioning</i></p>	<ul style="list-style-type: none"> • Remove as much clothing / PPE as possible • Enter a vehicle / room which has air-conditioning • Stay in the vehicle / room for at least 15 minutes. 	<ul style="list-style-type: none"> • If possible, the vehicle / room should be pre-cooled prior to personnel entering • If possible, sit as close to the air-conditioning unit as possible, to get a greater effect from the air movement.
 <p data-bbox="225 1608 432 1637"><i>Figure 6- Wet towels</i></p>	<ul style="list-style-type: none"> • Remove as much clothing / PPE as possible • Wet towels wringed out with water • Apply towels to head, neck, and shoulders • Ensure the towels are in contact with the skin for at least 15 minutes. 	<ul style="list-style-type: none"> • Towels should be re-applied with water periodically to keep them wet • If available, PVA-chamois towels are more effective than regular cotton / cotton-polyester towels.
 <p data-bbox="209 2007 467 2036"><i>Figure 7 - Splashing water</i></p>	<ul style="list-style-type: none"> • Remove as much clothing / PPE as possible to increase air movement • Splash water over the face / neck / other parts of the body for at least 15 minutes. 	<ul style="list-style-type: none"> • Individuals should not stop this procedure when the skin feels cool, since the core temperature may still be elevated.

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22.2 CONSIDERATIONS WHEN CHOOSING SUITABLE COOLING METHODS

(Note. check marks in the 'Pre Cooling' and 'Post-Cooling' column indicate whether the associated cooling method had been scientifically tested under each circumstance. It is recognised that any cooling method could be used before or after bouts of firefighting work.)

Cooling Method	Pre Cooling	Post Cooling	Effectiveness	Practicality	Limitations
Whole Body Immersion	✓	✓	High	Low	Large volumes of water required
Ice Slushies	✓	✓	High	Low	Uncomfortable to ingest
Ice Packs	✓	✓	Moderate	High	Require several ice packs to be effective
Misting Fan		✓	Low	Moderate	Need for power source
Air-conditioning	✓	✓	Low	High	Require vehicle – not accommodating for large groups of people Use of PODS or air-conditioned tents
Wet Towels		✓	Low	High	Requirement to keep towels wet/cool
Splashing Water		✓	Low	High	Requires continued application

23. REVIEW

23.1 This guideline will be reviewed on an ongoing basis, with a formal review to occur at a minimum of every two years. This guideline may also be reviewed in the following circumstances:

- following a serious or notifiable incident involving heat
- following a significant amendment to relevant legislation or
- as otherwise instructed.

24. ENQUIRIES

Enquiries about this Guideline can be directed to:

Director Safety Health and wellbeing Team
People and Workplace Strategy
JACS_OHS@act.gov.au or 02 6207 3985

DETAILS

Document Properties	Approval Details
Policy Name:	Occupational Exposure to Heat and Hot Environments
Policy Number:	0095
Policy Type:	Guideline
Custodian:	Chief Human Resources Officer, People and Workplace Strategy
Policy Advisor:	Director Safety Health and Wellbeing Team
Responsible Branch:	People and Workplace Strategy
Stakeholders:	JACS Work Health and Safety duty holders Workers carrying out work in extreme heat
Document/Legislation References:	American College of Sports Medicine Cold Water Immersion: The Gold Standard for Exertional Heatstroke Treatment ANZCOR Guideline 9.3.4 – Heat Induced Illness (Hyperthermia) AS/NZS ISO 31000:2009 Risk Management- Principles and guidelines

0095 - is the unique identifier of this document. It is the responsibility of the user to verify that this is the current and complete version of the document, available on the Directorate's intranet site.

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Document Properties	Approval Details
	<p><u>Australian Capital Territory; Work Health and Safety Act 2011</u></p> <p><u>Australian Capital Territory; Work Health and Safety Regulation 2011</u></p> <p><u>First Aid in The Workplace Code of Practice August 2020</u></p> <p><u>How to Manage Work Health and Safety Risks Code of Practice September 2020</u></p>

AMENDMENT HISTORY

Version	Issue Date	Amendment Details	Author (Position)
1.0	Mar 2017	Initial draft	T. Geoghegan
2.0	May 2017	Updates following consultation	T. Geoghegan
3.0	February 2021	Updates following consultation	T. Geoghegan