ACT Government

ACT FIRE & RESCUE

COMMUNITY FIRE UNIT HEAT STRESS GUIDELINES

JUSTICE AND COMMUNITY SAFETY DIRECTORATE
ACT EMERGENCY SERVICES AGENCY
ACT FIRE & RESCUE

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Content

1 PURPOSE

1.1 This Guideline is applicable to all personnel from the Community Fire Units (CFU), as defined in the *Emergencies Act 2004,* engaged in firefighting operations and training within the ACT. It provides practical guidance to CFU Team Leaders to manage the risks associated with heat stress to themselves and personnel in their unit. All CFU members must comply with this Guideline at an incident, in training or at a community engagement activity.

1.2 This Guideline should be used in conjunction with the *JACS Occupational Exposure to Heat and Hot Environments Guidelines*.

1.3 This Guideline will be reviewed on an ongoing basis, with a formal review to occur at a minimum of every two years.

2 HEAT STRESS – WHAT IS IT?

2.1 Heat stress is a general term used to describe a range of potentially harmful medical conditions that can occur when the body is unable to cope with working in heat. Heat stress can occur when the body fails to maintain normal healthy body temperatures (36.5 – 37.5°C) due to exercise, work or environmental conditions, including the wearing of PPE/PPC.

2.2 General symptoms include:

- Elevated heart rates.
- Increased sweat rates.
- Reduced strength.
- Decline in cognitive function.
- Heat rash (prickly heat) - an itchy rash of small raised red spots on the face, neck, back, chest and thighs caused by a hot and moist environment.
- Heat cramps - painful cramps in muscles, caused by heavy sweating that uses up the body's supply of salt and water.
- Worsening of pre-existing illnesses and conditions.

2.3 More severe symptoms of heat stress include:

- Heat exhaustion (core temperature 37°C-40°C) - a mild to moderate heat illness characterised by an inability to maintain cardiac output. Signs and symptoms include: heavy sweating, pupils dilated, rapid heart rate, weakness, fatigue, dizziness, visual disturbance, feeling of intense thirst and heat, nausea, vomiting, palpitations, hyperventilation, tingling of fingers or toes after exposure to a hot environment.
- Heat injury (core temperature <40°) - An intermediate condition between heat exhaustion and heat stroke. Symptoms include mild confusion and disorientation (more sustained than for heat exhaustion).
- Heat stroke (core temperature >40°) - a severe illness with profound central nervous system injury. Signs and symptoms include: dry/hot skin, rapid shallow breathing, dilated pupils, vertigo, confusion, delirium, headache, thirst, nausea or vomiting, muscle cramps, coma, seizure.

2.4 Heat stress can get worse when combined with:

- Physical exertion.
- Loss of fluids.
- Limited air movement.
- Direct sun exposure.
- High temperatures and humidity.
- Inadequate acclimatisation.
- Pregnancy.
- Physical condition and health status.
- Fatigue.
- A pre-existing medical condition.
- Wearing Personal Protective Clothing (PPC) or respiratory equipment.

3 HOW DO YOU MANAGE

Heat stress?

3.1 There are a number of measures you can put in place to manage heat stress. These include:

- Appropriate planning – ensuring you are well prepared with training and adequate resources for your activities.
- Hydration – ensuring you are adequately hydrated (before, during and after an activity) means you can continue to sweat to help dissipate heat when you are working.
- Appropriate PPC – wearing appropriate PPC for the type of activity, and removing PPC when appropriate.
- Proper work/rest protocols to avoid over exposure and maximise recovery.
- Access to other cooling techniques – wet towels, misting fans.
- Setting up rehabilitation and rest zones.

3.2 It is 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 action is needed.

3.3 Additionally, 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 is important to have appropriate actions in place to monitor workers who are expected to work in a hot environment for prolonged periods of time.

Heat Exhaustion?

3.4 You should

- Get the person to a cool area and lay them down.
- Remove outer clothing.
- Wet skin with cool water or wet cloths.
- Increase fluid intake (rehydration) if they are fully conscious.

- Seek medical advice.

Heat Stroke?

3.4 You should

- Call 000 for an ambulance.
- Basic life support.
- Remove all equipment and excess clothing.
- Place the person in a cool environment.
- Moisten the skin with a moist cloth or atomizer spray.
- Apply wrapped ice packs to neck, groin, and armpits.
- Maximise air movement, e.g. with fans if available.
- Immerse worker in cold water if available, including PPE or clothing.

4 FLUID REPLACEMENT AND WORK/REST GUIDE

4.1 The following table provides a guideline for average-sized, heat-acclimatised workers in 'work wear' (e.g., non-PPE/PPC}. When wearing firefighting PPC add 7°C to the Wet Bulb Global Temperature (WBGT) for moderate or hard work, and 3°C for easy work.

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

5 RESPONSIBILITIES OF CFU MEMBERS TO MANAGE HEAT

5.1 CFU Team leaders must:

- Include consideration of heat stress as part of the risk assessment for an operation or training session and plan supplies and rosters to mitigate the likely impacts of heat stress > see the planning table of general considerations on the following page.
- Ensure ongoing management and assessment of risks throughout operations or training sessions.
- Report any heat stress concerns for themselves or for personnel in their crew.

5.2 All CFU members must:

- Take personal responsibility to manage the impact of heat to themselves during an operation or training session > see the planning table of general considerations on the following page.
- Report any heat stress concerns - for themselves or for colleagues - to their Team Leader.

6 PLANNING AND RISK ASSESSMENT

Considerations for managing and mitigating the risk of heat stress

Before undertaking work or training activities in the heat, the CFU Team Leader should carry out a risk assessment to mitigate the likely impacts of elevated body temperatures of themselves and CFU team members. This assessment and planning should consider the issues outlined in the table below. CFU team members should also consider this table in managing their own heat stress.

Environmental conditions	• What temperatures and humidity levels are you likely to encounter? • Are these likely to change over the duration of an operation or event? • Have you made team members aware of the environmental conditions?
Personal Protective Clothing (PPC)	• The level of PPC worn must match the risk presented at each incident or training activity and also taking into account conflicting risks. • Removing PPC as soon as practical must occur during hot weather to allow for natural cooling to occur.
Hydration	• Do you have access to water? • Do you have access to electrolytes? Pre-hydration through maintaining fluid intake before and during a shift are important strategies for reducing the risk of heat stress. Electrolyte supplementation should be considered for extended duration operations.

Work rates	• Have you considered a work/rest protocol? • Are all non-essential training activities being risk-assessed, and/or postponed? Where possible, teams should ensure that a rest/work protocol is followed to maximise recovery from heat exposure.
Task rotation	• Are you rotating team members between tasks? Where possible, team members should be rotated between tasks to avoid heat exposure.
Resources	• Do you have adequate resources to manage heat stress? Eg: water, electrolytes, fans, shade.
Cooling	• Have you considered cooling personnel both before and after a work shift? Both passive and active cooling techniques may be necessary. Passive cooling techniques allow the body to self-regulate. These techniques include: • selection of clothing under PPC to allow evaporation of sweat from the body. • removing PPC when it is safe to do so. • accessing air-conditioning (vehicles) and shade. • access to cold water and electrolyte supplements. Active cooling techniques that can be applied in the field include:

	• misting fans. • icepacks applied to armpits and groin. • air conditioning. • wet towels. Access to these techniques may be limited by the circumstances of the operation.
Rehabilitation areas	Do you have a rest area where members can safely remove their PPC to maximise body cooling after working in a hot environment? The rehabilitation area should: • be set up in a safe place. • be upwind of smoke and other airborne hazards. • be large enough for all resting personnel. • provide shade, seating and other items to assist in reducing body temperatures and enhance comfort. • provide access to cool drinks and food. • be conveniently located for access. • allow room for personnel to remove non-essential PPC.
Ongoing Monitoring and Reporting	• Are all crews being monitored for signs of heat illness? All personnel should monitor themselves for any symptoms of heat-related illness and report any issues to crew leaders.

Related legislation and documents
Emergencies Act 2004 (ACT)
JACS Occupational Exposure to Heat and Hot Environments Guidelines.

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