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*The Gliding Federation of  
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*Trading as Gliding Australia*



## Safety Management System

# Safety Bulletin

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## Safety, Heat Stress, Heat Exhaustion & Dehydration

This bulletin addresses hazards associated with heat stress, heat exhaustion, dehydration, associated fatigue and ill effects that may affect summer flying, camps and competitions.

### HAZARDOUS SCENARIOS

Consider the following scenarios and your potential exposure to similar circumstances:

**Cumulative heat stress** – You rig your glider on a hot day in full sunlight and blustery winds. Work in the trailer, lifting heavy wings, rigging and connecting controls, then preparing the glider saps your energy. You rest in the clubhouse to cool off. Your preparations are interrupted. On resuming, you accidentally short circuit your battery connector. The fuse blows and must be replaced. You fail to notice burned wiring; after launch you smell burning insulation, abort the flight, then execute a poor landing.

**Heat exhaustion** – A training flight is planned, a long briefing is conducted in full sun at the glider with a student wearing inadequate protection, with insufficient hydration. The student's in-flight performance is degraded; later they suffer headache and severe fatigue. The student's father is concerned about duty of care.

**Dehydration and heat stress** – You set out on what is intended to be a short duration cross country flight. You carry two small bottles of water. You consume one in-flight, then outland safely. You push the glider 300m unassisted to a boundary gate in hot conditions over soft ground, to reduce fire risk. The crew arrives two hours later, when you are parched and overheated, with a severe headache and onset of disorientation.

**In-flight incapacitation** – After a long difficult cross-country flight in hot weather, with degrading soaring conditions, you work very hard to remain aloft in heat and turbulence. You are sweating profusely, under heat and stress. Eventually you commit to an outlanding; that's the last thing you remember before waking up in an ambulance. The farmer's wife found the pilot unconscious and injured, soaked in sweat, in the wreckage.

These scenarios are based upon actual events. Every glider pilot has experiences of being too hot and fatigued, thinks they can manage themselves and others' heat exposure, yet occasionally gets into hazardous circumstances.

### SYMPTOMS, MEDICAL ISSUES AND ADVICE

The NSW Health website has excellent advice on heat stress symptoms and prevention, at their Beat The Heat page <https://bit.ly/31wsZVU> and below.

## Heat-related illness

During extremely hot weather, it is easy to become dehydrated or for your body to overheat. This can lead to life-threatening heat-related illness such as heat stroke and heat exhaustion. Heat can also make existing illnesses worse (for example may trigger a heart attack in someone with a heart condition), cause serious permanent injuries (such as damage to the brain or other vital organs), and in extreme cases result in death.

## Extreme heat and your body

If the body temperature rises above 37.8 degrees Celsius a person may develop a heat-related illness. In very hot weather, the body must work hard and produce a lot of sweat to keep itself cool.

Sometimes sweating isn't enough and a person's body temperature rises rapidly. This is more likely to happen when it is humid, or when a person is dehydrated and cannot produce enough sweat.

Some people are at higher risk of heat-related illness. For example, elderly people and people taking certain medications have difficulty producing sweat. [Young children](#) are also at risk as they produce more body heat, sweat less and have more rapid rises in body temperature.

## Heat-related illnesses

Heat-related illness includes:

- [dehydration](#)
- [heat cramps](#)
- [heat exhaustion](#)
- [heat stroke](#)
- worsening of existing medical conditions

## Dehydration

Mild to moderate dehydration makes the heart work faster and leads to reduced fluid available for sweating.

## Symptoms of dehydration

- dizziness
- tiredness
- irritability
- thirst
- [bright or dark yellow urine](#)
- loss of appetite
- fainting

## First aid for dehydration

- drink plenty of water or oral rehydration drink
- move somewhere cool
- seek medical advice if you start to feel unwell

## Heat cramps

Heat cramps may also be a symptom of heat exhaustion. Symptoms of heat cramps include muscle pains and spasms.

## First aid for heat cramps

- stop all activity
- rest somewhere cool.
- drink water or oral rehydration solution.
- seek medical advice if there is no improvement.

## Heat exhaustion

Heat exhaustion is the body's response to an excessive loss of water and salt contained in sweat.

Those most at risk of developing heat exhaustion are elderly people, people with chronic diseases, and people working or exercising in a hot environment. **If heat exhaustion is not treated, it can turn into heat stroke.**

### Symptoms of heat exhaustion

- heavy sweating (cool and moist skin)
- pale skin
- fast and weak pulse rate
- breathing fast and shallow
- muscle weakness or cramps
- tiredness
- dizziness
- headache
- nausea or vomiting
- fainting

### First aid for heat exhaustion

- rest in a cool place
- cool yourself down by removing excess clothing, having a cool bath or shower, and placing cool packs under the armpits, groin or neck
- rehydrate by drinking cool water or oral rehydration drink

Seek urgent medical attention or call an ambulance if necessary if symptoms worsen or if there is no improvement.

## Heat stroke

Heat stroke occurs when the body temperature rises above 40.5 degrees Celsius. **Heat stroke is a life-threatening emergency.** Immediate first aid is very important to lower body temperature as quickly as possible.

### Symptoms of heat stroke

- a sudden rise in body temperature
- red, hot and dry skin (sweating has stopped)
- dry swollen tongue
- rapid pulse
- rapid shallow breathing
- intense thirst
- headache
- nausea or vomiting
- dizziness
- confusion, poor coordination or slurred speech
- aggressive or bizarre behaviour
- loss of consciousness
- seizures or coma

### First aid for heat stroke

- call Triple Zero 000 and ask for an ambulance
- if they are unconscious:
  - lay them on their side (recovery position) and check they can breathe properly
  - perform CPR if needed
- if they are conscious:
  - move them to a cool area and keep them still
  - give them small sips of fluid
  - bring their temperature down using any method available (sponge with cool water, put them in a cool shower, spray with cool water from a garden hose, soak clothes with cool water, place cool packs)

Do not give a person with heat stroke aspirin or paracetamol as they do not help and may be harmful.

## MITIGATING THE HAZARDS

Every glider pilot knows and applies three basic hazard mitigations:

- Stay cool
  - Use available shade
  - Use available cooling airflow
  - Wear hats, sun scarfs
  - Wear loose cool clothing
  - Use cool wet scarfs, towels
- Ensure good hydration
  - Hydrate well before hot work
  - Carry plenty of accessible water
  - Carry reserve water
  - Keep mouth moist, eg mints
- Sustain energy levels
  - Ensure nutrition before hot work
  - Carry accessible nourishment
  - Manage work pace and rest cycle
  - Keep calm, manage stress levels

Sometimes this requires a little lateral thinking and opportunism; rigging in a hangar or in shade, rather than beside a taxiway; doing most of a pre-flight briefing under shade before approaching the glider; or if possible outlanding at an aerodrome, or closer to civilisation and ground support. The last example illustrates the importance of situational awareness and decision-making, seeking out better options when things do not go to plan.

The IMSAFE Checklist is a useful tool. It is not a good idea to fly when over-tired, or dehydrated after evening alcohol consumption, or stressed, or feeling ill. Take a rest day or a late afternoon fun flight instead.

Threat and Error Management (TEM) is useful in considering the likelihood of threats coming at you, or errors coming from you, leading to undesired outcomes. For example, this includes anticipation of difficult conditions, high flight workloads, planning for longer flight durations or possible outlanding. Low hydration and overheating drives fatigue and decision errors.

If flying in a Designated Remote Area, survival equipment and supplies must be carried. Chapter 7 of the VFR Guide "*Dealing with Emergency Situations*" provides excellent safety advice. <https://bit.ly/34iDyNk> refers. Adequate hydration is essential to your survival.

Optimism bias is an issue. We are all prone to over-estimating our stamina and heat tolerance, our ability to deal with stressful situations. When working or flying with others, we can't assume our colleagues have the same fitness, hydration level, heat tolerance and stamina as ourselves.

Trainers must be attuned to any symptoms of heat distress in their colleagues, take opportunities to limit their hazardous exposure. We must guard against false bravado.

Optimism bias also extends to the under-estimation of cumulative effects of other life-stressors on our performance. For example, worry may drive reduced sleep, driving greater fatigue, less stamina and ability to handle heat and higher workloads. What you want to do, may be less than what you are capable of safely doing on a given day. You might think about this...



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