

ANNEX V - GUIDELINES OF MEASURES TO BE TAKEN IN ADVERSE CLIMATIC CONDITIONS OF HEAT AND HUMIDITY

I. GUIDELINES FOR RIDERS

The following recommendations are made as a result of the research and experience in the period up to and including the Atlanta Olympic Games 1996.

BEFORE COMPETITION

1. A period not less than seven days should be allowed for acclimatisation.
2. Personal fitness improves the ability to acclimatise.
3. A medical examination should be undertaken to identify the presence or likelihood of any health problem well ahead of the departure date.
4. It is known that dehydration will impair performance and may prove dangerous. Consequently, riders in consultation with their team doctor and Chef d'Equipe, are advised to establish their anticipated individual fluid requirements, both in and out of competition. Such fluids must be readily available, appropriate and enjoyable.
5. It should be noted that thirst is not a good indicator of hydration status and that it is best monitored by accurate weighing before and after exercise. The carrying of personal water bottles is recommended as is developing the ability to drink both before and during exercise whenever possible.
6. It is cautioned that participation whilst suffering from an illness, particularly causing a fever or dehydration, may be very dangerous and should not be attempted.
7. The suitability of allowable medications for treatment should be ascertained as some drugs may adversely affect heat regulation.
8. Dehydration may be caused by alcohol and caffeine drinks, such as coffee and cola, and their use should be a matter of discretion.
9. Direct exposure to the sun should be limited and use made of shade, broad-brimmed hats, sun glasses and sunscreen skin preparations. Clothing should be light-coloured, loose-fitting, lightweight and of a material capable of absorbing moisture.
10. The early symptoms of heat-related illness can include cramps, fatigue, weakness, headache and nausea. Concentration and judgement become impaired.

IN COMPETITION:

1. Protective Head-gear: The most effective currently available protective head-gear, offering ventilation and moisture absorption, should be worn. In order to reduce the absorption of heat, the shell of the helmet should be of white or light colour, and silks, if worn, should also be of a light colour and not impede ventilation. When it is considered safe to do so it is considered appropriate for helmets to be removed after the rider has dismounted.

2. **Body Protectors:** Body protectors, if worn, should not impede movement and be of such a design as to reduce the retention of body heat to a minimum.
3. **Mistakes and falls occur because of hot, tired horses – but the same applies to the rider.** To cool the rider, remove his hat, sit him in the shade, wash his face with cold water (which makes you feel better, but is not very effective at reducing body temperature) and encourage him to drink an isotonic drink (isotonic = same concentration as body fluids). The rider should also wear light coloured, loose fitting, cotton clothing. In addition, the hat should be lightweight and comfortable fit.

II. GUIDELINES FOR HORSES

1. **Flight or Transport recovery:** Transport of horses to events (by road or by air) can result in significant fatigue and dehydration, Especially after long-haul flights (weight loss sometimes ≥ 20 kg) it has been shown that horses may require one week to fully recover from flight-dehydration and return to their pre-transport bodyweight. Daily monitoring of the horse's weight is the best method to check the recovery period; knowledge of the pre-transport bodyweight is very helpful. Potential transport related diseases, such as colic or shipping fever are not addressed in this memorandum; however, it is essential to closely monitor the physical condition of the horse during the days following arrival for any signs of disease.
2. **Acclimatisation:** When the event location entails that the horse is transported from a moderate climate to hot and humid conditions, the horse will inevitably need to go through a period of acclimatisation to the new climatic conditions. This does not mean that the horse cannot be trained soon after arrival; however, it indicates that the training programme must be tailored to that situation whilst taking the horse's physical state into consideration.
3. **Continued Training:** Especially after long-haul transport to event locations in hot and/or humid conditions, the combined adverse effects of transport plus acclimatisation may well take the horse two weeks to return to competition fitness. It is therefore strongly recommended to plan for an arrival at the venue 7-14 days prior to the event. If the horse's normal weight is known (and this can easily be registered at home), it is very practical to monitor weight loss due to dehydration and verify the horse's return to normal levels. A loss of 5% or more bodyweight could compromise the performance level of the horse and affect the thermoregulatory response to exercise in hot weather.
4. **Monitoring the Climatic Conditions – WBGT Index:** In order to monitor the environmental conditions during the preparations for endurance phases in Eventing, Driving and Endurance competitions, the FEI recommends the use of the Wet Bulb Globe Temperature (WBGT) index. The WBGT index was introduced prior to the Atlanta Olympic Games and has the advantage that it combines the effects of air temperature, humidity, wind and sun radiation. into one number. The WBGT Index is calculated by measuring the Wet Bulb temperature in the shade, usually inside a white, ventilated wooden screen at a height of 1.5 metres from the ground. The Globe temperature is measured as the temperature inside a 15 cm matt black copper globe. The Globe is heated by the sun or radiation from the ground and cooled by the wind. Therefore the Globe temperature gives a balance between solar radiation and wind. The WBGT Index is calculated as follows:

WBGT Index = 0.7 x Wet Bulb Temperature (°C, shade) ÷ 0.3 x Black Globe temperature (°C, unshaded).

Although the units for the temperature are both in degrees centigrade (°C), the WBGT Index does not have units, (i.e. it is just a number and not a temperature).

Some recommendations for the use of the WBGT Index during the Cross Country day of an Eventing competition are shown in Table 1. These recommendations may need to be modified for different levels of competition and also for different disciplines (i.e. Marathon in Driving, Endurance rides).

For further information concerning technical aspects relating to the effect of the climatic conditions on horse welfare and the WBGT Index please contact the FEI.

Table 1 Recommendations for different levels of the WBGT Index for the Cross-Country day of a Three Day Event

WBGT Reading	Recommendations
Less than 28	<i>No changes to the FEI recommended format for the Three Day Event competitions should be necessary.</i>
28-30	<i>Some precautions to reduce heat load on horses will be necessary.</i>
30-32	<i>Additional precautions to those above to limit overheating of horses will be necessary.</i>
32-33	<i>These are hazardous climatic conditions for horses to compete in and will require further modifications to the competition.</i>
Above 33	<p><i>These environmental conditions are probably <u>not</u> compatible with safe competition.</i></p> <ul style="list-style-type: none"> • Further veterinary advice will be required before continuing.

5. Monitoring the Climatic Conditions

When the equipment to calculate the WBGT index is not available, it is possible to use the less precise “comfort index”. The comfort index is calculated by adding the shade temperature in degrees Fahrenheit to the percent relative humidity (also measured in the shade). This index has worked reasonably well, but can possibly lead to an underestimation of the severity of conditions, as it does not take into account the cooling effect of wind or the heating effect of the sun (or radiation reflected from the ground which will depend on the surface; grass will essentially feel cooler than dirt).

III THERMOMETER SCALE OF DEGREES FAHRENHEIT/CENTIGRADE:

CENTIGRADE

-20	-15	-10	-5	0	5	10	15	20	25	30	35	40	45	50
-4	5	14	23	32	41	50	59	68	77	86	95	104	113	122

FAHRENHEIT

IV GUIDELINES FOR COLD-WATER COOLING FOR HOT HORSES

1. **Why does a horse get hot:** The horse's normal rectal temperature at rest is around 37-38°C (98.6-100.4 °F). When muscles work, they produce heat. For every unit of energy used to make the muscles contract, around four times as much energy is lost as heat because the process of conversion of energy to movement is not very efficient.
2. **What happens when a horse overheats:** Very high temperatures (above 41 °C) result in high sweat rates, large sweat losses (water and electrolytes), dehydration and consequently a reduction in performance, or more serious consequences such as heat exhaustion and event death.
3. **How does a horse lose heat:**
 - 3.1 **Convection:** The heat is produced in the muscles and then carried to the surface of the horse's skin by the blood. If the surrounding air is cooler than the horse, as the horse moves through the air or as air passes over the horse, then heat will be lost by the process of convection. The greater the difference between the horse's skin temperature and the surrounding air, or the stronger the air movement (natural breeze or fans) the greater the rate at which the heat will be lost.
 - 3.2 **Evaporation:** Heat is lost when sweat evaporates from the horse. Sweat that drips from the body however, does little to keep the horse cool and is essentially wasted fluid loss. Sweating is highly effective when the horse is in a hot and dry environment, yet in a hot and humid environment the rate of evaporation from the skin is much lower. This is because the rate of evaporation depends mainly on the difference between the moisture level of the skin and that of the environment.
 - 3.3 **Respiration:** In the horse, around 15% of heat loss can occur through breathing. This is part of the reason why horses may have high respiratory rates during and after exercise in hot or hot and humid conditions.
4. **Warming-up or over-heating:** A moderate increase in body temperature is not a disadvantage. Horses should be warmed up prior to exercise. Muscles work more efficiently when they are warm. When it is hot the horse will warm up faster.
5. **Why should horses be cooled with cold water:** The horse's willingness to exercise hard and our previous lack of a precise understanding of how different environmental conditions affect the horse, have led to a number of competitions where horses have suffered heat stress, including at the 1992 Olympic Games and the 1994 World Equestrian Games. In the past, regimes for cooling horses with ice-cold water at competitions in hot climates have been criticised even though the cooling is beneficial and some people have suggested this type of cooling may cause other problems such as "tying-up".

6. Which horses will benefit from cold-water cooling: Any horse at any competition or show at any level including: event horses, dressage horses, show-jumpers, racehorses, polo ponies, endurance horses, driving horses and horses or ponies in gymkhanas.

Fact: Horses that are hot (above 40°C / 104 °F) and competing in hot environments (above 26.5°C / 80 °F) and are cooled quickly during or after competition are less likely to suffer heat stress, will recover more quickly, will not become as dehydrated and are almost certain to perform better.

7. Cold Water technique: All that is needed are some large buckets to hold 40-50 litres of water and ice, smaller buckets, giant sponges and three assistants – one to hold the horse and one person to cool each side. It is not necessary to remove the tack. Start to cool the horse whilst taking the horse's rectal temperature. Liberally apply cold water to all parts of the body including the quarters, as this is where most of the large muscles used for movement are located and so is an area that gets particularly hot. It is not necessary to scrape off excess water after each application, it is more important to continue to apply cold water. If you wish to scrape off excess water, do so quickly at the end of each 30 second cooling period and while the horse is being walked between cooling periods. Carry on cooling the horse for 20-30 seconds, walk the horse for 20-30 seconds and cool again. The walking and cooling sequence is **IMPORTANT**. The walking promotes skin flow and the movement of air aids evaporation. If possible, carry out the cooling and walking in the shade. Check the horse's rectal temperature at intervals. It should be possible to reduce rectal temperature by around 1°C in 10 minutes. There is no evidence to suggest that there is any harm in letting your horse drink small amounts of water (half a bucket) during competition (e.g.: during the 10 minute box in Three Day Eventing) between rounds (Show-Jumping) or during long warm-up periods (e.g.: Dressage), which will also help to cool the horse down and reduce the effects of dehydration.

8. When should cooling be stopped: When the horse's rectal temperature is less than 38°C-39°C, when the horse's skin feels cool to touch (over the quarters) after a walking period, if the respiratory rate is less than 30 breaths per minute and if the horse begins to shiver.

9. Misting Fans. In hot and humid conditions, the use of misting fans is an effective cooling procedure, and is strongly recommended.

10. Things *not* to do:

10.1 Ice in the rectum does very little to lower body temperature. It makes it hard to assess body temperature and can *hide* a high temperature. Masking a high temperature from vets at events is unwise as it will prevent a horse receiving appropriate cooling and other necessary treatments, which may result in the development of heat exhaustion and death. The chances of injury will also increase if the horse is allowed to continue when overheated and dehydrated.

10.2 Don't hold small bags of ice over the head, neck, under the tail, on the quarters, etc. Instead, concentrate on cooling as much of the body surface as possible. Holding bags of ice is likely to reduce cooling by stopping skin blood flow to the area under the pack.

10.3 Do not place wet towels on the neck or quarters. Although at first the towel may be wet and cold, it soon warms, and hinders the loss of heat, acting as insulator.

10.4 Excessive application of grease prior to cross-country limits sweating. The grease acts as an insulator, prevents sweating and limits sweat evaporation.

10.5 Do not let horses stand still for prolonged periods. If cold-water cooling is adopted, do so completely and not tentatively. The cold water on the skin will reduce the horse's sweating rate. This has the advantage that because as the horse sweats less, it becomes dehydrated less quickly.

10.6 There is no harm in allowing horses to drink small amounts (half a bucket) during competition. Water should also be left in the stable until 15-30 minutes before exercise. Water is emptied very rapidly from the stomach. **DO NOT** give the horse ice cold water to drink. Recent research has also shown that it is important to feed hard feed and some hay together, at least 4 hours prior to exercise.

10.7 There is no evidence to suggest that cold water cooling causes other problems such as "tying-up".