INTERNATIONAL ORIENTEERING FEDERATION

IOF Interim Guidelines on Extreme Heat

SEPTEMBER 2025

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The IOF Competition Rules state (rule 26.12) that:

"The organiser must stop, and postpone or cancel a race if at any point it becomes clear that circumstances have arisen which make the race dangerous for the competitor, officials or spectators."

The purpose of these guidelines is to provide guidance for organisers in determining what constitutes dangerous conditions in the context of extreme heat.

Scope

These guidelines apply to all IOF events covered by IOF Competition Rules with expected winning times of 20 minutes or greater.

These guidelines are interim guidelines. More detailed guidance is expected to be finalised prior to the 2026 northern hemisphere summer.

Factors influencing heat stress on athletes

Heat stress on athletes is influenced by a number of factors. High temperatures are clearly significant, but humidity is also very important, as high humidity limits the body's ability to cool itself through the evaporation of sweat. Heat stress will also be higher in direct sunlight than it will be in shaded areas or in cloudy conditions. The impact of heat stress also increases with increasing duration of the event.

Critical thresholds for heat stress

In these interim guidelines, IOF has adopted the Wet Bulb Globe Temperature (WBGT) as an indicator of heat stress. The WBGT is an index which combines temperature, humidity, solar exposure and wind and is used by a number of international sporting federations and in the heat health community more broadly.

IOF recommends that organisers consider cancellation or postponement of events when the WGBT exceeds 30 °C to 32 °C.

At this point IOF does not give specific guidance for particular groups (e.g. older masters) or on the potential role of acclimatisation. These are expected to be part of the forthcoming final guidance.

Calculating the WBGT

There are two options for calculating the WBGT:

Direct measurement

There are instruments which allow the WBGT to be measured directly.

If WBGT is measured directly, it is important that the instruments are used correctly in accordance with the manufacturer's instructions, as otherwise it is easy to over-expose the instruments and obtain misleading readings. The measurements should also be made in an environment representative of the competition terrain (e.g. if the course is predominantly in forest, the measurements should also be made within the forest).

In some countries, WBGT may also be reported by the local meteorological service or other agency; if so, these observations may be used.

Calculating the WBGT from temperature and humidity observations

For most organisers it will not be practical to obtain instruments to measure WBGT directly. An approximation exists which uses temperature and relative humidity only. This approximation assumes sunny midday conditions and light winds, and will therefore tend to overstate WBGT on cloudy days or in shaded environments, or early or late in the day.

The table below shows estimated WBGT for a given temperature and humidity. For example, if the temperature is 34 °C and the relative humidity is 30% (conditions typical of the hotter parts of WMOC 2025), the clear-sky WBGT will be 29 °C. As an approximate rule of thumb, the shade WGBT (applicable where there is full cloud coverage or shade) is typically 4-5 °C cooler than the clear-sky WGBT.

Wet Bulb Globe Temperature (WBGT) from Temperature and Relative Humidity

Relative Humidity (%) \ Temperature (°C)	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
0	15	16	16	17	18	18	19	19	20	20	21	22	22	23	23	24	24	25	25	26	27	27	28	28	29	29	30	31	31	32	32
5	16	16	17	18	18	19	19	20	21	21	22	22	23	24	24	25	26	26	27	27	28	29	29	30	31	31	32	33	33	34	35
10	16	17	17	18	19	19	20	21	21	22	23	23	24	25	25	26	27	27	28	29	30	30	31	32	32	33	34	35	36	36	37
15	17	17	18	19	19	20	21	21	22	23	23	24	25	26	26	27	28	29	29	30	31	32	33	33	34	35	36	37	38	39	
20	17	18	18	19	20	21	21	22	23	24	24	25	26	27	27	28	29	30	31	32	32	33	34	35	36	37	38	39			
25	18	18	19	20	20	21	22	23	24	24	25	26	27	28	28	29	30	31	32	33	34	35	36	37	38	39					
30	18	19	20	20	21	22	23	23	24	25	26	27	28	29	29	30	31	32	33	34	35	36	37	39							
35	18	19	20	21	22	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39								
40	19	20	21	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39									
45	19	20	21	22	23	24	25	26	27	27	28	29	30	32	33	34	35	36	37	38											
50	20	21	22	23	23	24	25	26	27	28	29	30	31	33	34	35	36	37	39												
55	20	21	22	23	24	25	26	27	28	29	30	31	32	34	35	36	37	38													
60	21	22	23	24	25	26	27	28	29	30	31	32	33	35	36	37	38														
65	21	22	23	24	25	26	27	28	29	31	32	33	34	36	37	38															
70	22	23	24	25	26	27	28	29	30	31	33	34	35	36	38	39															
75	22	23	24	25	26	27	29	30	31	32	33	35	36	37	39																
80	23	24	25	26	27	28	29	30	32	33	34	36	37	38																	
85	23	24	25	26	28	29	30	31	32	34	35	37	38	39																	
90	24	25	26	27	28	29	31	32	33	35	36	37	39																		
95	24	25	26	27	29	30	31	33	34	35	37	38																			
100	24	26	27	28	29	31	32	33	35	36	38	39																			

WBGT > 40

Note: This table is compiled from an approximate formula which only depends on temperature and humidity. The formula is valid for full sunshine and a light wind

Lookup table for approximate WBGT, using temperature and humidity (source: Australian Bureau of Meteorology). More detailed formulae underlying this table are available at https://www.bom.gov.au/info/thermal_stress/.)

In assessing WBGT, it is important to calculate it using temperature and humidity measured at the same time. Since relative humidity will tend to decrease with increasing temperature, it is not appropriate to combine a forecast maximum temperature with relative humidity at a fixed time (such as 9am).

In most countries, current temperature and humidity observations are available through local meteorological websites and/or apps. If these are used it should be checked which location these observations are being made at, especially for events in mountainous areas or near coasts. In hot, dry conditions, temperature will normally decrease with elevation at a rate of approximately 1 °C per 100m elevation, although this may be offset to some extent by increases in relative humidity. In hot conditions coastal areas will normally be cooler but more humid than inland areas.

If organisers measure temperature and humidity directly, care should be taken to ensure the instruments are used appropriately. Temperature must be measured using instruments in an appropriate screen or shelter to avoid over-exposure to solar radiation.

Planning to limit the impacts of extreme heat

In addition to time of year planning for events, organisers can take measures to limit the impacts of hot conditions at events where there is a significant risk of extreme heat. These include:

- Schedule events as early in the day as possible.
- Ensure sufficient shade is available (through the use of shade structures if needed) in arenas, pre-start areas and (if used) quarantine areas.
- Provide additional refreshment points above the minimum specified in the Competition Rules.
- Consider a cooler remote quarantine (if used) in a more distant place to shorten time in heat.
- Consider to shorten quarantine times and delay opening of GPS tracking etc.
- Provide cooling aids, i.e. ice water sponges, cold water-cooling fans etc.
- Course design considerations including the use of loops, arena spectator controls/run-throughs in which athletes can be better monitored, and additional aids (water/ice) offered
- Options to shorten courses
- Closer monitoring of GPS tracking (where possible) with health checks considered based on GPS movements
- Medical support provided (including availability of baths, ice baths etc)


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