



Extreme Weather Guidelines

Overview:

These guidelines have been developed by Athletics Canada to provide Competition Organizers and Technical Officials a set of strategies to provide a safe environment in regards to extreme weather events such as poor air quality, extreme cold/heat, or thunder and lightning, and to reduce the likelihood of illness or injuries occurring as a result from inclement weather.

Purpose:

Athletics Canada recognizes the dangers of extreme weather and the need to ensure that there are appropriate guidelines and procedures in place to mitigate risks to all participants in any sanctioned activity should an extreme weather event occur.

The objectives of these Extreme Weather Guidelines are to:

- Protect the health, safety, and wellbeing of all who participate in the activities and events Sanctioned by Athletics Canada and/or its Member Branches
- Ensure that the venues used by in the activities and events Sanctioned by Athletics Canada and its Member Branches are safe places to compete, spectate, and officiate as far as is reasonably practicable; and
- Provide guidance to Event and Competition organisers regarding the effective management of extreme weather conditions.

Scope:

These guidelines apply to all activities and events sanctioned by Athletics Canada and/or its Member Branches. Certain venues may have additional requirements however sanctioned activities shall not occur at a lesser standard than set out in these guidelines.

SECTION 1: AIR QUALITY

1. Low Visibility

- 1.1. Low visibility is generally caused by fog/mist, smoke, or darkness. If there is anticipated poor visibility because of inclement weather which could impact the safety of participants a decision will need to be made by the event organizer. Before a suitable decision can be achieved a range of measures need to be considered i.e. (not limited to) location, exposure time, and visibility distance. Based on the outcome from the range of measures a variety of actions can be determined i.e., modification of start / finish location, use of alternative course, or if required cancelation. A final decision is guided by the concern to ensure the safety of all participants.
- 1.2. Track & field, running and throwing events, should not start until the entire field of play and the track is visible.
- 1.3. Road running, cross country running, Mountain, Ultra, and Trail running events should not be started until visibility is more than 100m.

2. Air Quality Health Index

- 2.1. The Air Quality Health Index (AQHI) is normalized across Canada and gives a number from 1 to 10+ to demonstrate the degree of wellbeing hazard related with nearby air quality. Infrequently, when the measure of air contamination is unusually high, the number may surpass 10. The AQHI provides a local air quality current value as well as a local air quality maximum forecast for today, tonight and tomorrow and provides associated health advice.



Low degrees of air contamination can trigger inconvenience for some people, the index has been created as a continuum: The higher the number, the more prominent the wellbeing danger and need to take safeguards. The index depicts the degree of wellbeing hazard related with this number as 'low', 'moderate', 'high' or 'very high', and proposes steps that can be undertaken to decrease exposure.

2.2. Air Quality Health Index (AQHI) Chart

Health Risk	Air Quality Health Index	Health Messages for At-Risk Population	Health messages for General Population
Low	1-3	Enjoy your usual outdoor activities.	Ideal air quality for outdoor activities
Moderate	4-6	Consider reducing or rescheduling hard activities outdoors if you are experiencing symptoms.	No need to change usual outdoor activities unless you experience symptoms such as coughing and throat irritation.
High	7-10	Reduce or reschedule hard activities outdoors. Children and the elderly should also take it easy.	Consider reducing or rescheduling hard activities outdoors if you experience symptoms such as coughing and throat irritation.
Very high	Above 10	Avoid hard activities outdoors. Children and the elderly should also avoid outdoor physical exertion.	Reduce or reschedule hard activities outdoors, especially if you experience symptoms such as coughing and throat irritation.

3. Forest Fire Smoke Overview

Particulates are the primary concern in forest fire smoke. The size of the particles we inhale influences their capability to affect our wellbeing.

Particle contamination may contain substances like carbon, sulfur and nitrogen compounds, metals, and organic chemicals. The AQHI computation utilizes coarse particles in the scope of 2.5-10 microns in diameter. Fine particles, with measurements under 2.5 microns are regularly connected to wellbeing effects. Particles in this size range are delayed clearing from lungs when they are inhaled.

Particles from smoke in general are minuscule, with a size range close to the frequency of visible light (0.4 to 0.7 microns). At this size range, smoke particles proficiently dissipate light and make it hard to see and can be breathed into the lungs. This is the reason the smoke conceived fire related particles are a more prominent worry than bigger particles.

4. Risk Assessment of Smoke Conditions

Not all regions have an authority checking for AQHI or, Race Directors and Technical Officials might not have accessible admittance to official observing station information, so a method of building up particulate levels noticeable all around has been created by NOAA. A visibility index gives an efficient, elective approach to estimate smoke levels.



5. Appropriate Messaging and Actions Based on Air Quality Category

Air Quality Category	Visibility in KM	Message	Actions for Events
Good AQHI 1-3	15 kms and up	Ideal air quality for outdoor activities	Ideal conditions for an event
Moderate / Unhealthy for Sensitive Groups AQHI 4 - 6	5 - 14kms	Be aware of health effects of smoke and related symptoms	Be aware of health effects of smoke and related symptoms
Unhealthy AQHI 7 - 8	2.5 - 4kms	Reduce or re-schedule strenuous activities, especially if you experience symptoms	Consider reduction of length of events and / or cancellation of junior events. Provide warning to competitors with respiratory issues (e.g., Asthma)
Very Unhealthy AQHI 9 - 10	1.5 - 2kms	Avoid prolonged strenuous activities and stay indoors if possible	Consider reduction in length of events. Cancel or postpone event. Cancel Junior Events.
HAZARDOUS AQHI 10+	< 1.0km	Avoid all strenuous activities and stay indoors	Cancel all events and outdoor training

SECTION 2: INCLEMENT WEATHER

1. Thunder & Lightning

1.1. Overview. The definition of a thunderstorm is where lightning can be seen and/or thunder can be heard. Any storm which produces thunder means lightning is always present, even if it is obscured by cloud (it is the lightning which produces thunder). The simplest and most effective way to assess this distance of lightening is the 30-second rule. If there is less than 30 seconds between the lightning and thunder, then the lightning is within 10 km of the listener. (30 seconds at the speed of sound is 10.2km). When a lightning strike is within 10km of the event must be suspended and all patrons are encouraged to seek appropriate cover. An event or training can resume once the threat of lightening has passed, which is measured by the lightning and thunder being greater than 30 seconds apart.

1.2. Staying Safe. It is important to plan for a safe lightning shelter and evacuation method when thunder and lightning is a possibility.

1.2.1. A safe area to be during thunder and lightning includes;

1.2.1.1. A large, fully enclosed building

1.2.1.2. If a building is not available, a fully enclosed vehicle with a metal roof and the windows completely closed is a reasonable alternative.

1.2.2. Unsafe locations and situations include:

1.2.2.1. An open field

1.2.2.2. Close vicinity to the tallest structure in the area (e.g., Tree/s, light pole, discus cage)



- 1.2.2.3. Outdoor metals such as flagpoles, fences, gates, light poles, metal bleachers, Javelins, etc.
- 1.2.2.4. Use of electrical appliances
- 1.2.2.5. Umbrellas or any object that increases a person's height.

1.3. Competition Suspension. When there is thunder, it means lightening is in the area. Suspend training and competition immediately and direct participants to a safe spot to avoid lightning strikes. If there has been lightening, wait at least 30 minutes after the last sound (thunder) or observation of lightning and ensure conditions are completely safe before leaving shelter to resume activities. Each time lightning is observed or thunder is heard, the 30 minute clock should be re-started.

2. High Winds

- 2.1. Overview.** High winds have the potential to create dangerous conditions for athletes, spectators and officials. Where these winds create unreasonable risks within the track area activities may need to be suspended. Hazards may include furniture or fixtures disturbed, items being blown onto the field or track, or athletes health threatened by the force of the wind.
- 2.2.** Winds in excess of 65km/hr are considered to be strong winds and should result in a wind warning.

3. Black Ice

- 3.1. Overview.** Black ice, sometimes called clear ice, is a thin coating of glaze ice on a surface, especially on streets. The ice itself is not black, but visually transparent, allowing the often black road below to be seen through it. The typically low levels of noticeable ice pellets, snow, or sleet surrounding black ice means that areas of the ice are often practically invisible to drivers or people stepping on it. There is, thus, a risk of slippage and subsequent accident due to the unexpected loss of traction.
- 3.2. Occurrence.** When the temperature falls to 0 degrees Celsius and there is wet precipitation, rain and sleet will begin to freeze on roadways upon impact.
- 3.3. Mitigation.** Race directors should consider the factors for when black ice may occur and ensure courses are monitored and managed. Potential mitigations include salting road ways or postponing event until mid-day.

SECTION 3: EXTREME COLD / EXTREME HEAT CONSIDERATIONS

1. Extreme Cold

1.1. Cold weather exposure can be a serious health risk. Exposure to cold can be uncomfortable, can impact performance and may lead to higher risk of injury. Cold temperatures can negatively affect the body's regulatory system. Exposure to these conditions could lead to 'cold stress.' Early signs and symptoms of 'cold stress' include but not limited to shivering, fatigue, confusion, headaches, slurred speech and numbness, pain or burning sensations at the distal extremities. Children are at a greater risk than adults as they lose body heat more easily.

1.2. Cold Index Table and Athletic Activity Guidelines

Extreme Cold Temperatures	
Temperature / Humidity Index	Athletic Activity Guidelines
Below -28°C (DANGER)	<ul style="list-style-type: none"> • Cancel training or competition. • Hypothermia possible.



-23°C to -28°C (EXTREME CAUTION)	<ul style="list-style-type: none"> • Recommend cancelling training or competition. • If proceeding, training or competition blocks should be kept short in duration. (e.g., no longer than 10km) • Participants to be dressed for extreme cold weather activities. • Increase first aid presence and warm drinks at finish of event.
-18°C to -23°C (CAUTION)	<ul style="list-style-type: none"> • Proceed with training or competition. • Participants to be dressed for extreme cold weather activities. • Increase first aid presence and warm drinks at finish of event.
>18°C	<ul style="list-style-type: none"> • Proceed as usual

2. Extreme Heat

2.1. The heat index is the perceived temperature equivalent of air temperature, relative humidity and wind speed. It is important to monitor both temperature and relative humidity to ensure safety for participants. Health and safety considerations should be made for the following temperatures once the relative humidity exceeds 40%. In extreme temperatures, it is important to have a first aid attendant on site who is familiar with the signs and symptoms of heat exhaustion or heat stroke.

Children are more susceptible to dehydration and heat exhaustion, so it is important to encourage regular water breaks in shaded areas when the heat index rises above 27°C and 40% humidity.

2.2. Heat Index Table and Athletic Activity Guidelines

Extreme Warm Temperatures	
Temperature / Humidity Index	Athletic Activity Guidelines
Less than 27°C	<ul style="list-style-type: none"> • Unlimited activity with standard rest and water breaks every 30 minutes throughout the duration of the activity. • For prolonged activity, encourage time in the shade when possible.
27-32°C (CAUTION)	<ul style="list-style-type: none"> • Fatigue possible with prolonged exposure and activity. • Closely monitor new or unconditioned athletes during extreme exertion. • Schedule mandatory rest and water breaks every 25 minutes. • Have cold water accessible to all participants and areas of shade provided throughout the facility. • Consider having cold water (2–4°C) immersion tubs available at the facility / finish area. • Schedule longer endurance events either in the early morning or late evening.
32-41°C (EXTREME CAUTION)	<ul style="list-style-type: none"> • Extreme caution: heat cramps and heat exhaustion are possible. Prolonged activity and exposure could result in heat stroke. • Proceed with caution. Monitor participants for signs of heat exhaustion or heat stroke. • New or unconditioned athletes should not practice or



	<p>compete.</p> <ul style="list-style-type: none"> Well-conditioned athletes should have more frequent rest and hydration, scheduled every 20 minutes. Have cold water accessible to all participants and areas of shade provided throughout the facility. Have cold water (2–4°C) immersion tubs available at the facility / finish area. Officials should have access to shaded areas and should work shorter officiating shifts. Competition schedule and timetable may be modified with respect to the time of day and length of the event. (e.g., longer endurance events should be cancelled or moved either in the early morning or late evening.)
>41* (DANGER)	<ul style="list-style-type: none"> All training and competition should be postponed until the temperature is below 40 degrees Celsius.

2.3. Temperature / Humidity Index

Table 1: Temperature/ Humidity Index

Relative Humidity %	Temperature °C																
	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43
40	27	28	29	30	31	32	34	35	37	39	41	43	46	48	51	54	57
45	27	28	29	30	32	33	35	37	39	41	43	46	49	51	54	57	
50	27	28	30	31	33	35	36	38	41	43	46	49	52	55	58		
55	28	29	30	32	34	36	38	40	43	46	48	52	54	58			
60	28	29	31	33	35	37	40	42	45	48	51	55	59				
65	28	30	32	34	36	39	41	44	48	51	55	59					
70	29	31	33	35	38	40	43	47	50	54	58						
75	29	31	34	36	39	42	46	49	53	58							
80	30	32	35	38	41	44	48	52	57								
85	30	33	36	39	43	47	51	55									
90	31	34	37	41	45	49	54										
95	31	35	38	42	47	51	57										
100	32	36	40	44	49	56											

Caution

Extreme Caution

Danger

Extreme Danger

Source: Calculated °F to °C from NOAA's National Weather Service

Source: NDMA Heat Guidelines (2016)



REFERENCES

- http://lightningsafety.com/nlsi_pls/ncaa.html
- <http://www.phsa.ca/search?k=smoke>
- [Heat Guidelines.pdf \(nchsaa.org\)](#)
- <https://www.calculator.net/heat-index-calculator.html>

