

IHSAA / IGHSAU/IHSMA/IHSSA Wet Bulb Globe Thermometer (WBGT) Heat Modification Guidance

Heat illness is the leading cause of preventable death in high school athletes. Heat production during intense exercise is 15 - 20 times greater than at rest and can raise body core temperature 1 – 2 degrees Fahrenheit every 5 minutes unless heat is dissipated.

The IHSAA, IGHSAU, IHSMA, and IHSSA, under the guidance of the IA Sports Medicine Advisory Committee, have approved the Wet Bulb Globe Thermometer (WBGT) as the recommended measurement practice and device for measuring acceptable heat/humidity levels for practices and contests. The use of WBGT is recommended throughout the calendar year when the ambient temperature is above 80 degrees (indoors or outdoors).

WBGT Reading (Region 2)	Activity Guidelines / Required Modifications for Grades 9-12
< 79.7	Normal activities 3 separate rest/water breaks (3-5 minutes each) / hour
79.8 – 84.6	Use discretion for intense / prolonged practice 3 separate rest/water breaks (4-6 minutes each) / hour Monitor at-risk athletes closely <i>Cold water immersion available – see additional info sheet</i>
84.7 – 87.6	Maximum practice time is 2 hours <i>Reduce equipment to partial uniform</i> Remove all additional equipment if conditioning (football) <i>*if WBGT rises to this level during practice, players may continue practicing in football pants</i> 4 separate rest/water breaks (4-6 minutes each) / hour Monitor at-risk athletes closely <i>Cold water immersion available – see additional info sheet</i> CONTESTS: Implement additional/extended timeouts for rest/water breaks
87.7 – 89.7	Maximum practice time is 1 hour <i>Reduce equipment to out of uniform</i> No conditioning allowed There must be 20 minutes of rest breaks distributed throughout the one hour of practice Monitor athletes closely <i>Cold water immersion available – see additional info sheet</i> CONTESTS: Consider moving start times earlier or postponing; Implement additional/ extended timeouts for rest/water and shade.
> 89.7	No (outdoor) activities Cancel or delay outdoor practices / contests until lower WBGT is recorded

Additional information: Participants should ALWAYS have unrestricted access to water / fluids

- WBGT should be measured every 30 minutes (where the activity is being held)
- The same person should monitor WBGT throughout the event
- WBGT reading at the start of practice/contest is the lowest category directions to follow, if WBGT increases to a higher category modifications will follow that category.
- Individual reactions to heat will vary per athletes and/or position/role
- Schools should have an exertional heat illness emergency action plan
- At-risk athletes should always be monitored closely.
- See Appendices for additional activity-specific recommendations

WBGT is an all-inclusive measure of heat stress in direct sunlight, which takes into account ambient temperature, humidity, sun angle, wind speed, and cloud cover (solar radiation)

Wet Bulb Globe Temperature (WBGT)

Wet Bulb Globe Temperature (WBGT) is the gold standard for measuring heat stress during hot weather. This measurement comes from a Wet Bulb Globe—The WBGT device takes into account: *ambient temperature, humidity, wind speed, sun angle, direct sunlight and cloud cover.*

Why WBGT and NOT heat index?

- The heat index is calculated in the shade, considering a standard/average sized person with normal core temperature, and that individual is walking at a 3.1 mph.
- As you can imagine, this is not an accurate measurement for someone who is doing an outdoor sport or a non-climate controlled activity.
- Even in warm ups for practice at a sporting event, a student athlete's body temperature rises above normal within minutes of starting.
- This is why professional athletic associations such as the NCAA, U.S. Military and OSHA no longer allow heat index as a measurement; they all now require WBGT for determining participation for hot weather activities.
- Using local news weather forecasts, weather apps on your phone or smart device **do NOT** provide an accurate temperature for where your conducting your outdoor or non climate controlled activity. They do not consider all of the important variables for your specific location that go into the WBGT reading.

Will I end up canceling practices all the time because of this? Won't my athletes be unprepared for competitions?

- Most of the time, you will not be canceling practices but you may need to modify them to make sure athletes are heat-safe based on what the WBGT is and follow the policy.
- There are decades of research to support these WBGT procedures to prevent heat-related illnesses and events.
- Remember all high school sports and activities are going to be doing this at the same time under the same WBGT safety policy guidelines.
- There is no data to support following a WBGT policy will keep your student from being prepared for their activity.

Do I still have to do heat acclimatization at the start of the season?

Yes, it is extremely important that acclimatization to heat takes place and you still follow the state guidelines for that in your sport or activity.

What category is Iowa in for Heat Activity Guidelines?

Category 2 is where Iowa is at and how we derived our numbers for our policy.

FOR THE WBGT POLICY, WHEN IS THE STARTING TIME FOR PRACTICE?

THE START TIME IS WHEN THE FIRST ATHLETE SETS FOOT ON THE FIELD, IN THE GYM, ETC. THAT TIME SHOULD BE NOTED TO MAKE SURE BREAKS FOR WATER, UPDATED WBGT READINGS AND PRACTICE END TIMES ARE ACCURATE.



HOW DO I TAKE A READING AND WHEN?

- The WBGT should be set up and allowed to acclimatize at the venue at least 15-20 minutes prior to starting the activity.
- The unit should be 3 ft off the ground and away from obstructions.
- The WBGT should be set up IN THE SUN (not in the shade) and on the turf if you are practicing on turf. If using the WBGT in a non-climate-controlled building such as a gym, switch it to indoor mode.
- The WBGT should be monitored throughout the event—taking new readings every 20 to 30 minutes and adjusting athletic participation or activities accordingly (WBGT activity guidelines may move up or down based on the readings—see policy chart).
- Readings should be taken by the medical personnel on-site (if available) or athletic director/administrator overseeing the event or principal and then readings and participation modifications communicated to the coaching staff before and during practices.
- Practice using the device before an event occurs needing a WBGT so you are familiar and ready to use the WBGT device.

**Please refer to the WBGT Policy for further implementation and modification information

Appendix A: Different Types of Heat Illness¹

Condition	Description	Treatment
Heat (fatigue) cramps	Painful muscle spasms/cramps that can happen during activity in hot environments. Athletes who sweat a lot may be prone to heat cramps due to fluid and electrolyte losses.	Stop exercising, massage or stretch involved muscle. Replace salt and water loss by drinking a lot of cool, salt-containing fluids. Future cramping may be reduced by improved conditioning, getting more used to exercising in hot temperatures, and drinking more salt-containing fluids.
Heat exhaustion	A type of heat illness when the body overheats leading to symptoms like excessive sweating, rapid heart rate, dizziness, faintness, fatigue, low blood pressure with standing, nausea, headache, muscle cramps.	Stop exercising, move to shaded or air-conditioned area. Replace water loss by drinking a lot of cool fluids. If the athlete does not quickly improve or is unable to drink fluids, then the athlete should be immediately taken to the nearest emergency facility.
Heat stroke	A type of heat illness that includes any of the symptoms of heat exhaustion + symptoms of confusion, disorientation, distress or loss of consciousness. Core (rectal) body temperature should be measured right away by a trained medical professional.	Call 911 or your local emergency number. Begin cooling immediately by cold water immersion technique (see below); don't wait for help to arrive. The athlete needs immediate medical attention.

Appendix B – Cold Water Immersion Tub set up and protocol^{3,4,7,8}

Set-up:

- Acquire a 50-gallon tub, stock tank or kiddie pool (rubber or structural foam)
- Prior to the start of activity, half-fill with water and ice, keep additional chest coolers of ice next to tub
- Cool the water to a temperature of 35-59 degrees F

When an Athlete is in need of Cold Water Immersion:

- Remove the athlete's equipment and excess clothing
- Immerse athlete in the tub up to their neck, if possible
- Place an ice/wet towel over the head and neck
- Stir/agitate the water continuously, adding more ice throughout the cooling process
- Remove athlete from the tub and transport to the emergency room when the core (rectal) temperature reaches 102 degrees F

Appendix C--Additional Specific Sport/Activity Guidance

All sports/activities performed in a non-climate-controlled setting should follow the Wet Bulb Globe Thermometer Heat Modification Policy, however, below are some additional sport/activity guidance.

Sport-Specific Practice Guidance

Football Practices:

- WBGT **84.7 to 87.6 (ORANGE)**: Helmets, Shoulder Pads and Shorts only should be worn and any additional equipment (e.g. shoulder pads) should be removed for conditioning. If WBGT rises to this level during practice, players may continue to practice in football pants.
- WBGT **87.7 to 89.7 (RED)**: Shorts, t-shirts and footwear only for activities. No conditioning allowed.
- WBGT **89.8 or greater (BLACK)**: No outdoor activities, cancel or delay practices until lower WBGT is recorded.

Marching Band⁵/Cheerleading:

- WBGT **84.7 to 87.6 (ORANGE)**: Partial / 1/2 uniform (no long sleeves or long pants). Move practice to grassy area rather than turf or concrete.
- WBGT **87.7 to 89.7 (RED)**: out of uniform. Shorts, t-shirts and footwear only for activities. No conditioning allowed.
- WBGT **89.8 or greater (BLACK)**: No outdoor activities, cancel or delay practices until lower WBGT is recorded.

Sport Specific Competition Guidance

Football competitions:

- When kick off temperature is **87.7 to 89.7 WBGT (RED)**--A mandatory hydration break should take place at approximately the 6 min mark of the quarter of each quarter.
 - The hydration break will last 3 minutes and all players will remove their helmets and go to the sideline for a break.
 - No coaches allowed on the field.
- If kick off temperature is at or above **89.8 WBGT or greater (BLACK)**--A mandatory hydration break should take place at approximately the 4 and 8 min mark of the quarter of each quarter.
 - The hydration break will last 3 minutes and all players will remove their helmets and go to the sideline for a break.
 - No coaches allowed on the field.

Cross Country Competitions:

- When in competition and WBGT is **87.7 or greater (RED) (BLACK)**, at least two (2) hydration stations should be placed on the race course as well as at the finish line.

Soccer Competitions:

- When in competition and WBGT is **87.7 or greater (RED)/(BLACK)**, referees will take a 3 minute hydration break at or near the midway point of each half.
 - Teams will go to the bench area during the hydration break, no coaches permitted on the field.

Baseball/Softball Competitions:

- When in competition and WBGT is **87.7 or greater (RED)/(BLACK)**, umpires should have a 3 minute hydration break starting in the beginning and mid-point of inning 3 and every inning through the remainder of the contest.

Appendix D– Middle School Activities Guidelines for Outdoor/Non-Climate Controlled Settings⁶

<79.7	Normal activities 3 separate rest/water breaks (3-5 minutes each) / hour
79.8 -- 84.6	4 separate rest/water breaks (4-6 minutes each) / hour Monitor at-risk athletes closely Cold-water immersion available--see additional information sheet and Appendix B
84.7 --87.6	Maximum practice time is 2 hours 4 separate rest/water breaks (4-6 minutes each) / hour There must be 20 minutes of rest breaks distributed throughout each hour of practice Monitor at-risk athletes closely Cold-water immersion available--see additional information sheet and Appendix B CONTESTS: IMPLEMENT ADDITIONAL/EXTENDED TIMEOUTS FOR REST/WATER BREAKS
87.7 -- 89.7	Maximum practice time is 1 hour Shorts/t-shirt/footwear only for all activities No conditioning allowed There must be 20 minutes of rest breaks distributed throughout the one hour of practice Monitor at-risk athletes closely Cold-water immersion available--see additional information sheet and Appendix B CONTESTS: IMPLEMENT ADDITIONAL/EXTENDED TIMEOUTS FOR REST/WATER BREAKS. Consider delaying/postponing start times
89.8 or >	No activities Indoor workouts permitted in air-conditioned/climate controlled facilities CONTESTS: CANCEL CONTESTS UNTIL LOWER WBGT IS RECORDED

Appendix E--References and Videos

Articles:

¹American Academy of Pediatrics Definitions of Heat Illness:

https://www.aap.org/globalassets/publications/coya/exercise_related_heat_illness_final_secured.1.0.pdf

²NFHS Wet Bulb Globe Temperature Reading: <https://www.nfhs.org/articles/wet-bulb-globe-temperature-wbgt-why-should-your-school-be-using-it/>

³Use of Rectal Thermometry as Core Temperature Reading:

<https://oata.org/images/McCannRecTherm.pdf>

⁴Cold Water Immersion and Heat Stroke Article: <https://thesportsinstitute.com/cold-water-baths-for-heat-stroke-every-minute-counts/>

⁵Marching Band Article: <https://www.nfhs.org/articles/heat-illness-prevention-keep-the-marching-band-playing/>

⁶American Academy of Pediatrics Policy Statement on Heat 2011, reaffirmed in 2021:

<https://publications.aap.org/pediatrics/article/128/3/e741/30624/Climatic-Heat-Stress-and-Exercising-Children-and>

⁷American College of Sports Medicine Heat Illness Policy: https://journals.lww.com/acsm-csmr/fulltext/2023/04000/acsm_expert_consensus_statement_on_exertional_heat.10.aspx#:~:text=Identifying%20the%20athlete%20with%20suspected,sepsis)

⁸National Association of State EMS Officials-- Policy on Heat Illness: pgs 320-325

https://nasemso.org/wp-content/uploads/National-Model-EMS-Clinical-Guidelines_2022.pdf

Videos:

Wet Bulb Globe Temperature (WBGT)

KSI video on how to use the Kestrel Meter/WBGT--

<https://www.youtube.com/watch?v=uABBWW1GRjM>

Safe Sports Network--<https://www.youtube.com/watch?v=RrtXV3U2vvo>

Cold Water Immersion (CWI)

KSI/USA Football--<https://www.youtube.com/watch?v=vtLt0zKbog>

TACO method of CWI--Safe Sports Network--https://www.youtube.com/watch?v=mhTvq_QUIX4

General Heat Illness Video

Safe Sports Network--https://www.youtube.com/watch?v=gbuOikV_IW0&t=0s

Cold Water Immersion Guidelines

In the event of a potential Exertional Heat Stroke (EHS), each school participating in interscholastic sports must be properly prepared and equipped to initiate Cold Water Immersion (CWI) or equivalent whole body cooling techniques and EMS concurrently contacted, noting that the focus is to cool first and then transport. The water should be aggressively stirred during the cooling process. The best practices should be carried out by a license athletic trainer, designated healthcare provider, or EMS provider. The cooling modality must be set up at all warm weather practice, and should be readily available if the need arises.

Cold Water Immersion

When treating a potential EHS, schools shall be properly prepared and equipped to initiate CWI or other best practice cooling technique. Cooling techniques must be implemented immediately, and EMS should be contacted concurrently. This must be followed during all sanctioned events when the temperature is at the WBGT is a Yellow flag alert level or higher.

WBGT READING Flag	COLD WATER IMMERSION GUIDELINES
Green	Green: Access to alternative cooling measures (cooler with ice, water, and towels, or tarp) are readily available at the practice and competition sites.
Yellow	Yellow through Black: A cold-water immersion tub of approximately 150 gallons shall be partially filled with water or cold water immersion bag/ tarp (taco/burrito method) for cooling is accessible within 5-10 minutes of the practice/competition site. Ice shall also be readily available. Remove necessary external clothing/equipment prior to cooling. Aggressively stir water during cooling process.
Orange	
Red	
Black	

TREATMENT OF EXERTIONAL HEAT STROKE

- If an athletic trainer/medical provider is onsite, utilize the principle of Cool First, Transport Second.
- When cooling, use CWI or other best practice cooling method, until a core temperature at or below 102F is reached.
- If the athletic trainer/medical provider is not present or not onsite and EHS is suspected, cool immediately for a minimum of 20 minutes based upon the average estimated cooling rate of 1 degree per 3 minutes.
- Continue cooling until either an athletic trainer or other appropriate medical providers, EMS assumes control of the EHS patient and determines if additional cooling is needed based on core temperature (102F).
- Rectal thermometry is the gold standard for monitoring core body temperature.

Preferred Methods for Cooling

1. Cold Water Immersion Tub**
2. Cold Water Immersion Bag
 - a. A cold water immersion bag is a method which uses a combination of ice and cold water are added to an athlete once they have been placed in a cold water immersion bag and seal the bag to reduce core body temperature.
3. Taco/ Burrito Method
 - a. Tarp Assisted Cooling Oscillation (TACO) is a method in which a combination of ice and cold water are added to an athlete once they have been placed on a tarp with the edges held up by clinicians to create a physical “taco” for the patient to be encased inside.
 - b. <https://www.youtube.com/watch?v=vonrl4IQOFM&t=38s>