Why to Use Wet Bulb Globe Temperature Instead of Heat Index
Environmental Heat Stress Monitoring – Background Rationale

The MSHSAA Board Directors 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 ambient temperature is above 80 degrees. Member schools can secure and use the instruments found on the suggested list of WBGT's.

There has been an increased awareness of the catastrophic events associated with exertional heat illness over the past 5-7 years. Changes in national and local policy regarding heat illness prevention, recognition and management have increased over the last decade. For the purposes of this paper, we will focus on the environmental factors and the appropriate mechanism of choice to monitor.

Environmental heat stress is a major cause that includes high temperature/humidity/sun exposure during physical activity and can be amplified with cumulative days of participation. Obtaining accurate and reliable information about these environmental factors is crucial in the prevention of exertional heat illness. This allows for appropriate practice modifications, work rest ratios, sport event/practice start and end times, equipment modifications, and cancellations. Currently there are two mechanisms to monitor environmental conditions; the Heat Index and the Wet Bulb Globe Thermometer (WBGT). For better understanding it is important to recognize the difference between the two indices.

Heat Index

A measure of temperature and humidity and is calculated for shady areas. Heat index is "how hot it feels" when relative humidity is factored into the ambient temperature.

The heat index is calculated of the perceived environmental effects on a person that is 5'7" and weighs 147 lbs. walking at about 3.1 miles per hour in a light breeze, wearing pants and a short-sleeved shirt.

Wet Bulb Globe Thermometer (WBGT)

A measure of the heat stress in direct sunlight, which takes into account: temperature, humidity, wind speed, sun angle and cloud cover (solar radiation). (NOAA)

The chart below summarizes the distinct differences between the two.

WBGT VS. HEAT STRESS INDEX	WBGT	HEAT INDEX
MEASURED IN THE SUN	✓	✗
MEASURED IN THE SHADE	✗	✓
USES TEMPERATURE	✓	✓
USES RELATIVE HUMIDITY	✓	✓
USES WIND	✓	✗
USES CLOUD COVER	✓	✗
USES SUN ANGLE	✓	✗

It is a common assumption that environmental heat stress monitoring data is accomplished by the utilization of the heat index. Utilization of the heat index does not account for direct sunlight exposure which results in inaccurate measurement of onsite environmental conditions. The interchanging of the heat index and the WBGT in policies and recommendations continue to compound the lack of consistency of best practices amongst high schools within the state of Missouri. The American College of Sports Medicine, the National Athletic Trainers Association, the NCAA, and the NFHS' Sports Medicine Advisory Committee (SMAC) recommends the utilization of the Wet Bulb Globe Temperature (WBGT) indices as the indicator for environmental heat stress conditions. It is important to note that the utilization of the heat index is an alternative but is NOT considered best practice and has significant limitations.

The MSHSAA Sports Medicine Advisory Committee recommended removing the utilization of the heat index as an indicator for participation in heat stress associated environmental conditions and to obtain a WBGT on site reading to assist in practice/event planning, activity modification and execution.

The combination of the instituted 16-day acclimatization period and activity and rest guidelines can dramatically reduce the heat stress influences for all student athletes participating in hot and humid environments. It is also important to note that environmental conditions monitoring is a major consideration in preventing exertional heat illness, there are additional contributing variables that should be considered. Those include water loss, electrolyte/mineral loss, nutrition, hydration, illness, medications, supplements, conditioning status, and sleep status.

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