

Heat Index

Heat index (HI) is sometimes referred to as the "apparent Temperature". The HI, given in degrees F, is a measure of how hot it feels when relative humidity (RH) is added to the actual air temperature.

$$\begin{aligned} \text{Heat Index Formula} = & -42.379 + 2.04901523T + 10.14333127R - \\ & 0.22475541TR - 6.83783 \times 10^{-3} T^2 - 5.481717 \times 10^{-2} R^2 + 1.22874 \times 10^{-3} T^2 R \\ & + 8.5282 \times 10^{-4} TR^2 - 1.99 \times 10^{-6} T^2 R^2 \end{aligned}$$

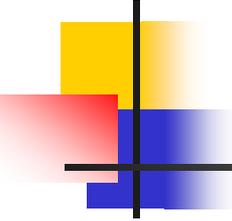
Heat Index Reference Chart

Category	Heat Index	Possible heat disorders for people in high risk groups
Extreme Danger	130°F or higher	Heat stroke or sunstroke likely.
Danger	105 - 129°F	Sunstroke, muscle cramps, and/or heat exhaustion likely. Heatstroke possible with prolonged exposure and/or physical activity.
Extreme Caution	90 - 105°F	Sunstroke, muscle cramps, and/or heat exhaustion possible with prolonged exposure and/or physical activity.
Caution	80 - 90°F	Fatigue possible with prolonged exposure and/or physical activity.

HEAT INDEX °F (°C)

RELATIVE HUMIDITY (%)

Temp.	40	45	50	55	60	65	70	75	80	85	90	95	100
110	136												
108	130	137											
106	124	130	137										
104	119	124	131	137									
102	114	119	124	130	137								
100	109	114	118	124	129	136							
98	105	109	113	117	123	128	134						
96	101	104	108	112	116	121	126	132					
94	97	100	103	106	110	114	119	124	129	135			
92	94	96	99	101	105	108	112	116	121	126	131		
90	91	93	95	97	100	103	106	109	113	117	122	127	132
88	88	89	91	93	95	98	100	103	106	110	113	117	121
86	85	87	88	89	91	93	95	97	100	102	105	108	112
84	83	84	85	86	88	89	90	92	94	96	98	100	103
82	81	82	83	84	84	85	86	88	89	90	91	93	95
80	80	80	81	81	82	82	83	84	84	85	86	86	87



Heat Index in Perspective

Las Vegas Far West Regions 2007

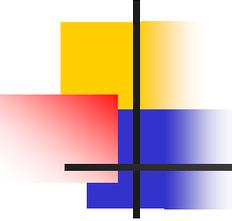
108 °F 40% H = 130 Heat Index

Extreme Danger

Honolulu Projected Weather 2008

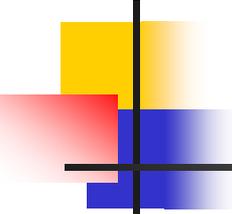
92 °F 90% H = 131 Heat Index

Extreme Danger



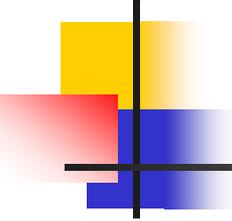
Heat Wave Toll

Heat kills by taxing the human body beyond its abilities. In a normal year, about 175 Americans succumb to the demands of summer heat. Among the large continental family of natural hazards, only the cold of winter-not lightning, hurricanes, tornadoes, floods, or earthquakes-takes a greater toll. In the 40-year period from 1936 through 1975, nearly 20,000 people were killed in the United States by the effects of heat and solar radiation. In the disastrous heat wave of 1980, more than 1,250 people died.



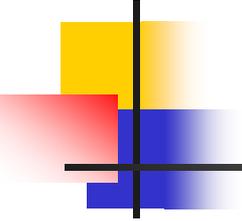
How Heat Affects the Body

Human bodies dissipate heat by varying the rate and depth of blood circulation, by losing water through the skin and sweat glands, and-as the last extremity is reached-by panting, when blood is heated above 98.6 degrees. The heart begins to pump more blood, blood vessels dilate to accommodate the increased flow, and the bundles of tiny capillaries threading through the upper layers of skin are put into operation. The body's blood is circulated closer to the skin's surface, and excess heat drains off into the cooler atmosphere. At the same time, water diffuses through the skin as perspiration. The skin handles about 90 percent of the body's heat dissipating function.

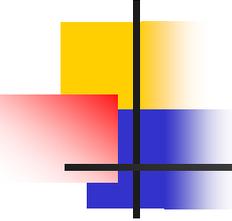


How Heat Affects the Body Continued...

Sweating, by itself, does nothing to cool the body, unless the water is removed by evaporation, and high relative humidity retards evaporation. The evaporation process itself works this way: the heat energy required to evaporate the sweat is extracted from the body, thereby cooling it. Under conditions of high temperature (above 90 degrees) and high relative humidity, the body is doing everything it can to maintain 98.6 degrees inside. The heart is pumping a torrent of blood through dilated circulatory vessels; the sweat glands are pouring liquid-including essential dissolved chemicals, like sodium and chloride onto the surface of the skin.

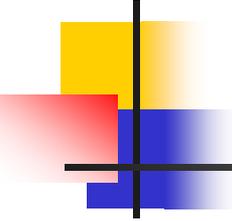


Temperature, Humidity, and
Field surface all effect the
heat index (HI)



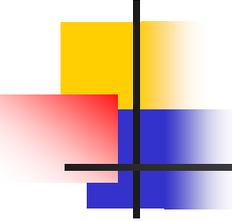
Four Categories in Dealing with the Heat Index (HI)

- Caution: 80 ° - 90 °F
- Extreme Caution: 90 ° - 105 °F
- Danger: 105 °- 129 °F
- Extreme Danger: 130 °F or higher



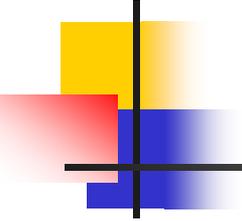
BYU Synthetic Surface Heat Studies

- Air Temperature 80 °F
- Grass 78.19 °F
- Concrete 94.08 °F
- Asphalt 109.62 °F
- Bare Soil 98.23 °F
- Synthetic Turf 117.38 °F



Irrigation of Synthetic Turf: tracked at five and twenty minutes after irrigation

- 174 °F to 85 °F after irrigation
- After five minutes surface temp. rebounded to 120 °F
- After twenty minutes surface temp. rebounded to 164 °F

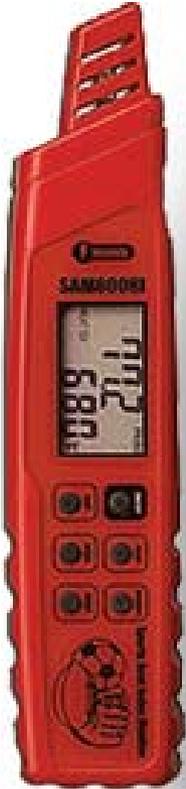


Surface Temp. of Synthetic Turf

- 37 °F Higher than Asphalt
- 86.5 °F Higher than Grass

Digital Pocket Heat Index Monitor Sports Model

Part #: SAM800HI
Price \$109.95



General Tools & Instruments

- Displays heat index, temperature, humidity & dew point
- Ideal for monitoring outdoor conditions for athletics
- Danger icon w/ audible beep
- Min/max memory with reset feature
- Data hold
- Reset feature
- °F or °C readings
- Large digital display
- Auto power off w/ low battery indicator

Heat index. range: 32°to 140°F (0°to 60°C)

Temp. range: -4°to 122°F (-20°to 50°C)

Humidity range: 0 to 100% RH

Dew point: -22° to 122°F (-30° to 50°C)

Temperature accuracy: ±1.8°F (1°C)

Humidity accuracy: ±5%

Dew point accuracy: ±3%

Dimensions: 6.88" x 1.57" x 0.91"

Power source: 1 "CR2032" battery

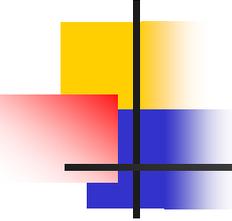
Includes:

- Pocket Clip on back
- Battery

Field Surface

Recommendations

- Need to avoid playing on artificial surfaces in hot climates
- Use of artificial fields only early morning or late evenings



Temperature – Humidity

- These two factors can be controlled (monitored) by using Heat Index factors
- Medical officials at playing site can monitor the heat index (HI) and inform cup officials of the four categories that influence whether to play, increase water and rest breaks, or suspend play
- Four Categories: Caution – Extreme Caution – Danger – Extreme Danger