

# **Kestrel® 4400 Heat Stress Tracker**

Handheld device warns when environmental conditions become dangerous

Obtain immediate assessment of the risk of heat stress on the track, in the field or in the workplace in order to avoid the dangers of heat related illness.

## **FUNCTIONS**

- **Wet Bulb Globe Temperature (WBGT)**
- **Thermal Work Limit (TWL)**
- **Naturally Aspirated Wet Bulb Temperature**
- **Globe Temperature**
- **Mean Radiant Temperature (MRT)**
- Wind speed
- Air, water & snow temperature
- Wind chill
- Heat index
- Dew point
- Relative humidity
- Barometric pressure
- Altitude
- Density altitude
- Wet bulb temperature



Bluetooth  
model  
available

Ideal for streaming  
real-time data to  
laptop or PDA



**Human heat stress** results from a combination of many environmental factors - air temperature and humidity along with radiant heat from the sun and surfaces, balanced by the cooling effect of breezes or air flow.

Working or exercising in high temperatures may lead to heat illness, or at the very least loss of concentration resulting in impaired performance, which may cause mistakes or even accidents. The Kestrel 4400 Heat Stress Tracker is a portable handheld device that monitors environmental conditions to avoid this situation arising.

The **wet bulb globe temperature (WBGT) index** is the most widely used and accepted index for the assessment of heat stress in industry, combining temperature, humidity, wind speed, and thermal radiation to assess heat stress.

The Kestrel 4400 calculates WBGT from three measurements - naturally aspirated wet bulb temperature, globe temperature and dry bulb temperature - for an indoor or outdoor environment.

**Globe temperature** is measured via a 25mm black globe, calibrated to provide as accurate and reliable information as a 150mm globe on other much larger and

cumbersome measurement tools which have been the only options available to date.

The Kestrel 4400 also displays **thermal work limit (TWL)**, another recognised composite heat stress prediction tool. For both WBGT and TWL, the Kestrel 4400 provides on-screen alarms when conditions enter the caution and danger zones, providing clear and immediate guidance that heat illness prevention steps must be taken. Clothing levels can also be customised, making the Kestrel 4400 particularly useful in activities requiring heavy protective gear which worsens heat stress.

Designed to fit in a pocket, the Kestrel 4400 has a level of portability not seen before for heat stress measurement equipment and provides accurate readings within 2-3 minutes of exposure to the air.

The **Kestrel Vane Mount** accessory allows the Kestrel 4400 Heat Stress Tracker to be mounted on a tripod for longer-term monitoring and logging of heat stress conditions.



## **Applications**

- ☑ **Sporting Events / Athletics:** Prevention of heat related illness commonly found among football players, marathon runners, and other athletes working in harsh conditions.
- ☑ **Military:** Ensuring soldiers stay healthy while training for the gruelling heat of overseas operations.
- ☑ **Industrial Health & Safety:** Monitoring safe working conditions in a hot environment created by the process or restricted spaces typically found in bakeries, commercial kitchens, laundries, compressed air tunnels, foundries and smelting operations, power plants, boiler rooms, glass and rubber manufacturing plants and mines.

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## Kestrel 4400 Technical Specification:



Physical	Dimensions		127mm x 45mm x 28mm
	Weight		102g
	Lanyards		0.2m and 0.5m (for wrist and neck)
Display	Case colour		Options of grey, safety orange or olive drab for NV version
	Display type		Dot matrix LCD with electro-luminescent backlighting
	Display update		1 second
	Data logging		Programmable 2 second to 12 hour intervals, 2400 data points with graphical display. Manual data capture. Data upload with optional PC interface. Bluetooth models only: Integrated Bluetooth wireless data transfer with adjustable range from 5 to 30 feet.
	Functions	Wet Bulb Globe Temperature (WBGT)	Relative humidity
		Thermal Work Limit (TWL)	Heat index
		Naturally Aspirated Wet Bulb Temperature	Calculated dew point
		Globe Temperature	Barometric pressure
		Mean Radiant Temperature	Altitude
		Wind speed (current, maximum and average)	Density altitude
		Temperature	Wet bulb temperature
		Wind chill equivalent temperature	
	Speed units		kt, m/s, km/h, mph, ft/min, Beaufort Force (B)
	Temperature units		°C, °F
	Pressure units		mbar, inHg, hPa, psi
	Altitude units		m, ft
Performance	Date and time display		dd/mm/yy, mm/dd/yy, 12 hour, 24 hour
	Speed (1 sec response)	Operational range	0.6m/s to 60m/s (1.3 to 135.0mph)
		Specification range	0.6m/s to 40m/s (1.3 to 89.0mph)   Start-up speed stated as lower limit, readings may be taken down to 0.4 m/s   79 ft/min   1.5 km/h   .9 mph   .8 kt after impeller start-up.
		On axis accuracy	± 3% of reading or ± 0.1 m/s. (Some loss of accuracy from bearing wear may occur with sustained operation at or near maximum speed)
		Off -axis response	-1% @ 5°, -2% @ 10°, -3% at 15°
		Calibration drift	<1% after 100hrs operation at 7m/s
		Resolution	0.1 kt, m/s, km/h, mph. 1 FPM below 1999 FPM, 10 FPM above 2000 FPM. 1 Beaufort (0 to 12)
	Temperature (1 sec response)	Operational range	-45.0°C to +125.0°C
		Specification range	-29.0°C to +70.0°C
		Accuracy	±1°C
		Resolution	0.1°
	Relative Humidity (1 min response)	Wind chill accuracy	±1.0°C (from wind speed and temperature)
		Operational range	0% to 100%
		Specification range	5% to 95% non-condensing
		Resolution	0.1%
		Accuracy	±3% (when unit allowed to equilibrate to external temperature)
	Barometric Pressure (1 sec response)	Calibration drift	±2% over 24 months (correctable)
		Dew point accuracy	±2°C (above 20% relative humidity)
		Heat index accuracy	±2°C (between 21.1°C and 54.4°C)
		Operational range	10 to 1100 mbar at 25°C
		Specification range	750 to 1100 mbar at 25°C
	Altitude (1 sec response)	Resolution	0.1 mbar
		Accuracy	±1.5 mbar (max error over range 0°C to 70°C: ±2.0 mbar)
		Calibration drift	Typically ±1 mbar per year (correctable)
		Wet bulb temperature accuracy	±2°C (between 0°C and 37.8°C)
		Density altitude accuracy	±75m (between 0°C and 37.8°C)
Sensors	Impeller	Operational range	-2000m to +9000m (-6000 ft to +30,000 ft)
		Specification range	-2000m to +6000m at 25°C
	Accuracy	Accuracy	±15m (max error out of spec range: ±30m)
		Resolution	1m or 1ft
	Impeller		Diameter 25mm.   High precision axle and low-friction Zytel® bearings.   Replacement impeller field installs without tools.
	Temperature		Air, water or snow temperature. Hermetically-sealed, precision thermistor mounted externally and thermally isolated for rapid response. Airflow of 2.2 mph   1 m/s or greater provides fastest response and reduction of insulation effect. Calibration drift negligible.
Environmental	Relative Humidity		Polymer capacitive sensor, mounted externally in thin-walled chamber
	Pressure		Monolithic piezo-resistive silicon based sensor with second-order temperature correction
	Globe Temperature		25mm black globe thermometer, copper, externally mounted. Calibrated to achieve same measurements as standard 150mm globe
	Sealing		Electronics enclosure IP67 and NEMA-6 [Water resistant]
Miscellaneous	Shock		Drop tested (MIL-STD.810F - unit only)
	Temperature		Operating range: -10°C to +55°C (for LCD readability and batteries)   Storage range: -30°C to +60°C
	EMC		CE marked
Miscellaneous	Battery		2 off AAA alkaline, included, user replaceable
	Battery Life		400 hours of use, average, ± depending on backlight use
	Auto switch off		Selectable to remain switched on or switch off 15 or 60 minutes after last key press
	Wind chill equivalent temperature calculation		Perceived temperature resulting from combined effect of wind speed and temperature. Utilises the (US) NWS Wind Chill Temperature (WCT) Index, revised 2001, with wind speed adjusted by a factor of 1.5 to yield equivalent results for wind speed measured at 10m above ground
	Heat Index calculation		Steadman, from temperature and relative humidity
	Certification		Wind speed, temperature, pressure and humidity measurements are tested during manufacture.   A certificate of conformity (C of C) is included with each Kestrel.   Calibration certificates are available for an additional fee.

The Kestrel UK Distributor:

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**Kestrel 4400 Heat Stress Tracker includes:**

- ☒ Protective transport case
- ☒ Kestrel vane mount
- ☒ Batteries - 2 AAA
- ☒ Kestrel Certificate of Conformity

The manufacturer reserves the right to amend the specification and therefore the information in this document may be subject to change. Please check our website [www.r-p-r.co.uk](http://www.r-p-r.co.uk) for details.