



 **Kestrel<sup>®</sup>**  
*Environmental Meters  
for Agriculture*

**Affordable, accurate environmental conditions monitoring across your entire agriculture or ranch operation.**

The Kestrel Agriculture line gives you reliable, site-specific weather data you can count on to make critical management decisions to increase yield, reduce losses and boost profit.

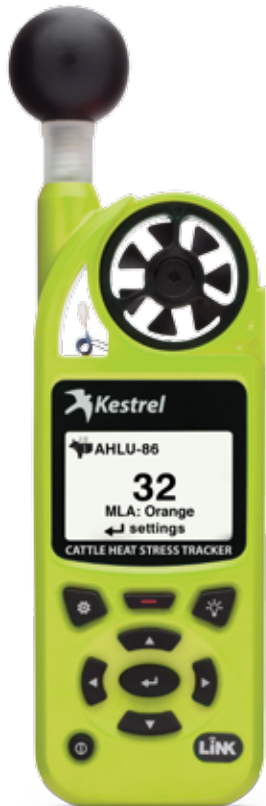




# Kestrel Agriculture Line of Environmental Monitoring Meters

Designed to meet the needs of **livestock production, crop production, and animal health professionals**, Kestrel Agriculture Meters provide essential micro-climate data needed for:

- Heat Stress Management
- Ventilation Assessments
- General Environmental Monitoring
- Commodity Storage
- Transport and Lairage Condition Monitoring
- Field & Harvest Condition Monitoring
- Spraying Compliance & Management



5400AG



5500AG



5000AG



D2AG

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**IP-67** sealed against water and dust, Kestrel Environmental Monitoring Meters are **portable, extremely rugged** and come backed by a **5-year warranty**.

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# Cattle Heat Stress



**Rising temperatures and humidity result in increasing body temperature of cattle with very negative consequences**, even in moderate climates. Heat stress causes a wide range of behavioral and medical issues in cattle – all of which cost the dairy or beef producer money:







## Measure

To provide more accurate management guidance, researchers and government agencies have developed a variety of cattle-specific measurements and management models which are conveniently available in the Kestrel Agriculture Meters:

-  **THI** Temperature-Humidity Index
-  **HLI** Heat Load Index
-  **AHLU** Accumulated Heat Load Units






## Manage

There are a variety of management options available depending on the site characteristics and options relevant to your location.

-  Improve air flow by removing obstructions
-  Wet the animals or the ground with sprinklers
-  Change the nutrition mix to a low heat increment diet
-  Change the feeding schedule
-  Increase the availability of water
-  Remove manure buildup

## Maximize

Implementing a measurement-based heat stress management plan helps you maximize herd performance and profits.

-  Increase Milk Production
-  Improve Weight Gain
-  Reduce Feed Loss
-  Reduce Veterinary Costs
-  Avoid Livestock Loss

Learn more at [www.cattleheatstress.com](http://www.cattleheatstress.com)

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**Annual losses are estimated to have averaged \$897 million in the dairy industry and \$369 million in the beef industry in the United States.**

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*Economic Losses from Heat Stress by US Livestock Industries. N.R. St-Pierre, B. Cobanov, G. Schnitkey, Journal of Dairy Science, Volume 86 Supplement*

# Kestrel Solutions

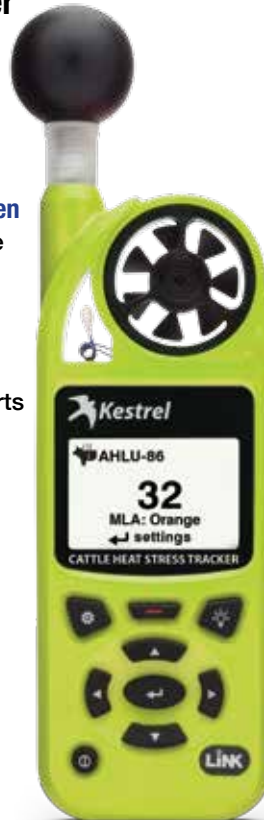
## Kestrel 5400AG Cattle Heat Stress Tracker

The Kestrel 5400AG Cattle Heat Stress Tracker offers **micro-climate measurement** and monitoring at the pen or yard location. Built-in Globe Temperature sensor and complete **cattle-specific calculations**. Measure THI and HLI and track AHLU based on **easy-to-input herd and pen parameters**. Perform spot checks or mount in place with the included vane mount accessory to track AHLU for months. LiNK capability allows remote access to current and logged data from your iOS or Android mobile device. Mount a cellular data equipped tablet within range to send threshold alerts even when you're not on site.

### Measures:

-  AHLU
-  HLI
-  THI
-  Wind Speed
-  Temperature
-  Relative Humidity





And More...



## Kestrel 5000AG Livestock Environmental Meter

The Kestrel 5000AG Livestock Environmental Meter offers the measurements you need for environmental assessments to confirm **Effective Cow Velocity (ECV), air speed at calf level, cold weather management, and livestock heat stress abatement**. Easily monitor and record barn conditions, storage conditions, transportation safety, field microclimates, spraying conditions, and more.

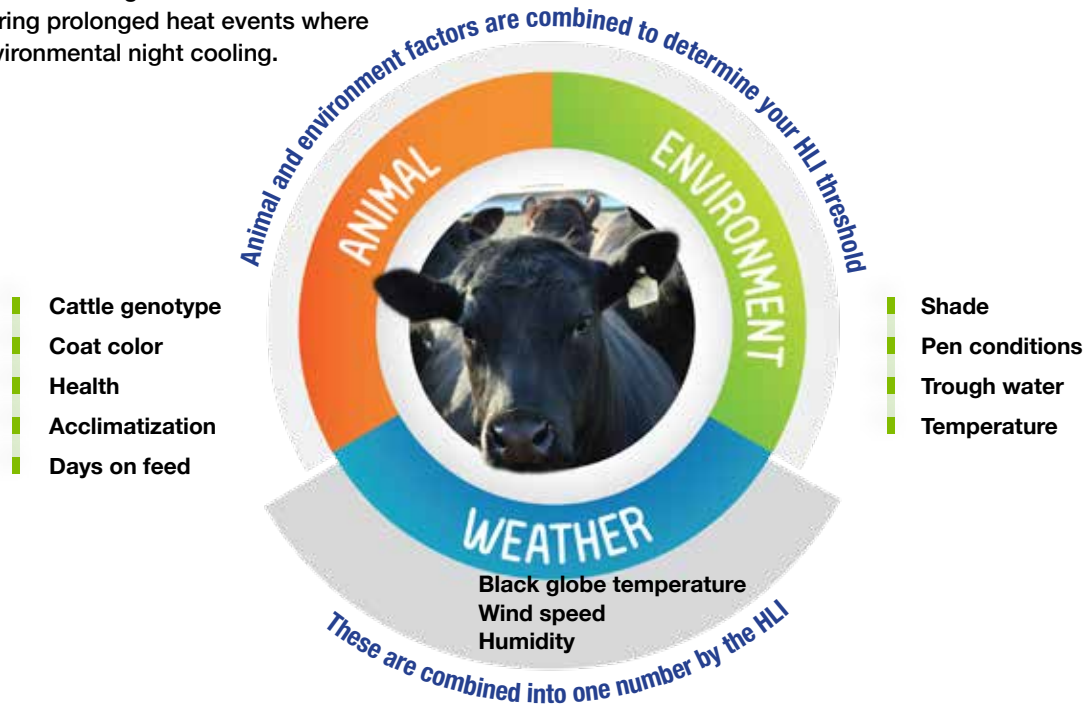
### Measures:

-  THI
-  Volume Air Flow
-  Air Speed
-  Temperature
-  Relative Humidity

And More...



**Accumulated Heat Load Units (AHLU)** is the most complete cattle heat stress model – addressing the fact that cattle accumulate heat load during prolonged heat events where they have insufficient environmental night cooling.



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## **OBJECTIVE AND ACCURATE MEASUREMENTS**

at pen level are critical to planning your heat management strategy.

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[www.cattleheatstress.com](http://www.cattleheatstress.com)

# Livestock Heat Stress

**Heat stress can reduce health, productivity and even cause death in livestock.** Any effective heat stress abatement plan must include knowledge of environmental conditions wherever livestock is housed. Using data from nearby weather stations does not always accurately reflect ground conditions.

## Measure

Small, rugged, extremely low cost and easily read on your mobile phone from up to 100' away, you can afford to place many Kestrel DROP data loggers around your facility.

-  Temperature
-  Relative Humidity
-  THI Temperature-Humidity Index



### The Kestrel DROP D2AG

*Livestock Heat Stress Monitor can be used in the holding pen, during transport, exhibition, auction, and at processing.*

## Manage

By using a Kestrel to monitor temperature, humidity and THI and referring to the heat stress threshold appropriate for their specific livestock, farmers can take appropriate cooling measures in time to prevent sickness and loss.

- Improve air flow
- Wet the animals or the ground with sprinklers (Caution when humidity is high)
- Implement heat stress management nutrition strategy
- Change the feeding schedule
- Increase the availability of water
- Reduce stocking density

## Maximize

Monitoring barn or housing conditions of livestock facilities helps you to maximize animal production and profits.

- Maintain Animal Health
- Improve Rate of Gain
- Increase Production
- Improve Reproduction Rates
- Prevent Spread of Disease and Loss



**High ambient temperatures have a negative effect on animal health and performance, costing billions of dollars in losses to global animal agriculture.**

*"Heat Stress: What's The Gut Got To Do With It?", Baumgard*




# Ventilation Assessments and General Environmental Monitoring

Ventilation systems in livestock housing, agriculture buildings, auction houses, and greenhouses contribute to overall animal/plant health and wellbeing. **Inefficient systems negatively affect air quality and the housing environment and cost you more money to run.**

## Measure

Easily capture and log vital environmental information with a rugged, handheld meter. With optional LiNK wireless transfer, current and logged data can be easily sent to your mobile device or laptop. NO complex volume air flow calculator needed.

 Wind (Air) Speed

 Temperature

 Relative Humidity

 THI

 Volume Air Flow

## Manage

Identify system inefficiencies and make adjustments to prevent a decrease in performance levels:

- Quantify air movement in the vicinity of livestock/plants
- Locate drafts
- Measure fan effectiveness
- Confirm duct discharge velocity

## Maximize

Maximize system efficiency and growth rate for increased profits.

- Increase Animal Comfort
- Improve Feed-Conversion Efficiency
- Increase Performance Levels
- Improve system efficiency

### The Kestrel 5000AG

*Livestock Environmental Meter offers the measurements you need for ventilation and general environmental assessments. Whether looking to confirm Effective Cow Velocity (ECV), air speed at calf level, cold weather conditions, or drafts, use a Kestrel 5000AG to monitor and record current conditions or track and log and historical conditions.*





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Some fans in the truck-holding area and receiving dock were not working efficiently and not all of the misters were operating effectively. Birds were observed panting, showing signs of heat stress. There is an economic advantage to having a good cooling system for reducing bird stress, yield loss and improving meat quality.

”

*Food Safety Magazine, Feb/March 2009*





“

I placed (the DROP) in the potato seed truck. It was nice not having to climb into the truck, attach a cable, and then download the data.

”

*Dr. Jeff Miller, Miller Research*



# Commodity Storage

All commodities require proper storage conditions. **Temperature and moisture control is essential to preserving quality, nutrient content, and controlling bacterial growth.**

Daily monitoring of temperatures, humidity levels, and other conditions is necessary to ensure a safe, compliant storage environment.

By proactively monitoring and managing the environment, you can ensure optimum storing conditions and maximize yield while preventing costly loss due to shrink and mold.



## The Kestrel DROP D2AG

*The Kestrel DROP D2AG can be used in the storage facility, field, and even during transport. Simply hang in place and wirelessly access current and historical data with your iOS or Android device.*

- Visible up to 100' away
- Months of data stored for download

Enzyme activity and micro-organism growth can be expected to increase dramatically when the moisture content of the air (relative humidity) in a storage bin rises **above 70%**, i.e., the relative humidity levels found in tough and damp grain. As a consequence, tough and damp grain that is stored at warm temperatures will rapidly spoil while dry grain stored at cool temperatures can be safely stored for a long period of time.

# Transport and Lairage Condition Monitoring



During consolidation and transport, an animal's stress level can be very high. **Extreme environment temperatures and/or humidity during livestock transportation increase the risk of stress, injury and mortality.**



## Kestrel Vane Mount

*The optional vane mount accessory turns any Kestrel Agriculture Meter into a portable monitoring station.*

## The Kestrel 5400AG & 5000AG

*Environmental Meters offer the measurements you need to keep animals safe during transport or lairage.*

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Many transit factors and their various combinations may impose stress upon the birds, but it is well recognized that thermal challenges and in particular heat stress constitute the major threat to animal well-being and productivity.

”

*Poultry Welfare Symposium Cervia*

## The Kestrel DROP D2AG

*can be used in the holding pen, during transport, exhibition, auction, and at processing. Simply hang in place. Current and historical conditions can be accessed with your iOS or Android device.*





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**Transport of livestock is undoubtedly the most stressful and injurious stage in the chain of operations between farm and slaughterhouse and contributes significantly to poor animal welfare and loss of production.**

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*FAO, Guidelines for Humane Handling, Transport and Slaughter of Livestock.*



# Field & Harvest Condition Monitoring & Spraying

Weather conditions can significantly impact safety and effectiveness in spraying as well as yield and quality of harvest. Whether determining when conditions are safe for spraying applications or logging growing degree days, **field-level data is critical.**

Work with the weather – not against it – to adapt application methods to current conditions maximizes application results, compliance and effectiveness.

## The Kestrel 5500AG

*Agriculture Weather Meter is a comprehensive tool for condition monitoring and recording. This handheld meter provides relevant and easily accessible data in the palm of your hand to make informed decisions whenever weather impacts yield and performance. With LiNK wireless functionality, get real-time readings on your phone or tablet on a customizable dashboard up to 100' away.*



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**Delta T is becoming one of the standard indicators for acceptable spray conditions. It is indicative of evaporation rate and droplet lifetime.**

*Australian Government Bureau of Meteorology,  
Weather for Pesticide Spraying*

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**Weather conditions such as wind, temperature, relative humidity and precipitation influence the effectiveness of spray applications and the potential for wastage by run-off and drift.**

*Ontario Ministry of Agriculture, Food and Rural Affairs  
“How Weather Conditions Affect Spray Applications*

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MEASUREMENTS	Kestrel DROP D2AG Livestock Heat Stress Monitor	Kestrel 5000AG Livestock Environmental Meter with LiNK	Kestrel 5500AG Agriculture Weather Meter with LiNK	Kestrel 5400AG Cattle Heat Stress Tracker
🌡️ Temperature	✓	✓	✓	✓
💧 Relative Humidity	✓	✓	✓	✓
HI🌡️ Heat Stress Index	✓	✓	✓	✓
🌡️🌫️ Temperature-Humidity Index (THI)	✓	✓	✓	✓
DP🌡️ Dew Point Temperature	✓	✓	✓	✓
🌀 Wind Speed/Air Speed		✓	✓	✓
❄️ Wind Chill		✓	✓	✓
WB🌡️ Wet Bulb Temp (Psychrometric)		✓	✓	✓
👤 Station Pressure (Absolute Pressure)		✓	✓	✓
📏 Barometric Pressure		✓	✓	✓
⬆️ Altitude		✓	✓	✓
🏔️ Density Altitude		✓	✓	✓
📦 Volume Air Flow		✓	✓	
🕒 Direction			✓	✓
☰ Crosswind			✓	✓
👤 Headwind/Tailwind			✓	✓
DT🌡️ Delta T			✓	✓
🌡️ Globe Temperature				✓
WB🌡️ Naturally Aspirated Wet Bulb Temp				✓
WB🌡️ Wet Blub Globe Temperature (WBGT)				✓
🌡️ Heat Load Index (HLI)				✓
🌡️ Accumulated Heat Load Units (AHLU)				✓
LiNK LiNK Wireless Data	✓	optional	optional	✓





**Measure. Manage.**  
**Maximize.**

[www.kestrelinstruments.com](http://www.kestrelinstruments.com)



DESIGNED & BUILT  
  
IN THE USA