

# **Kestrel® Pocket Weather® Meters Certificate of Conformity**

## **The Kestrel Pocket Weather Meter**

accompanying this Certificate of Conformity was manufactured by:

**Nielsen-Kellerman Co.**

at its facilities located at:

**21 Creek Circle, Boothwyn, PA 19061 USA**

*This product was produced under rigorous factory production control and documented standard procedures. It was individually inspected and tested for display, backlight, button and software functionality and its measurement performance was individually calibrated and tested against standards traceable to the National Institute of Standards and Testing ("NIST"). This product is certified to have performed at the time of manufacture in compliance with the specifications printed on the reverse.*

## **Methods Used in Calibration and Testing**

### **Wind Speed / Air Flow (All Kestrel Models):**

*Every Kestrel impeller is individually tested in a subsonic wind tunnel operating at approximately 1200 fpm (6.1 m/s) monitored by an ultrasonic time-of-flight anemometer (Gill Instruments, Model 1350) calibrated at low and high speeds to a minimum of +/- 0.6% by the National Institute of Standards and Testing (NIST) and further verified on a regular schedule by NK's internal measurement assurance program.*

### **Temperature (Kestrel 2000, 2500, 2500NV, 3000, 3500, 3500NV, 4000, 4000NV, 4100):**

*The temperature response of every unit is verified in comparison with a Eutechnics Precision Temperature 4600 Thermometer calibrated yearly to ensure accuracy and NIST traceability.*

### **Relative Humidity (Kestrel 3000, 3500, 3500NV, 4000, 4000NV, 4100):**

*Every unit undergoes a two-point calibration in humidity and temperature controlled chambers. Calibration is done at 75.5% RH and 32.5% RH at 25° C. The calibration chambers are monitored with a NIST- traceable chilled mirror hygrometer accurate to +/- 0.5% RH (EdgeTech DewPrime II). Following calibration, the performance of each instrument is further verified at an RH of approximately 43% against the DewPrime II instrument.*

### **Barometric Pressure (Kestrel 2500, 2500NV, 3000, 3500, 3500NV, 4000, 4000NV):**

*Every unit is tested against a Mensor Series 6000 digital pressure transducer at ~1,000 hPa, ~900 hPa, and ~500 hPa. The Mensor transducer is NIST traceable and accurate to +/- 0.2 hPa.*

**Manufactured, Calibrated and Tested September 2005**

Inspected By: \_\_\_\_\_

## Kestrel® Pocket Weather Meters Specifications

Measurement Response Time	Model	Units	Maximum Range	Resolution	Accuracy (+/-)	Specification Range
<b>Wind Speed (Air Velocity)</b> 1 second	All Models	m/s	0.4 to 60.0 m/s	0.1	Larger of 3% of reading or least significant digit	0.4 to 40.0 m/s
		ft/min	59 to 11,948 ft/min	1		59 to 7877 ft/min
		km/h	1.0 to 218.0 km/h	0.1		1.0 to 144.0 km/h
		mph	0.8 to 135.0 mph	1		0.8 to 89.0 mph
		knots	0.6 to 118.3 kt	0.1		0.6 to 78.0 kt
		Beaufort	0 to 12 B	0.1		0 to 12 B
1 inch diameter impeller with precision axle and sapphire bearings. Off-axis accuracy -1% @ 5° off-axis; -2% @ 10°; -3% @ 15°. Calibration drift < 1% after 100 hours use at 16 MPH / 7 m/s. Sustained operation above 60 MPH / 27 m/s will wear impeller rapidly and may cause destruction of impeller. Replacement impeller (NK PN-0801) may be field-installed without tools (US Patent 5,783,753).						
<b>Air Flow</b> 1 second	4100	cfm	0 to 99,999 cfm	1	Dependent upon accuracy of duct measurement.	0 to 99,999 cfm
		m³/h	0 to 99,999 m³/h	1		0 to 99,999 m³/h
		m³/m	0 to 99,999 m³/m	1		0 to 99,999 m³/m
		m³/s	0.0 to 9,999.9 m³/s	0.1		0.0 to 9,999.9 m³/s
		L/s	0 to 99,999 L/s	1		0 to 99,999 L/s
Automatically calculated from Air Velocity measurement and user-specified duct shape (circle or rectangle) and dimensions (units: in, ft, cm or m). Maximum duct dimension input: 258.0 in / 21.5 ft / 655.3 cm / 6.55 m.						
<b>Temperature</b> 1 second	2000 2500 3000 3500 4000 4100	°F	-49.0 to 257.0 °F	0.1	1.8 °F	-20.0 to 158.0 °F
		°C	-45.0 to 125.0 °C	0.1	1.0 °C	-29.0 to 70.0 °C
Measures air, water and snow temperature. Thermally isolated, hermetically sealed, precision thermistor mounted externally (US Patent 5,939,645). Calibration drift negligible. <b>NOTE: See "Functional Temperature Limits" below for further temperature range information.</b>						
<b>Relative Humidity</b> 1 minute	3000 3500 4000 4100	%RH	0.0 to 100.0 %	0.1	3.0 %RH	5.0 to 95.0 % non-condensing
Polymer capacitive humidity sensor mounted in thin-walled chamber external to case for rapid, accurate response (US Patent 6,257,074). (To achieve stated relative humidity accuracy, unit must be permitted to equilibrate to external temperature when exposed to large, rapid temperature changes and must be shielded from direct sunlight.) Calibration drift +/- 2% over 24 months. Relative humidity may be recalibrated at factory or in field using Kestrel Humidity Calibration Kit (NK PN-0824).						
<b>Pressure</b> 1 second <i>(mb &amp; PSI 4000 model only)</i>	2500 3500 4000	inHg	8.86 to 32.48 inHg	0.01	0.05 inHg	At 77.0 °F, <19,700 ft
		hPa / mb	300.0 to 1100.0 hPa / mb	0.1	1.5 hPa / mb	At 25.0 °C, <6,000 m
		PSI	PSI	0.1	PSI	At 77.0 °F, <19,700 ft
Monolithic silicon piezoresistive pressure sensor with second-order temperature correction. Maximum error beyond specified temperature, +/- 0.09 inHg / 3.0 hPa. Calibration drift typically -0.03 inHg / -1.0 hPa per year. Pressure sensor may be recalibrated at factory or in field.						
<b>Altitude</b> 1 second	2500 3500 4000	ft	-6000 to 30000 ft	1	50 ft	At 77.0 °F, <19,700 ft. Max error +/- 98 ft
		m	-2000 to 9000 m	1	15 m	At 25.0 °C, <6,000 m. Max error +/- 30 m
Temperature compensated pressure (barometric) altimeter.						
<b>Wind Chill</b> 1 second	2000 2500 3000 3500 4000 4100	°F	0.7 to 135.0 MPH, -49.0 to 257.0 °F	0.1	1.8 °F	1.8 to 89.0 mph, -50.0 to 50.0 °F
		°C	0.4 to 60.0 m/s, -45.0 to 125.0 °C	0.1	1.0 °C	0.4 to 40 m/s, -45.6 to 10.0 °C
Calculated from the primary measurements of wind speed and temperature. Utilizes the NWS Wind Chill Temperature (WCT) Index, revised 2001, with wind speed adjusted by a factor of 1.5 to yield equivalent results to wind speed measured at 10 m above ground. (Specification temperature limits established by WCT Tables.)						
<b>Heat Index</b> 1 minute	3000 3500 4000 4100	°F	0.0 to 100.0 %RH, -49.0 to 257.0 °F	0.1	3.6 °F	70.0 to 130.0 °F, 0 to 100% RH
		°C	0.0 to 100.0 %RH, -45.0 to 125.0 °C	0.1	2.0 °C	21.1 to 54.4 °C, 0 to 100 %RH
Calculated from the primary measurements of temperature and relative humidity. Utilizes the NWS Heat Index (HI) tables. (Specification temperature limits established by HI tables.)						
<b>Dewpoint</b> 1 minute	3000 3500 4000 4100	°F	0.0 to 100.0 %RH, -49.0 to 257.0 °F	0.1	3.6 °F	-20.0 to 158.0 °F, 20.0 to 95.0% RH
		°C	0.0 to 100.0 %RH, -45.0 to 125.0 °C	0.1	2.0 °C	-29.0 to 70.0 °C, 20.0 to 95.0 %RH
Calculated from the primary measurements of temperature and relative humidity. Temperature to which the air would need to be cooled at a constant pressure to become saturated.						
<b>Wet Bulb Temperature</b> 1 minute	3000 3500 4000	°F	-49.0 to 257.0 °F, 0.0 to 100.0 %RH, 8.86 to 32.48 inHg	0.1	3.6 °F	32.0 to 100.0 °F, 5.0 to 95.0% RH, 8.86 to 32.48 inHg, <19700 ft
		°C	-45.0 to 125.0 °C, 0.0 to 100.0 %RH, 300.0 to 1100.0 hPa	0.1	2.0 °C	0.0 to 37.8 °C, 5.0 to 95.0 %RH, -2000.0 to 9000.0 hPa, <6000 m
Calculated from the primary measurements of temperature, relative humidity and pressure. Equivalent to temperature indicated by a wet bulb psychrometer.						
<b>Density Altitude</b> 1 second	4000	ft	-49.0 to 257.0 °F, 0.0 to 100.0 %RH, 8.86 to 32.48 inHg	1	246	32.0 to 100.0 °F, 5.0 to 95.0 %RH, 8.86 to 32.48 inHg, <19700 ft
		m	-45.0 to 125.0 °C, 0.0 to 100.0 %RH, 300.0 to 1100.0 hPa	1	75	0.0 - 37.8 °C, 5.0 to 95.0 %RH, -2000 to 9000 hPa, <6000 m
Calculated from the primary measurements of temperature, relative humidity and pressure. Air density converted to equivalent sea level elevation at the International Standard Atmosphere.						
<b>Max / Average Wind Speed (Air Velocity)</b>	All Models	One-button clear and restart of Max Wind Gust and Average Wind measurement.				
<b>Pressure Trend</b>	2500 3500	Continuously updating three-hour barometric pressure trend indicator: rising rapidly, rising, steady, falling, falling rapidly.				
<b>Data Storage / Display</b>	4000 4100	Minimum, maximum, average and logged history stored and displayed for every measured value. 480-point data logger with graphical display. Auto data storage; interval settable from 2 seconds to 12 hours. Manual data capture.				
<b>Data Upload</b>	4000 4100	Requires optional PC interface (NK PN-0830) and provided software. RS-232 connection with USB adapter available.				
<b>Display</b>	1000 2000 3000	Reflective 3 1/2 digit LCD. Digit height 0.36 in / 9 mm.				
	2500 3500	Reflective 4 digit LCD. Digit height 0.36 in / 9 mm.				
	4000 4100	Multifunction, multi-digit programmable dot-matrix display.				
<b>Display Update</b>	All Models	1 second.				
<b>Languages</b>	4000 4100	English, French, German, Italian, Spanish.				
<b>Display Backlight</b>	2000 2500 3000 3500	Aviation green electroluminescent backlight.				
	4000 4100	Choice of aviation green or visible red (4000 only) electroluminescent backlight. Automatic or manual activation.				
<b>Clock / Calendar</b>	2500 3500	Real-time hours:minutes clock.				
	4000 4100	Real-time hours:minutes:seconds clock, calendar, automatic leap-year adjustment.				
<b>Functional Temperature Limits</b>	All Models	The liquid crystal display and batteries will not function below 14 °F / -10 °C, and <b>damage to both may result if the unit temperature exceeds 131 °F / 55 °C</b> . Readings may be taken beyond these functional limits, to the limits of the maximum ranges listed above, by maintaining the unit within these functional limits and exposing it to temperature extremes for the minimum time necessary to take a reading (30 seconds to 1 minute).				
<b>Storage Temperature</b>	All Models	-22 °F to 140 °F / -30 °C to 60 °C.				
<b>Auto Shutdown</b>	2000 2500 3000 3500	After 45 minutes of no key presses.				
	4000 4100	User-selectable: 15 or 60 minutes with no keypresses or disabled.				
<b>Languages</b>	4000 4100	English, French, German, Italian, Spanish.				
<b>Certifications</b>	All Models	CE certified. Individually tested to NIST-traceable standards (written certificate of tests available at additional charge).				
<b>Batteries</b>	2000 2500 3000 3500	CR2032, one, included. Average life, 300 hours of use, +/- depending on backlight use.				
	4000 4100	AAA Alkaline, two, included. Average life, 400 hours of use, +/- depending on backlight use.				
<b>Sealing</b>	All Models	Waterproof (IP67 standard).				
<b>Dimensions</b>	2000 2500 3000 3500	Unit 4.8 x 1.7 x 0.7 in / 122 x 42 x 18 mm. Case 4.8 x 1.9 x 1.1 in / 122 x 48 x 28 mm.				
	4000 4100	Unit 5.0 x 1.8 x 1.1 in / 12.7 x 4.5 x 2.8 cm.				
<b>Weight</b>	2000 2500 3000 3500	Unit 2.3 oz / 65 g. Case 1.3 oz / 37 g.				
	4000 4100	Unit 3.6 oz / 102 g.				