



**Kestrel Weather Meters**  
**Model Numbers 1000-3550**



## **Certificate of Conformity**

This instrument was produced under rigorous factory production control and documented standard procedures. It was individually inspected and leak tested and the functioning of the display, backlight, buttons and firmware was verified. The accuracy of each of its primary measurements was individually calibrated and/or validated against standards traceable to the National Institute of Standards and Technology (“NIST”) or other calibrated standards in accordance with the documented standard test methods detailed below. This instrument is warranted to perform in compliance with the published specifications for the specific measurements and features of its model number including specified typical drift since its date of manufacture. (See *Kestrel Limited Warranty for full warranty terms.*)

### **Standards Used in Testing**

#### **Wind Speed:**

The Kestrel Weather & Environmental Meter impeller installed in this unit was individually tested in a subsonic wind tunnel operating at approximately 300 fpm (1.5 m/s) and 1200 fpm (6.1 m/s) monitored by a Gill Instruments Model 1350 ultrasonic time-of-flight anemometer. The Gill 1350 is calibrated regularly and is traceable to NIST with a maximum combined uncertainty of  $\pm 1.04\%$  within the airspeed range 711.4 to 3930 fpm (3.61 to 19.96 m/s), and  $\pm 1.66\%$  within the airspeed range 170 to 711.4 fpm (0.86 to 3.61 m/s).

#### **Temperature:**

Temperature response is verified in comparison with an Ametek DTI-050 Digital Temperature Indicator and STS Reference Sensor. The DTI-050 is calibrated annually and is traceable to NIST with a maximum relative expanded uncertainty of  $\pm 0.04\text{C}$ .

#### **Relative Humidity:**

Relative humidity is verified in comparison with an Edgetech HT120 Humidity Transmitter. The HT120 is calibrated annually and is traceable to NIST with a maximum relative expanded uncertainty of  $\pm 1.0\%RH$ .

#### **Barometric Pressure:**

Pressure response is verified against a Vaisala PTB210A Digital Barometer. The Vaisala Barometer is calibrated annually and is traceable to NIST with a maximum relative expanded uncertainty of  $\pm 0.3hPa$ .

#### **Approved By:**

**Michael Naughton**  
Chief Product Officer, Nielsen-Kellerman

# Product Specifications for Kestrel Weather Meters, Model Numbers 1000-3550

## SENSORS

SENSOR	ACCURACY (+/-)	RESOLUTION	SPECIFICATION RANGE	NOTES
Wind Speed   Air Speed	Larger of 3% of reading, least significant digit or 20 ft/min	0.1 m/s 1 ft/min 0.1 km/h 0.1 mph 0.1 knots 1 B*	0.6 to 40.0 m/s 118 to 7,874 ft/min 2.2 to 144.0 km/h 1.3 to 89.5 mph 1.2 to 77.8 knots 0 to 12 B*	1 inch 25 mm diameter impeller with precision axle and low-friction Zytel® bearings. Startup 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 startup. Off-axis accuracy -1% @ 5° off axis; -2% @ 10°; -3% @ 15°. Calibration drift < 1% after 100 hours use at 16 MPH  7 m/s. Replacement impeller (NK PN-0801) field installs without tools (US Patent 5,783,753). Wind speed calibration and testing should be done with triangle on impeller located at the top front face of the Kestrel. Measuring wind speeds above 60 m/s / 134.2 mph can damage the impeller. *Beaufort not available on ballistics units.
Ambient Temperature	0.9 °F 0.5 °C	0.1 °F 0.1 °C	-20.0 to 158.0 °F -29.0 to 70.0 °C	Airflow of 2.2 mph 1 m/s or greater provides fastest response and reduction of insulation effect. For greatest accuracy, avoid direct sunlight on the temperature sensor and prolonged sunlight exposure to the unit in low airflow conditions. Calibration drift is negligible for the life of the product. For further details, see Display & Battery Operational Temperature Limits.
Relative Humidity	3%RH	0.1 %RH	5 to 95% 25°C non-condensing	To achieve stated accuracy, unit must be permitted to equilibrate to external temperature when exposed to large, rapid temperature changes and be kept out of direct sunlight. Calibration drift is typically less than ±0.25% per year.
Pressure	1.5 hPa mbar 0.044 inHg 0.022 PSI	0.1 hPa mbar 0.01 inHg 0.01 PSI	25°C/77°F 750-1100 hPa mbar 22.15-32.48 inHg 10.88-15.95 PSI	Monolithic silicon piezo-resistive pressure sensor with second-order temperature correction. Between 1100-1600 mbar, unit will operate with reduced accuracy. Sensor may not operate above 1600 mbar and can be damaged above 6,000 mbar or below 10 mbar. Calibration drift is negligible for the life of the product.
Compass	5°	1° 1/16th Cardinal Scale	0 to 360°	2-axis solid-state magneto-resistive sensor mounted perpendicular to unit plane. Accuracy of sensor dependent upon unit's vertical position. Self-calibration routine eliminates magnetic error from batteries or unit and must be run after every full power- down (battery removal or change). Readout indicates direction to which the back of the unit is pointed when held in a vertical orientation.

## CALCULATED MEASUREMENTS

MEASUREMENT	ACCURACY (+/-)	RESOLUTION	SENSORS EMPLOYED
Altitude	typical: 23.6 ft/7.2 m from 750 to 1100 mBar max: 48.2 ft/14.7 m from 300 to 750 mBar	1 ft 1 m	Pressure, User Input (Reference Pressure)
Barometric Pressure	0.07 inHg 2.4 hPa mbar 0.03 PSI	0.01 inHg 0.1 hPa mbar 0.01 PSI	Pressure, User Input (Reference Altitude)
Delta T	3.2 °F 1.8 °C	0.1 °F 0.1 °C	Temperature, Relative Humidity, Pressure
Dew Point	3.4 °F 1.9 °C 15-95% RH. Refer to Range for Temperature Sensor	0.1 °F 0.1 °C	Temperature, Relative Humidity
Heat Index	7.1°F 4.0°C	0.1 °F 0.1 °C	Temperature, Relative Humidity
THI (NRC)*	1.5 °F 0.8 °C	0.1 °F 0.1 °C	Temperature, Relative Humidity
THI (Yousef)*	2.3 °F 1.3 °C	0.1 °F 0.1 °C	Temperature, Relative Humidity
Wet Bulb Temperature - Psychrometric	3.2 °F 1.8 °C	0.1 °F 0.1 °C	Temperature, Relative Humidity, Pressure
Wind Chill	1.6 °F 0.9 °C	0.1 °F 0.1 °C	Wind Speed, Temperature

## ADDITIONAL PRODUCT INFO

Display	Reflective LCD
Backlight	Standard or dim red (NV models only) backlight. Manual activation with auto-off.
Response Time & Display Update	Display updates every 1 second. After exposure to large environmental changes, all sensors require an equilibration period to reach stated accuracy. Measurements employing RH may require longer periods particularly after prolonged exposure to very high or very low humidity.
Auto Shutdown	After 45 minutes with no key presses.
Clock	Real Time Hour:Minute Display
Certifications	CE certified, UKCA, RoHS, and WEEE compliant. Individually tested to NIST-traceable standards.
Origin	Designed and manufactured in the USA from US and imported components. Complies with Regional Value Content and Tariff Code Transformation requirements for NAFTA Preference Criterion B.
Bluetooth® Data Connect	Wireless range up to 100ft. Employs Kestrel LiNK protocol for data transmission with Kestrel LiNK and Kestrel LiNK Ballistics App. (iOS/Android)
Battery	Requires one CR2032 battery, included. Up to 300 hours of use, reduced by backlight or Bluetooth use.
Shock Resistance	MIL-STD-810H, Transit Shock, Method 516.8 Procedure IV; unit only; impact may damage replaceable impeller.
Sealing	Waterproof (IP67 and NEMA-6)
Display & Battery Operational Temperature Limits	14° F to 131° F   -10 °C to 55 °C Measurements may be taken beyond the limits of the operational temperature range of the display and batteries by maintaining the unit within the operational range and then exposing it to the more extreme environment for the minimum time necessary to take reading.
Storage Temperature	-22.0 °F to 140.0 °F   -30.0 °C to 60.0 °C.
Altitude Operating Range	Sea level to 10,000m / 33,000 ft
Pollution Degree of the Intended Environment	4
Size & Weight	4.8 x 1.9 x 1.1 in   12.2 x 4.8 x 2.8 cm, 3.6 oz   102 g (Including slip-on cover).

Note: Accuracy calculated as uncertainty of the measurement derived from statistical analysis considering the combined effects from primary sensor specifications, circuit conversions, and all other sources of error using a coverage factor of k=2, or two standard deviations (2σ)

Note: For Kestrel 1000, 2000, 2500, 2700, 3000, 3500, 3550 series these specifications are valid for units with a serial number higher than 2262687. If your product has a lower serial number, please reference the K4000 specifications 329011.



## EC DECLARATION OF CONFORMITY TO EMC DIRECTIVE 2004/108/EC

**MANUFACTURER:** Nielsen-Kellerman, Inc.  
21 Creek Circle  
Boothwyn, PA 19061 USA

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**PRODUCT:** Kestrel Pocket Wind / Weather Meter

<b>MODELS:</b>	<b>Model No.</b>	<b>Measurements</b>
	1000	Wind Speed / Air Velocity
	2000	Wind Speed / Air Velocity, Temperature
	3000	Wind Speed / Air Velocity, Temperature, Humidity

<b>REFERENCE STANDARDS:</b>	<b>Emissions:</b>	<b>Description:</b>	<b>Reference:</b>
	EN 61326-1:2006	Radiated Disturbance	CISPR 11:2003, Class B

<b>Immunity:</b>	<b>Description:</b>	<b>Reference:</b>
EN 61326-1:2006	Electrostatic Discharge	IEC 61000-4-2:2001
Immunity requirement	Radiated RF Interference	IEC 61000-4-3:2002
(Annex A)	Power Frequency Magnetic Field	IEC 61000-4-8:1993 (3A/m level test reference selected from the test standard EN 61000-6-1:2001, Light Industrial Generic.)

**DECLARATION:** Nielsen-Kellerman, Inc. declares that the above Products, to which this Declaration relates, are in compliance with the Council Directive 2004/108/EC (December 15, 2004) on Electromagnetic Compatibility and are CE-marked accordingly. These products have been independently tested and demonstrated to comply with the technical requirements concerning the applied sections of the above test standards for electrical equipment for measurement, control and laboratory use (battery powered).

This Declaration of Conformity is issued based upon compliance testing of the Kestrel 3000 model, selected in accordance with the "Worst Case Approach" described in the "Guide for the EMC Directive 2004/108/EC" (21st May 2007), section 3.2.1.1:

1. Where a range of instruments share a common PCB and key components the "Worst Case Apparatus" is EMC tested;
2. The Worst Case Apparatus is considered to be the product with all possible options included;
3. No situation has been identified where a product with fewer options fitted could have a worse EMC performance than the Worst Case Apparatus.

All technical documentation and test results relevant to this Declaration are maintained at the headquarters of Nielsen-Kellerman at 21 Creek Circle, Boothwyn, PA 19061 USA.

The below named signatory is a Nielsen-Kellerman officer and employee authorized to execute this Declaration on behalf of the Company.

**AUTHORIZED SIGNATURE:**

**NAME:** Paul Nielsen, Vice-President of Engineering

**TEST PERIOD:** 1<sup>st</sup> to 4th August 2006, 8th September 2008

**CERTIFICATE DATE:** 1<sup>st</sup> January 2009