CHART A TEMPERATURE TEST

	TEMP 1	TEMP 2	TEMP 3	TEMP 4	TEMP 5
SKYWATCH ATMOS	33 F	40	49	58	71
SKYWATCH METEOS	33	43	52	60	73
SKYWATCH XPLORER2	31.2	43.7	51	59	69.6
SKYWATCH XPLORER4	31.2	42.2	50.9	58.8	69.8
SKYWATCH GEOS 11	30.9	42.5	51.1	59	70.2
KESTREL 3500	33	41.7	51	59.8	71.1
KESTREL 4000	32.5	42.1	51.2	59.6	71.2
SPEEDTECH SKYMATE	32.6	41.6	51.5	59.2	70.1
SPEEDTECH SKYMASTER	26.2	39.2	49.6	57.8	69.1
SPEEDTECH ECO EDGE	31.4	40.8	50.5	60	70.1
RANGE	7%	11%	6%	4%	6%

All temperatures are expressed in degrees Fahrenheit.

The range is the difference between the highest and lowest temps, expressed as a percentage. The range was the highest—and the devices' readings varied the most—at lower temperatures. However, most of the devices' performances fall within the manufacturers' claims for accuracy.

CHART B BAROMETRIC PRESSURE TEST

	BARO 1	BARO 2	BARO 3	BARO 4	BARO 5	BARO 6
SKYWATCH XPLORER4	1009.3	1006.8	1006.0	1006.4	1016.8	1017.5
SKYWATCH GEOS 11	1010.2	1007.7	1006.8	1007.1	1017.7	1018.3
KESTREL 3500	1008.8	1006.3	1005.2	1005.5	1015.9	1016.5
KESTREL 4000	NA*		1004	1004	1015	1015
SPEEDTECH SKYMASTER	1014	1011	1010	1010	1019	1021
SPEEDTECH ECO-EDGE	1008	1005	1004	1004	1015	1016
RANGE	5.2	8.0	4.8	4.5	4.0	6.0

All barometric pressure readings expressed in millibars, but were taken using kilopascals (kPa). (1 kPa = 10 mb)
* These readings omitted because they were taken at a preset, not an actual, reference for QNH.

All of the barometric readings tally closely if they are zeroed out. Remember, a barometer needs to be calibrated against a known value and compensated for elevation.

CHART C WIND SPEED TEST

	SPEED 1	SPEED 2	SPEED 3	SPEED 4	SPEED 5
SKYWATCH EOLE	2.1 / 2.3	2.8 / 3.1	4.2	7.8 / 8	9.5
SKYWATCH ATMOS	2	2	4	8	10
SKYWATCH METEOS	1.7 / 2.1	2.4 / 2.8	3.9 / 4.2	8.1 / 8.5	9.5 / 9.9
SKYWATCH XPLORER2	3.5	4.4	6.7	11	13.2
SKYWATCH XPLORER4	3.2	4.3	6.3	11.2	13
SKYWATCH GEOS 11	N/R	N/R	N/R	7.6	10.3
KESTREL 1000	3.5	4.3	5.9	9.6	11.2
KESTREL 3500	3.6	4.3	5.8	10	11.6
KESTREL 4000	3.5	4.2	6	9.9	11.2
SPEEDTECH SKYMATE	3.6 / 3.8	4.1 / 4.3	6 / 6.2	9.5 / 9.7	10.8
SPEEDTECH SKYMASTER	3.3	4.2	6.2	10.4	12.2
HIGH / LOW AVERAGE	3.7 / 1.9	4.4 / 2	6.7 / 4	11.2 / 7.6	13.2 / 9.5

Speeds are measured in knots. Where two speeds are given, the reading flipped constantly between the two numbers listed.

The Skywatch models showed consistently lower wind speeds. To see whether this was a result of the test setup, we compared the Atmos and the Kestrel 3500 outdoors. There, the measurements were more in sync. The Xplorer models seemed more enthusiastic than the others at higher wind speeds, so we pitted the Xplorer 2 against the Kestrel 3500. The Xplorer continued to show higher readings. The Skywatch Geos, which has a small prop-style impeller, didn't begin registering until Speed 4, when it showed readings closer to those of the Eole.

Measuring Schtik

The handheld weather instrument test had four main evaluation points: usefulness, ease of use, ergonomics, accuracy/consistency. To determine usefulness, testers considered the data each device provided and how well it met the needs of mariners. For ease of use, testers looked for the most accessible format that was easy to manipulate. To rate ergonomics, testers weighed how each device felt in the hand, whether it gripped well, and whether it felt robust enough for marine duty. Consistency was determined by how each instrument compared to the others in terms of accuracy.

The first three areas have a strong subjective element. Someone who uses a lot of gadgets might find all of these instruments intuitive. A less techy individual might want fewer functions and more buttons with which to scroll between them. Mariners have specific needs with regard to weather readings. Sailors heading out for a day or an afternoon can probably get what they need from the media and the NOAA VHF broadcasts. Those with longer-range plans want to be able to follow trends so as to make informed prognostications for what might be coming their way in a day or two.

If these readings are to be made at sea, the instrument needs to be rugged, easy to use with one hand while holding onto the boat with the other, and offer a clear display. Gloves inhibit dexterity, so to be useful in cold weather, the instrument's buttons need to be accessible for gloved hands and not too close together.

Because we did not have access to the Bureau of Standards calibrated comparators for the consistency test, we simply placed the instruments in controlled environments and observed how their readings compared. Standing outdoors with two wind gauges in one hand and a notebook in the other proved pointless. Wind strength and direction is so variable even in an open field that readings were never constant enough for us to make fair comparisons, so we resorted to the lab approach. Using a length of pipe and a fan, we created a small draft generator. By controlling the fan with a rheostat, we could reproduce—with reasonable consistency—a range of steady "winds," and by clamping the devices at a fixed distance from the nozzle, we could take "same conditions" measurements with them. (See results, Chart C at left.)

To track temperature (Chart A), humidity, and barometric readings (Chart B), we simply moved the instruments between a heated office, a basement, and an outdoor shed, leaving them each place long enough to acclimate. The one calibration we were able to reach was the melting point of ice. We set the Xplorer2, which was rated as waterproof, in ice water that had reached an equilibrium. The number thus obtained was close enough to the temperature in the frigid shed to serve as a standard for comparing the other devices.