

Nonin Medical SpO₂ Sensor Most Durable Compared to Envitec, Unimed, and Cables & Sensors Brands

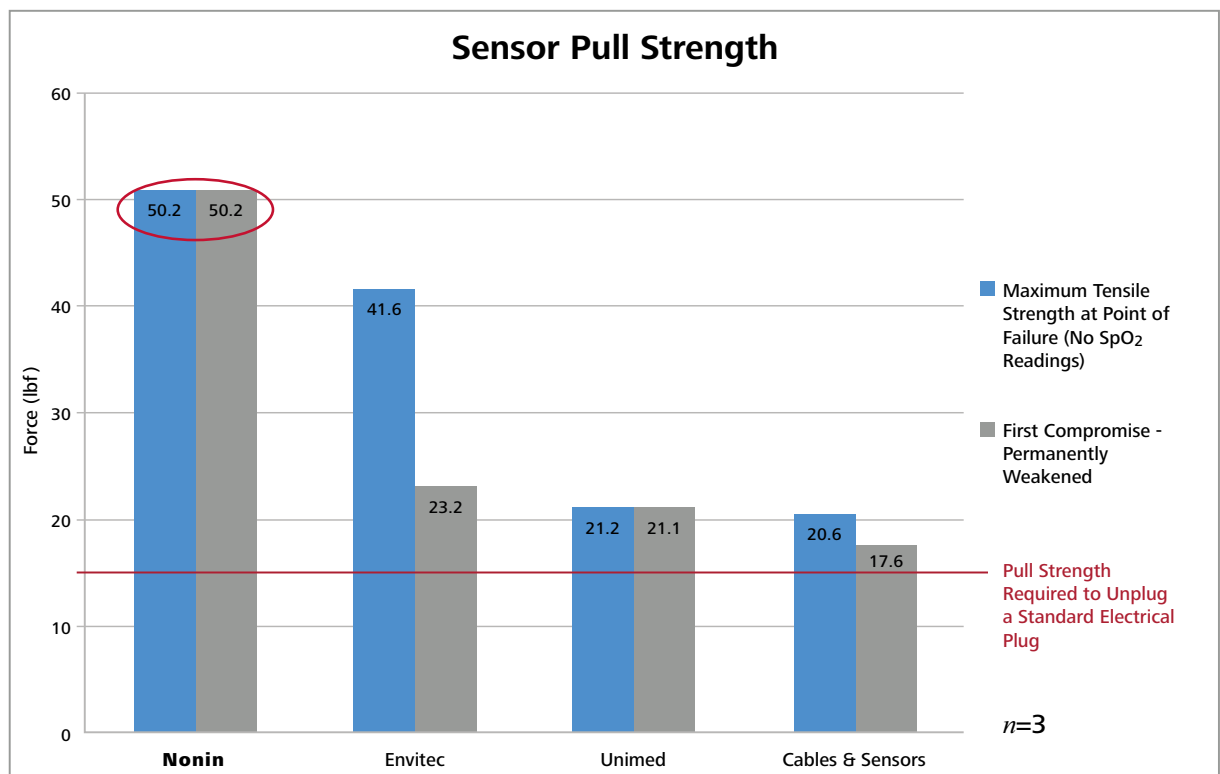
Greater Durability Can Contribute to Lower Overall SpO₂ Costs

INTRODUCTION

An independent laboratory test comparing Nonin Medical's 8000AA Adult Pulse Oximetry Sensor with three competitive finger clip pulse oximeter sensors (labeled and promoted as "Nonin Compatible") was performed in order to compare aspects of durability. The tested brands included Nonin Medical, Envitec, Unimed, and Cables & Sensors. Specifically, the test sought to quantify and compare the maximum amount of force which can be applied to the sensor-end of the SpO₂ finger clip sensors before signal transmission from the sensor to the oximeter failed.

As Figure 1 shows, the Nonin 8000AA sensor displayed the greatest durability among the sensors tested. Even more significantly, the structural integrity of the Nonin sensor was never compromised until the sensor reached its average failure point of 50.2 lbs of force. In comparison, other sensor brands became structurally compromised and permanently weakened *at less than half of the strength of force exerted on the Nonin sensor before signal transmission failure.*

FIGURE 1. Nonin sensors displayed the greatest durability among sensors tested. Unlike other sensor brands, Nonin sensors remained uncompromised until their breaking point.



METHODS

Four brands of pulse oximeter clip sensors underwent a mechanical pull test at The Specialty Lab, Inc. in Minneapolis, Minnesota. Using a mechanical pull fixture, gradual force was applied to the sensors' cables. The objective of this testing was to measure the tensile force on the sensor cable until the point where pulse oximeter signal transmission failure occurred, as verified by loss of reading on the pulse oximeter monitor. Testing was performed on three samples from four different manufacturers.

The four sensor brands included:

- Nonin Medical adult SpO₂ reusable sensor, model 8000AA
- Envitec reusable SpO₂ adult finger sensor, model F-3012
- Unimed reusable adult finger SpO₂ sensor, model/catalogue number U410-08L
- Cables & Sensors reusable adult finger SpO₂ sensor, model/catalogue number S403-080

Test equipment included:

- Instron TTC Automated Material Tester
- Instron TTC Weights
- Nonin Model 7500

TEST PROCEDURE

The testing session began by connecting each manufacturer's sensor to the Nonin Model 7500 pulse oximeter. A finger simulator was then inserted into the sensor to verify functionality. Next, the sensor was inserted into the bottom restraint fixture of the mechanical pull tester and the cable was secured to a cable restraint fixture. For testing consistency, the same amount of cable length was left between each restraint fixture at the beginning of each test. The gauge was then zeroed out while no tension was applied to the sensor. Finally, the mechanical pull tester was started, pulling at a rate of 2.0 in/min. The pull test was halted the instant readings were lost on the oximeter monitor. The maximum tension was recorded, and a plot of load versus displacement was generated for the report. The entire procedure was repeated for an additional two samples of each brand under test.

RESULTS

As Figure 2 shows, the Nonin Medical 8000AA SpO₂ sensor endured the most amount of force and continued to perform with over 50 lbs of force applied. Other sensors that were tested in this session market and label themselves as "Nonin Compatible." When tested with Nonin oximeters, competitive sensor performance was compromised well before the point of complete breakage and failure.

FIGURE 2. Test results showed the Nonin sensor was the most durable over Envitec, Unimed, and Cables & Sensors brands.

Sensor	Force at First Compromise (lb)	Force at Failure (lb)
Nonin	50.2	50.2
Envitec	23.2	41.6
Unimed	21.1	21.2
Cables & Sensors	17.6	20.6

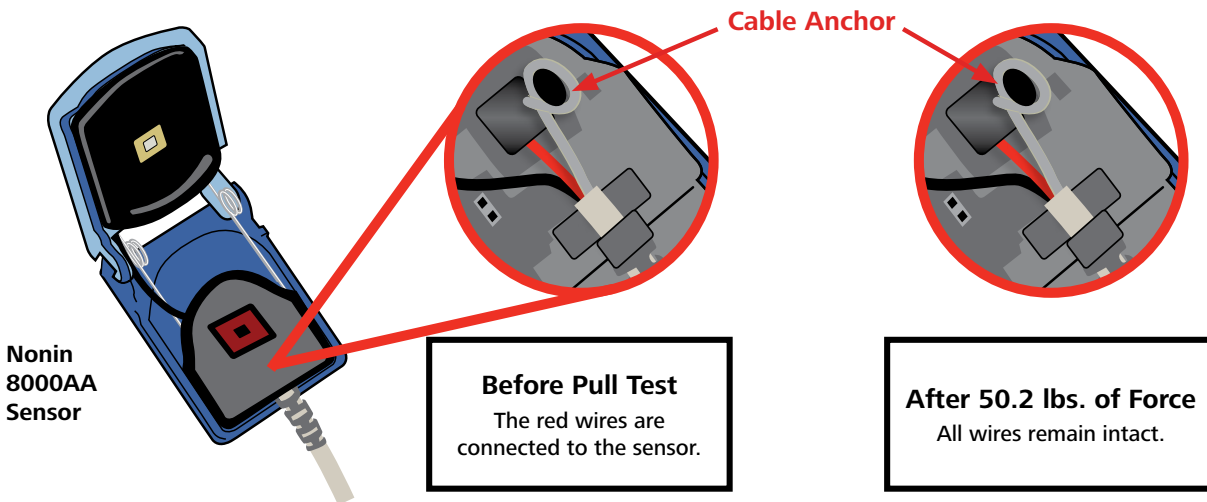
n=3; numerical averages displayed

- The Nonin sensor was strongest and **never failed or broke** with up to **50.2 lbs. of force.**
- The Nonin sensor **showed no compromise** up to **50.2 lbs. of force.**

CONCLUSION

Sensor replacement is often the most significant expense in the cost of ownership of pulse oximetry patient monitoring. Sensors must be able to withstand the rigors of a fast-paced healthcare environment. They get pulled, caught, dropped and damaged on a regular basis. In addition, testing shows that sensors start to break even though damage to them may not be readily visible. The shortened lifespan due to compromise and breakage leads to increased sensor replacement costs.

FIGURE 3. Nonin's unique cable anchor technology protects cable conductor wires from pulling forces.



The key to Nonin sensor durability is the sensor's unique cable anchor design feature (Figure 3). Using the same material found in bullet-proof vests, Nonin's cable fiber is anchored at both ends of the sensor and provides a strong, stretch-resistant construction that protects the cable's conductor wires from pulling forces.

Nonin Medical's 8000AA Pulse Oximetry Clip Sensor has proven durability, which can lead to lower replacement costs and a lower cost of ownership.











Nonin sensor durability, in combination with the industry-leading accuracy provided by Nonin PureLight® sensor and PureSAT® patented signal processing technologies, offers reliable performance and safety that clinicians trust.

CAUTION

Accuracy, safety and durability depend on complete system performance. Mixing Nonin oximeters with other manufacturers' sensors could compromise performance and patient safety. **Beware of sensors claiming to be compatible with Nonin pulse oximeters; order sensors only from an authorized Nonin Medical dealer.**

ISO Standards 80601-2-61:2011 for pulse oximetry state that "pulse oximeter probes and probe cable extenders are as important in establishing the safety and accuracy of the complete pulse oximeter equipment as is the pulse oximeter monitor itself." Nonin Medical is fully compliant in meeting this international quality standard.

Nonin's Durable SpO₂ Sensors are Designed for a Wide Range of Patient Sizes, Ages and Conditions

					
Sensors		Handhelds	Tabletops	WristOx ₂ Model 3150	OEM/Xpod
	Soft, 8000S Series	✓	✓	✓	✓
	Cloth, 6000C Series*	✓	✓	✓	✓
	Flexi-Form® III, 7000 Series*	✓	✓	✓	✓
	FlexiWrap®, 8000J - 8001J - 8008J Series	✓	✓	✓ (8001J Only)	✓
	Durafoam, 6500 Series*	✓	✓	✓	✓
	Clip 8000AA - 8000AP Series	✓	✓	✓	✓

* Requires adapter for use with WristOx₂®, Model 3150

Visit nonin.com/producttraining for the Nonin Pulse Oximeter and Sensor Compatibility Guide and Nonin SpO₂ sensor user training videos.