

## **Cell specifications and use.**

### **CE Approval:**

**These sensors have been tested in various units to EN14143. It has passed those tests in the equipment we are most concerned with and we retained the coaxial (SMB) connector as the most suitable for our application.**

**These sensors are in compliance to the following:**

**BS EN 60601-1-2, ASTM F 1462, ASTM F 1463, ISO 7767, ISO 9703-1, ISO 9703-2, EN/IEC 60601-1, MIL-STD810E.**

**The sensors are manufactured in accordance with ISO 9001 and also ISO 13485 accreditation.**

**In the absence of any specific standard/s for dive sensors, the new generation sensors are currently manufactured in accordance to the applied standards EN 50270, EN 50104/A1, EN 61010-1 and EN61326-1.**

**If we ever get a dive sensor EN standard it may also be required that a notified body number be applied next to the CE mark. We are at present taking advice and depending on the ruling will carry out the required procedures for compliance.**

**There is no way that a manufacturer of sensors can fully test sensors in every piece of equipment in which they can be used. We test the sensors in laboratory testing and in simulators (such as ANSTI), but it is better and more honest not to make any claims that we cannot 100% substantiate.**

### **About Vandagraph:**

**Historically ( about 40yrs) John Lamb has supplied Teledyne Analytical Instruments (TAI) sensors. Over the last 15years or so he has supplied TAI sensors into the recreational diving industry. Over this period he has modified the standard R-22MED sensor into the R-22D. This has involved the addition of hydrophobic membranes , conformal coating to the pcb , and variations in the temperature compensation electronics. Non of the modifications were major changes. When TAI pulled out of recreational diving the need for good reliable sensors for rebreathers remained and he was in a good position to ensure it could be fulfilled. Over the last 35 years he has been approached by all the major oxygen sensor manufacturers and some of the minor ones. Most of them could not meet TAI consistency or quality. For your information there are companies manufacturing galvanic oxygen sensor for niche markets. Some of these companies have a good basic product but do not have the knowledge to manufacture sensors for our market. However one company he has been able to work with for over 10 years and they have manufactured relatively small quantities ( it still adds up to thousands over the years ) of sensors to fit gaps in the TAI range. Historically he has been impressed with the stability, quality and long life. It therefore made sense to approach them and teach them to manufacture a diving sensor. Due to the litigation floating around they are not interested in manufacturing diving sensors. However he persuaded them to manufacture the basic core for him and enclose it in a plastic housing which he specified. John has specified all the changes that he believes are needed to enable this sensor to be used in rebreathers.**

In his historic association with the new company he has seen various manufacturing processes not employed by TAI that can vastly improve the sensors and make them even more re-breather friendly. These have been incorporated and should have three major effects:

- 1) less chance of electrolyte leakage.
- 2) Tighter output tolerances.
- 3) Better stability.

The sensors we have have been through the ANSTI tests and passed. However examining the tests and his experience with re-breather sensors has lead him to believe the sensors can be refined further in the future. He has also noted that the temperature compensation specification needs to be understood by manufacturers. At present all different manufacturers sensors will react differently to temperature over the first 20-30 minutes of the dive. It is our opinion that different manufacturers sensors should not be mixed.

#### **Use of our sensors and Conditions of sale:**

These sensors have been tested in various units to EN14143. It has passed those tests in the equipment we are most concerned with and we retained the coaxial (SMB) connector as the most suitable for our application as a rebreather sensor.

For use in equipment other than that specifically stated as compatible, Vandagraph Sensor Technologies Ltd. and Narked at 90 Ltd have not performed validation or verification testing and therefore cannot promote these sensors for use in any other application and disclaims any liability for off-label use. Verification and validation for use in these applications is the responsibility of the equipment user and/or manufacturer. Vandagraph Sensor Technologies Ltd. and Narked at 90 Ltd expect the purchaser/manufacturer to carry out all “fit for purpose tests” required before these sensors are used underwater in your equipment.

The sensors supplied will have standard limited warranty. Purchase of oxygen cells from Narked at 90 Ltd is on the express condition that you understand and agree to these terms. If you do not agree with any term of the Agreement, you must not use the cell(s), and you may return the items unopened and unused for a full refund.