

### **Partial Pressure Oxygen Set Point Control**

The Megalodon electronic control module was activated and the apparatus PO<sub>2</sub> set point fixed at 1.2 bar. The apparatus PO<sub>2</sub> control was tested for overshoot from the surface to 40m at 30m/min using 1.78 l.min oxygen uptake simulation at a ventilation rate of 40.0 l.min. The depth was stabilised at 40m and the PO<sub>2</sub> set point control for test ventilation rates of 10.0, 22.5, 40.0, 62.5 and 75.0 l.min respectively, was examined. On completion the ventilation rate was reset to 40.0 l.min and the system depressurised at 20m/min and the PO<sub>2</sub> undershoot examined. The results indicated that overshoot was well within the acceptance limits reaching a maximum value of 1.6 bar. The low ventilation rate tests indicated the PO<sub>2</sub> control cycled outside of the acceptance limit of +/-0.1 bar and always high sided the set point. Technical discussions revealed the PO<sub>2</sub> algorithm was based around the PO<sub>2</sub> sensor correction of 14.7 psi but the indicated PO<sub>2</sub> was in bar (14.5psi). At higher ventilation rates the PO<sub>2</sub> control cycled within the set point control limits. Post test note, although the PO<sub>2</sub> overshoot and under shoot were within the acceptance limits it is considered prudent to use the fast response analysis / data acquisition system when testing the revised algorithm. The results for the 0.7 bar PO<sub>2</sub> set point were similar to the 1.2 bar value but tended to have a narrower bandwidth.

The full results are contained in Appendix D.

