

Partial Pressure Oxygen Set Point Control

The Megalodon electronic control module was activated and the apparatus PO₂ set point fixed at 1.2 bar. The apparatus PO₂ 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 PO₂ 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 PO₂ 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 PO₂ control cycled outside of the acceptance limit of +/-0.1 bar and always high sided the set point. Technical discussions revealed the PO₂ algorithm was based around the PO₂ sensor correction of 14.7 psi but the indicated PO₂ was in bar (14.5psi). At higher ventilation rates the PO₂ control cycled within the set point control limits. Post test note, although the PO₂ 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 PO₂ 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.

