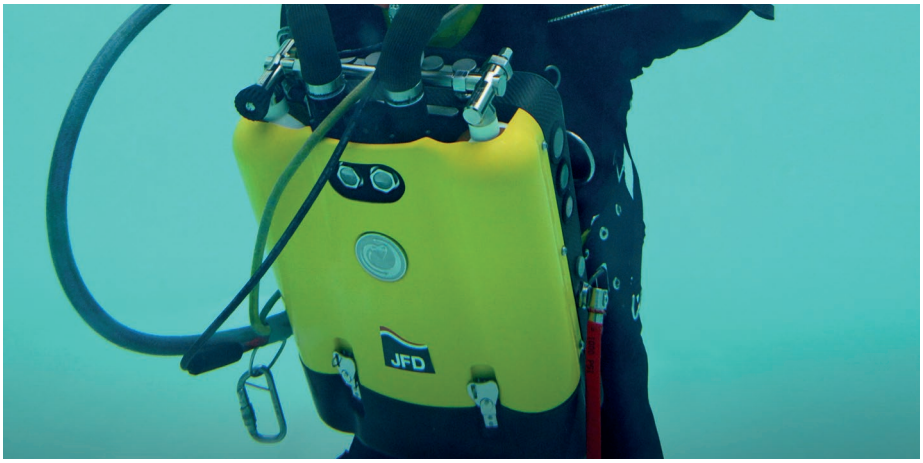
# COBRA duration at shallow depths – interim guidance

## Background

Clients are expanding their use of COBRA to include shallow diving and require better guidance regarding duration times at these depths.




## ISSUE

For the initial product testing, the endurance of the COBRA set was tested using the method specified in EN14143. This test was performed in the Breathing Laboratory using the Breathing Machine to move gas around the COBRA breathing loop with the gas injection activated at the specified test depths. Endurances at other depths and cylinder pressures of 200 bar and 300 bar were conservatively calculated to provide information for users.

Certain users now intend to use the COBRA system at relatively shallow depths. Use of COBRA at these depths requires the set to be filled with heliox with an O2 content >20%. Boosting gas with this O2 content causes difficulties for some clients. The relatively high O2 content also affects the gas injection flowrate into the COBRA set and therefore the specific gas mix can have an effect on the set endurance. Various clients have requested additional information regarding endurance times with cylinder pressures of less than 200 bar, so that COBRA sets can be charged by decanting gas.

Discussions are ongoing with various clients regarding the most useful test conditions. To date, these discussions have not been finalised.

A certain client requires information now for a particular set of conditions (30% heliox at 30m and 50m). Ongoing utilisation of the JFD Breathing Laboratory and the current working restrictions due to COVID-19 means that it is impossible to conduct the endurance test as described in EN14143 at this time.

## SOLUTION

In a COBRA set, there is theoretically no difference in onboard gas duration, whether the set is being breathed or not, therefore an endurance test for a COBRA set can be performed in a standard hyperbaric chamber.

To provide endurance information to the client, JFD performed a test of this style. A COBRA set was charged with 30% heliox to ~200 bar and activated in a chamber at a depth of 30msw. Remaining cylinder pressure and time were logged. The test was repeated at 50msw. The data was plotted to show cylinder pressure and remaining endurance time in Figures 1 and 2 below.

Users must be aware that, in reality, additional gas usage can occur due to diver descent/ascent, demand valve operation or improper use (releasing mouthpiece etc). Users may choose to apply an additional safety factor to the results reported below.



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**NOTE: COBRA endurance can never exceed 53 min due to scrubber capacity irrespective of gas endurance.**

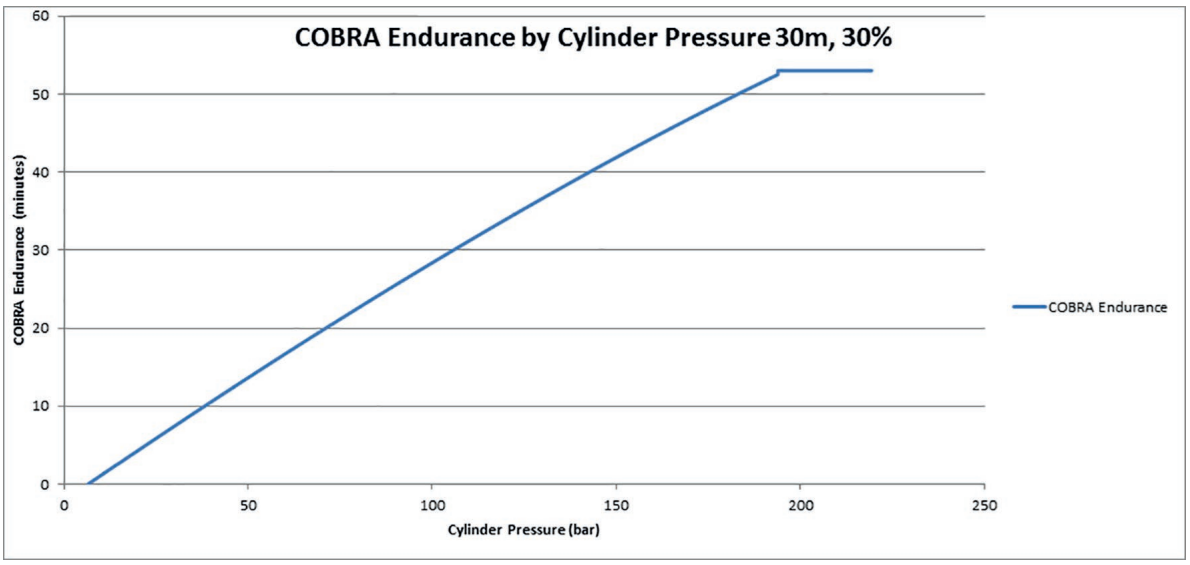


Figure 1 - COBRA Endurance 30m, 30%

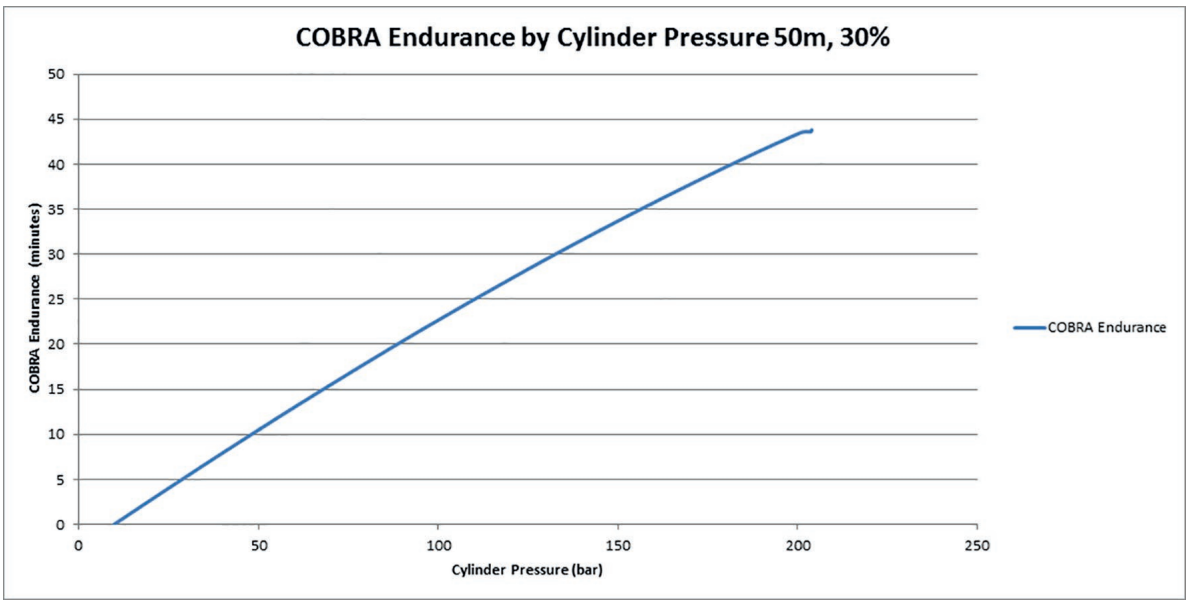


Figure 2 - COBRA Endurance 50m, 30%



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