

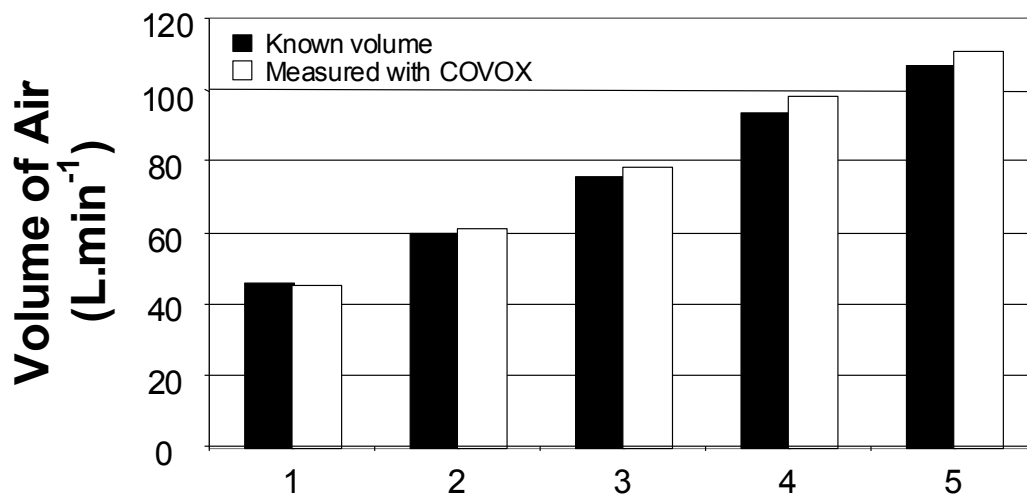


Report for COVOX on-line gas analyser by Dr Daryl Wilkerson (exercise physiologist at the University of Exeter).

The remit for this short report was to assess the accuracy of the COVOX online gas analyzer for measuring gas volume and oxygen concentration.

Volume Assessment

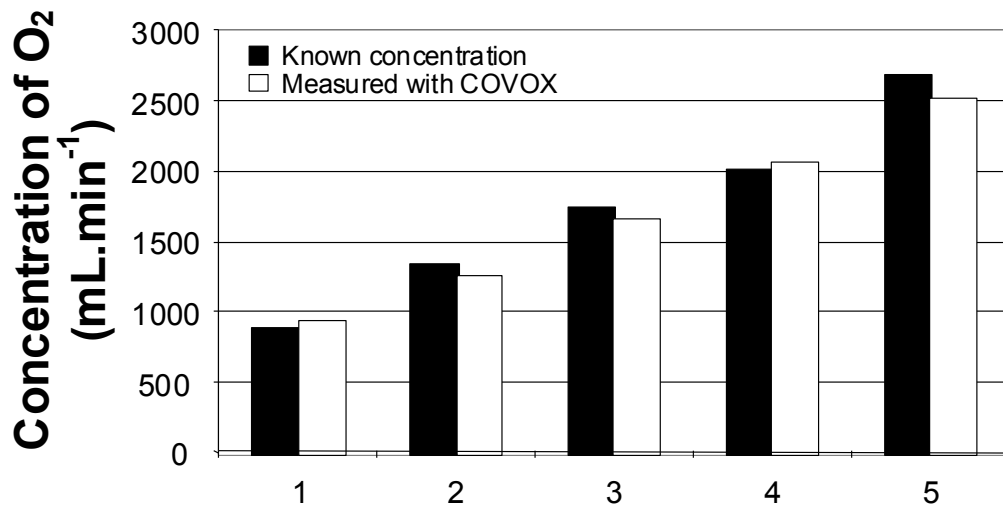
To determine the validity of the volume measurement a respiratory pump in the form of a motorised calibration syringe was used (VacuMed, CA, USA). This equipment enables online verification of the performance of gas flow transducers at a range of respiratory rates (from 6-59). For the test on the COVOX machine tidal volume was set at 2 L.min⁻¹ and respiratory rates examined were between 15-52.5. The calibration syringe was connected to the COVOX machine in the standard way (i.e. taking the place of the human participant) and delivered volumes from 30-105 L.min⁻¹, with a $\pm 1\%$ error. The volumes measure by the COVOX machine for each of these known volumes are shown in the figure below.



The Covox machine performed within accepted margins of error, fairing better than the industry standard. Overall the mean error for the differing measured volumes was 3.5% of the known volume.

Oxygen Concentration Assessment

The oxygen concentration assessment was also completed via the use of VacuMed equipment. This equipment allows the simulation of a range of differing metabolic rates via the manipulation of the concentrations of oxygen which are delivered to the COVOX machine. For this test, five known concentrations of oxygen simulating metabolic rates from 900-2500 mL.O₂.min⁻¹ were passed through the system. The results are shown in the figure over the page.



As with the volume check, the COVOX machine performed to the required level for fitness assessment and scientific research. The mean error for the 5 differing metabolic rates was 5.2% of the known concentration.

Overall this machine provides an accurate output for both volume and oxygen concentration, performing in line with, or better, than most commercially available online gas analysers.