

Douglas Bag System operating instructions

The following set-up, collection and analysis instructions have been written specifically for a 4-bag system, but the same principles apply to any other set-up.

System set-up

Switch on the gas analyser to allow the unit to warm up and calibrate following the manufacturers guidelines. Connect the inlet port of the gas analyser to the right hand 'white' port of the left hand 4 way sample stopcock via the drying tube, and the outlet port of the gas analyser to the right hand 'white' port of the right hand 4 way sample stopcock.

Fill the drying tube with drierite and replace when its colour changes from blue.

Ensure all the coloured ('red', 'blue', 'yellow' and 'green') sample taps are closed and the 'white' sample taps are open. **Having all of the sample taps closed at the same time for a long period may cause damage to the gas analyser.**

Switch on the gas meter (refer to the manual with regard to operation and battery charging)

The Digital Dry Gas meter requires the sample gas to pass through it at approximately 50 litres per minute.

To achieve this, connect the vacuum pump to the outlet port of the gas meter, using a 4' tube (666119), with no connection to the inlet port, reset the gas meter and switch on the vacuum controller. Run for 60 seconds and note the gas meter reading. Adjust the vacuum controller and repeat this procedure until a reading of approximately 50 litres is reached. Note the position of the dial on the vacuum controller.

Remove the breathing hose from the right hand port of the 'red' 2100C and connect the inlet port of the gas meter to it using a 4' tube (666119) to. Ensure all 2100C stopcocks point to the right. Switch on the vacuum pump with the vacuum controller set to maximum and turn the 'red' 2100C stopcock to connect the 'red' bag. When the bag is fully evacuated, turn the stopcock back to its original position. Repeat the operation for the three other bags. Ensure all stopcocks are now pointing to the right to maintain the fully evacuated bags.

Gas collection

Measure and record barometric pressure.

Fit a clean mouthpiece to the 2700 valve and reconnect the breathing hose to the 'red' 2100C.

Connect the subject ensuring the flange of the mouthpiece is between the gums and lips.

Fit nose clip.

The subject is now expiring through the system to room air via the left hand port of the 'green' stopcock.

Start the exercise protocol and timer.

At the point of collection of the first sample, turn the 'red' 2100C stopcock and note the time. Collect the expired gas in the 'red' bag for the required period (normally 30 or 60 seconds) and then return the stopcock to its original position. You may wish to record heart rate, ergometer workload or treadmill speed and elevation.

Repeat this procedure for other bags.

Gas Analysis

Ensure gas analyser is warmed up, calibrated and the pump is switched on with the flow rate set at the recommended rate.

Close the AIR IN and AIR OUT 'white' sample taps (these are the taps with no tubes connected) and quickly open the two 'red' sample taps, to sample the contents of the 'red' bag. The sample in this bag is now being removed from the Douglas bag sample port, passed through the drierite, through the analyser and back in to the bag via the sample port on the 2100C stopcock. Allow the analyser to sample the gas until the values are stable, and then note the values.

Close both of the 'red' taps and quickly open the two 'blue' taps to sample the next bag. Repeat for all bags, finally reopening the AIR IN and AIR OUT taps to sample ambient air again.

Always ensure that the time when all taps are closed is kept to a minimum.

Volume Analysis

Remove the breathing tube from the 'red' stopcock and connect the tube from the inlet port of the gas meter. Reset the gas meter to zero.

Set the vacuum controller to the marked position. (i.e. 50 litres per minute)

Turn the 'red' stopcock to open the first bag.

Switch on the vacuum controller to start evacuating the bag.

Monitor the temperature of the sample and note down the value.

When the reading of the gas meter slows down, increase the vacuum controller to maximum, until the bag is empty. Switch off the vacuum and note down the final volume of the 'red' bag.

Close the 'red' stopcock and repeat the operation for the other bags.

Remember to return the vacuum controller to its marked position and to reset the gas meter after each bag.