Claims

1. A breath sampling device comprising:

a buffer tube having a proximal end into which a user exhales and a distal end opposite the proximal end;

a sensor module at the distal end, for measuring parameters of a breath exhaled by the user into the buffer tube; ~~and~~

a breath sampling port, disposed between the proximal end and distal end, through which a portion of the exhaled breath can be diverted substantially without contacting the sensor module~~.~~; and

~~2. A breath sampling device according to claim 1, comprising~~ a sterilisation device for sterilising an internal region of the breath sampling device.

2. A breath sampling device according to claim ~~2~~1, wherein the sensor module comprises the sterilisation device and the internal region.

3. A breath sampling device according to claim ~~2~~ 1 or ~~3~~2, wherein the sterilisation device is an ultraviolet (UV) light source.

4. A breath sampling device according to any preceding claim, wherein the buffer tube comprises a heating jacket, the heating jacket heating the buffer tube to reduce attachment of volatile organic compounds (VOCs) to the buffer tube.

5. A breath sampling device according to any preceding claim, wherein the sensor module comprises a flow meter for sensing a flow rate of exhalation of the exhaled breath, and the breath sampling device further comprises an output device for receiving a measurement of the flow rate from the flow meter and, if the measurement is outside an acceptable flow rate range, outputting a signal to the user to modify the flow rate to bring it into the acceptable flow rate range.

6. A breath sampling device according to any one of claims 1 to ~~5~~4, further comprising a valve for selectively opening and closing the breath sampling port, wherein the sensor module comprises a carbon dioxide (CO_2) sensor for detecting an instantaneous carbon dioxide level in the exhaled breath, and the sensor module determines a breathing phase from the instantaneous carbon dioxide level and actuates the valve depending on a breathing phase desired to be sampled by the breath sampling device (the desired breathing phase).

7. A breath sampling device according to claim ~~7~~6, wherein the sensor module comprises a flow meter for sensing a flow rate of exhalation of the exhaled breath, and the breath sampling device further comprises an output device for receiving a measurement of the flow rate from the flow meter and, if the measurement is outside an acceptable flow rate range, outputting a signal to the user to modify the flow rate to bring it into the acceptable flow rate range.

8. A breath sampling device according to claim ~~8~~7, wherein the sensor module actuates the valve only if the flow rate is within the acceptable flow rate range.

9. A breath sampling device according to any one of claims ~~6~~5, ~~8~~ 7 and ~~9~~8, wherein the output device comprises a light-emitting diode (LED) display or organic LED display for providing an output to the user to guide the user through exhalation manoeuvres.

10. A breath sampling device according to any one of claims 1 to ~~5~~ 4 and ~~7~~6, further comprising a clean air supply connected to the buffer tube, for delivering clean air to the user for inhalation.

11. A breath sampling device according to claim ~~11~~10, wherein the clean air supply comprises a first one-way valve enabling passage of clean air from the clean air supply to the user in a first direction, and precluding air flow in a second direction opposite the first direction.

12. A breath sampling device according to claim ~~12~~11, wherein the first one-way valve can be actuated to prevent delivery of clean air during exhalation.

13. A breath sampling device according to claim ~~12~~ 11 or ~~13~~12, further comprising a second one-way valve disposed in the buffer tube proximally of the sensor module, enabling the exhaled breath to flow distally through the sensor module in a first direction and precluding flow of air through the second one-way valve in a second direction opposite the first direction.

14. A breath sampling device according to claim ~~14~~13, wherein the second one-way valve is positioned distally of the clean air supply to prevent passage of air through the second one-way valve during inhalation of clean air.

15. A breath sampling device according to any preceding claim, wherein the proximal end of the buffer tube is adapted to engage a mouthpiece through which the user exhales into the buffer tube.

16. A breath sampling device according to claim ~~16~~15, wherein the mouthpiece is formed from a material comprising at least one of Teflon®, glass and a silanized material.

17. A breath sampling device according to any preceding claim, being useable to detect the presence of one or more volatile organic compounds (VOCs) in exhaled breath, wherein the buffer tube comprises a removable inner tube formed from a material that is inert with respect to the VOCs.

18. A breath sampling device according to claim ~~18~~17, wherein the buffer tube is formed form a material comprising at least one of Teflon®, glass and a silanized material.

19. A breath sampling device according to any preceding claim, wherein the sampling port is attachable to at least one of a breath collection vessel and an analytical instrument.