



pico^{baby}[™] Smokerlyzer[®]

Operating manual



breath analysis is the new blood test

www.bedfont.com

Contents

Introduction and intended use	4
Operation	5
Specification	6
Pack Contents	7
Instrument layout	7
Display symbols	8
Warnings and maintenance	9
Functional Check	10
Troubleshooting	11
COdata ⁺ software	11
Frequently asked questions (FAQ)	12
Returns procedure	13
Spares and warranty	14

Introduction

Carbon monoxide is a toxic, odourless, colourless, tasteless gas. It is formed by incomplete combustion of organic material at high temperatures, with an insufficient oxygen supply.

When inhaled, CO displaces oxygen in the bloodstream to form carboxyhaemoglobin (COHb). This starves the body tissues of the oxygen vital to repair, regeneration and general living. CO can remain in the bloodstream for up to 24 hours, depending on factors such as physical activity, sex, and inhalation intensity. The half life is about 5 hours.

CO (ppm) and carboxyhaemoglobin (%COHb) correlation:

Breath carbon monoxide is measured in parts per million (ppm) and blood carboxyhaemoglobin is measured in percentages (%COHb and %fCOHb). The three are compatible and convertible: the CO and %fCOHb reading relates to gas in the lungs and on the breath (i.e. the amount of poisonous CO that has been inhaled), the COHb and %fCOHb reading relates to the percentage of vital oxygen that has been replaced in the bloodstream. The piCO^{baby} Smokerlyzer[®] displays all three measurements. Clinical research has demonstrated that a useful relationship between carbon monoxide and carboxyhaemoglobin is obtained after a short period of breath-holding.

The cut-off point between smoker and non-smoker has been found to be 6ppm CO. The piCO^{baby} Smokerlyzer[®] defines a non-smoker as 0-3ppm, a low-dependence smoker as 4-6ppm and strongly addicted smokers as over 6ppm.

Intended use

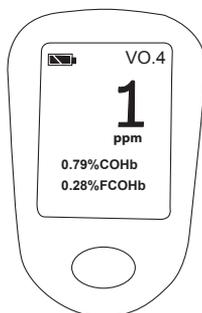
The piCO^{baby} Smokerlyzer[®] is a breath carbon monoxide monitor intended for multi-patient use by healthcare professionals in smoking cessation programmes and research. It can also be used as an indicator of carbon monoxide poisoning in a healthcare environment.

Operation

- 1 Attach a breath sampling D-piece and new mouthpiece.
- 2 Turn on the monitor by clicking the button once.
- 3 Inhale and hold breath for the 15 second countdown. If unable to hold breath for full 15 seconds, see 'Warnings', page 9.
- 4 A beep will sound during the last three seconds of the countdown.
- 5 Blow slowly into mouthpiece, aiming to empty lungs completely
- 6 The ppm, equivalent % carboxyhaemoglobin (COHb) and equivalent % foetal carboxyhaemoglobin (FCOhb) levels will rise and hold. The coloured LEDs will light accordingly. See the table on page 12 for an interpretation of the reading.
- 7 Remove the D-piece between tests to purge sensor with fresh air.
- 8 To repeat breath test, click the button once to switch off and continue from step two, above.
- 9 To switch off, click the button once. Unit will auto power off after 5 minutes of inactivity.



15



Specification

Concentration range:	0 - 100ppm
Display:	LCD with 1ppm increments
Detection principle:	Electrochemical sensor
Repeatability	< ±5%
H ₂ cross-interference:	<12%
Power:	2 × AA (LR6 or equivalent) alkaline batteries
Response time:	Typically <1 second to 90% FSD
Operating temperature range:	0 - 40°C (storage/transport 0-50°C)
Operating/Transport/Storage:	800 - 1200 mbar
Operating humidity:	10-90% (storage/transport 0-95%) non-condensing
Sensor operating life:	5-year warranty
Sensor sensitivity:	1ppm
Sensor drift:	<5% per annum
Dimensions:	Approximately 45 × 75 × 120 mm
Weight:	Approximately 200g (including batteries)
Monitor construction:	Body: Polycarbonate/ABS blend with elastomeric overmould D-piece: Polypropylene

Symbols

 Direct Current

Degree of protection against electric shock:  Type BF applied part

Type of protection against electric shock: Internally Powered Equipment

 Please refer to the warnings and safety notes in the manual

 Consult instructions for use

Degree of protection against ingress of liquid: IPX0 - not protected against water ingress

Degree of safety application in the presence of a flammable anaesthetic mixture with air, oxygen or nitrous oxide: Equipment not suitable for use in the presence of flammable mixtures.

Environment
 The piCO^{baby} complies with the directive EN60601-1-2 electromagnetic compatibility but can be affected by cellular phones and by electromagnetic interference exceeding the levels specified in EN50082-1. This equipment should be moved if necessary to avoid interference.

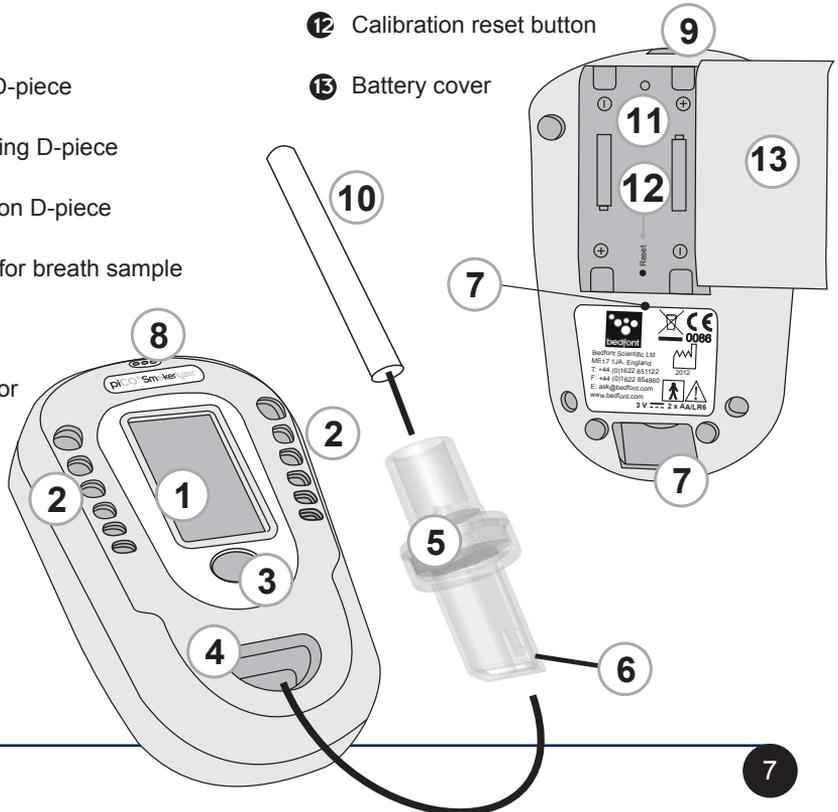
Pack contents

- 1 Instrument
- 2 Carry pouch
- 3 User manual
- 4 Breath sampling D-piece
- 5 Disposable SteriBreath™ mouthpiece
- 6 2 × AA batteries



Instrument layout

- 1 Display
- 2 Coloured LEDs
- 3 Button
- 4 Aperture for D-piece
- 5 Breath sampling D-piece
- 6 Securing lug on D-piece
- 7 Exhaust port for breath sample
- 8 Sounder
- 9 USB connector
- 10 SteriBreath™ mouthpiece
- 11 Battery compartment
- 12 Calibration reset button
- 13 Battery cover

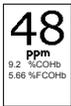


Display symbols

- 1 Battery condition: OK:  Flat:  Dead: 

- 2 Breath-hold and countdown: 
15

- 3 Exhale for breath test: 

- 4 Peak CO reading (ppm, %COHb and %FCOHb): 

- 5 Calibration button has been pressed with no gas present 

- 6 Calibration successful 

Warnings and maintenance

Warnings

People with lung disease or chest ailments may not be able to achieve the 15-second breath-hold. In such cases, the user should inhale and hold their breath when the breath test is started, and exhale, if necessary, before the countdown has completed.

Mouthpieces should be replaced after every use.

Hands should be washed regularly in accordance with infection control practice.

Cleaning

Wipe the instrument and D-piece external surfaces with a product specifically developed for this purpose. Bedfont provides instrument cleansing wipes.

NEVER use alcohol or cleaning agents containing alcohol or other organic solvents as long term exposure to these vapours will damage the CO sensor inside.

Under no circumstances should the instrument be immersed in liquid or splashed with liquid.

Routine maintenance

Replace batteries when indicated – battery symbol either  or .

Replace breath sampling D-piece every 30 days or if visibly soiled or contaminated.

The D-piece cannot be cleaned or sterilised.

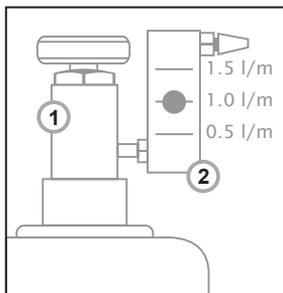
Bedfont recommend a functional check annually or when the user suspects a fault (procedure on page 10).

Batteries

Batteries should be removed if the instrument is not likely to be used for some time.

Additional technical information can be made available on request; please contact Bedfont or its distributor.

Functional Check



Bedfont functional check kit

1. Fine control valve
2. Flow indicator
3. Gas cylinder, 20ppm CO in air
4. Adapter and tube



- Instruments are calibrated before leaving Bedfont.
- Bedfont recommend annually or if you suspect the instrument is reading incorrectly, eg. Smoker inaccurately reports smoking status, you can check the function using Bedfont check gas.
- The check gas required is Bedfont 20ppm carbon monoxide in air.
- Ensure the fine control valve is in the off position.
- Screw the fine control valve and flow indicator assembly to the gas can. This is best done by screwing the gas can into the valve.
- Click the button to start a breath test.
- Immediately open the fine control valve and allow the gas to flow at 1 litre per minute.
- To maintain this, adjust the flow so the ball in the flow indicator remains at the middle line.
- Allow the gas to flow through the instrument for the duration of the test, again monitoring the rate of flow.
- As the 20ppm CO check gas is applied, the displayed ppm reading will climb.
- If the final displayed value is less than 18 ppm or higher than 22 ppm, re-calibrate by pressing the calibration reset button illustrated on page 7. This will automatically store the new calibration.

Troubleshooting

- If the unit fails to turn on properly, or if either low battery symbols  or  are shown, replace both AA batteries. Ensure that the batteries are inserted the correct way around, matching the symbols moulded into the plastic.
- If a breath test on a non-smoker gives an indication of CO being present, it may indicate a high ambient level of CO (possibly due to a faulty combustion appliance or exhaust fumes), or the effects of passive smoking. A false reading can, under certain circumstances, be caused by alcohol on a person's breath, or the presence of hydrogen, which can be generated in the human digestive system.

COdata⁺ software

Connecting to the PC

- Place one end of the connection lead into the mini USB socket on the top of the piCO^{baby}. Connect the other end to the USB port on the PC.
- Before starting the software, ensure that the piCO^{baby} is connected to the PC and switched on. Once the sensor has stabilised, double click the COdata⁺ icon on the PC to start the programme.
- Refer to the supplied documentation for how to operate COdata⁺ software.



Frequently asked questions (FAQ)

Frequently asked questions about breath carbon monoxide (CO) monitoring in smoking cessation

Q What is carbon monoxide?

A Carbon monoxide (CO) is a poisonous gas that you cannot smell or see. When a smoker inhales smoke from a cigarette, CO is absorbed into their blood through their lungs. CO is dangerous because it binds to haemoglobin in red blood cells about 200 times more readily than oxygen, depriving the body of vital oxygen.

Q What does a breath CO test show?

A It shows the amount of carbon monoxide in a person's breath (ppm CO), which is a measure of blood carboxyhaemoglobin (%COHb). It also acts as an indicator of the possible level of around 4,000 toxic substances in cigarette smoke, 60 of which can cause cancer.

Q What does ppm and COHb and %FCOHb mean?

A Parts per million; in this case, one part of CO in one million parts of air (breath). This might not seem like very much, but ppm has a direct correlation with %COHb and %FCOHb (the percentage of CO combined with haemoglobin in the blood).

If a patient gives a reading of 20ppm (that of a frequent adult smoker), it means that their oxygen carrying capacity is reduced by 5%. It also indicates a high level of addiction to nicotine.

Q How quickly does CO disappear from the body when a person stops smoking?

A It takes about 5-6 hours to reduce the original level by half. Usually, after a maximum period of 48 hours, an ex-smoker will have the same level of CO as a non-smoker in the same environment.

Q How long after having a cigarette should the test be conducted?

A After a minimum of 10 minutes.

Q When is the best time to take a CO reading?

A The best time to take a CO reading is as late as possible in the day.

Q What level of breath CO do you expect to see?

A Clinical research has shown that the popular guidelines are:

LED Colour	Description	Reading:
Green	Pregnant Non smoker	0-3
Yellow	Pregnant Danger zone	4-6
1 Red	Pregnant Smoker	7-10
2 Reds	Pregnant Frequent smoker	11-15
3 Reds	Pregnant Addicted smoker	16-25
4 Reds	Pregnant Heavily addicted smoker	26-35
4 Reds flashing	Pregnant Dangerously addicted smoker	35+

Returns procedure

If your equipment requires servicing, please contact Bedfont's Customer Repairs Department before returning any goods. If you did not purchase your monitor directly from Bedfont, please contact your local distributor or supplier.

- When you have supplied the Customer Repairs Department with the monitor serial number and description of the fault, you will be issued with a returns/ticket number.
- Please state the returns/ticket number on a compliment slip or headed paper when returning the monitor, and ensure that your full details, including telephone, fax numbers and returns address are clearly stated.
- Bedfont advise that you use a courier service when returning monitors. This enables you to insure goods for loss or damage in transit.
- When your goods are received, you will be sent an 'order acknowledgement'.
- The monitor will then be examined and you will be sent an 'Engineer's Report' and a quotation for the repair, which will include an authorisation form.
- If your monitor is still in warranty, Bedfont will repair it and return it to you with an 'Engineer's Report', free of charge. If the monitor is found to simply require calibrating, you will be charged a fee for this service if you wish to proceed.
- If the monitor is out of warranty and you wish to proceed with the repair or calibration, complete the authorisation form within the quotation, and ensure that you include the 'Official Purchase Order Number'. Return the unit to Bedfont. Please contact the Customer Repairs Department if you are unable to supply an 'Official Purchase Order Number'.
- If you choose not to proceed with the repair, a handling fee will be charged. Ensure that you return the completed authorisation form with an 'Official Purchase Order Number'.
- The equipment will be returned to you as soon as Bedfont has received all relevant paperwork. A carriage fee will be charged if the monitor is no longer in warranty.

Spares and warranty

Spares:

D-pieces

Disposable SteriBreath™ mouthpieces

Check Gas

Instrument cleansing wipes

AA alkaline batteries

Hand Foam

Warranty:

Bedfont Scientific Limited warrants the piCO^{baby} (excluding batteries) to be free of defects in materials and workmanship for a period of five years from the date of shipment. Bedfont's sole obligation under this warranty is limited to repairing or replacing, at its choice, any item covered under this warranty when such an item is returned, intact and prepaid, to Bedfont Scientific Limited or the local representative.

These warranties are automatically invalidated if the products are repaired, altered, or otherwise tampered with by unauthorised personnel, or have been subject to misuse, neglect or accident.

Never dispose of any electronic instrument in domestic waste. At the end of the product's life, contact Bedfont or its distributor for disposal instructions.

Bedfont Scientific Ltd

Station Road, Harrietsham, Maidstone, Kent,
ME17 1JA, England

Tel: +44 (0) 1622 851122

Fax: +44 (0) 1622 854860

Email: ask@bedfont.com





Bedfont Scientific Ltd

 Station Road, Harrietsham,
Maidstone, Kent,
ME17 1JA, England
Tel: +44 (0) 1622 851122
Fax: +44 (0) 1622 854860
Email: ask@bedfont.com
www.bedfont.com

Issue 5- September 2013. Part No: LAB554

© Bedfont Scientific Ltd

Bedfont Scientific Limited reserves the right to change or update this literature without prior notice.

Registered office: England and Wales. Registered No: 1289798



ISO 9001:2008
Cert No. FM 31664
ISO 13485:2003
Cert No. MD 502905

