

smokerlyzer[®]

piCO & piCO-lo
Smokerlyzer[®]

Operating Manual

Notice d'utilisation

Bedienungsanleitung

Manual de utilización

Manuale operativo



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ENGLISH



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piCO & piCO-lo Smokerlyzer®

1 Introduction

The piCO and piCO-lo Smokerlyzer[®] are Breath CO Monitors intended for use in smoking cessation programmes and research.

Carbon Monoxide is a toxic, odourless, colourless, tasteless gas. It is formed from incomplete combustion of organic material at high temperatures with an insufficient Oxygen supply. When inhaled, CO competes successfully with Oxygen in the bloodstream to form 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 a range of factors including physical activity, sex and inhalation intensity. The half life is about 5 hours.

CO (ppm)/Carboxyhaemoglobin (%COHb) Correlation

Breath Carbon Monoxide is measured in parts per million (ppmCO) and blood Carboxyhaemoglobin in percentages (%COHb).

But the two are compatible and convertible, CO relating to lung/breath and COHb to blood gas. The Smokerlyzer[®] displays both measurements, see the conversion chart on the back cover. Clinical research has demonstrated that a useful relationship between Carbon Monoxide and Carboxyhaemoglobin is obtained after a short period of breath-holding by the person. CO readings demonstrate the levels inhaled of poisonous CO, while the COHb reading shows the percentage of vital Oxygen that has been replaced in the bloodstream.

The cut off point between smoker and non-smoker has been clinically found to be 10ppmCO. The piCO Smokerlyzer[®] shows a non-smoker to be 0-10ppm, a light smoker to be 11-20ppm and strongly addicted smokers to be over 20ppm.

The piCO-lo Smokerlyzer[®] has been adapted for use with young smokers. As their smoking habits and views are generally different from adult smokers the display has been changed. 0-4ppm shows a non-smoker, 5-6 a light or casual smoker and 7+ a more frequent young smoker.

3 Instrument Layout

Mouthpiece

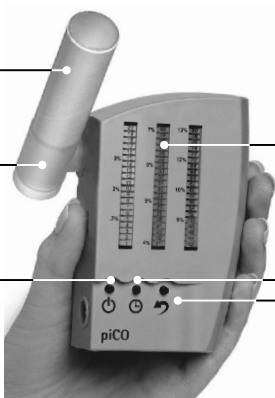
T-piece

ON/OFF Button 

LED Display

 GO Button

 RECALL Button





- 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 GO button is pressed, and exhale, if necessary, before the countdown has completed.
- If people with contagious diseases are being analysed, Bedfont recommend that the sampling system be replaced or sterilised after use (refer to the Cleaning & Sterilisation section on page 16).
- The calibration limits of this unit are 25-80ppm. The gas used must be 50ppm (+/- 5%) CO/Air to retain accuracy.
- Batteries should be removed if the instrument is not likely to be used for some time.

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Getting Started

- Press and hold ON Button until the 80ppm red LED flashes. Release ON Button.
- When green 1 ppm LED flashes, the piCO is ready for use.
- Press & release GO button to start a 15 second breath-hold countdown, indicated by descending LEDs.
- Blow slowly into mouthpiece at end of countdown, aiming to empty lungs.
- The ppm value will rise, and the highest level will hold.
- The reading will be shown by a single solid LED.
- The conversion chart on the back cover can be used to convert ppm to % Carboxyhaemoglobin (COHb).
- Removing the T piece will allow fresh air to purge sensor.
- To do another reading, press GO button, which initiates auto zero facility.

- To view the previous reading, press RECALL button.
- To switch off, press and hold ON button for 5 seconds. Unit will auto power-off after 15 minutes.

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Operation

- Ensure 3 AA batteries are correctly located in battery compartment.
- Attach T piece sampling system, with the cardboard mouthpiece attached, to the piCO. Check all connections are pushed firmly together.
- Press & hold ON Button until 80ppm LED flashes. Release ON Button.
- When the green 1 ppm LED flashes, the piCO is ready.
- Press & release GO button to initiate a 15 second countdown display. The first 15 LED's will be illuminated, and then countdown to zero in 1 second intervals.
- Ask the user to hold their breath throughout the countdown. When the countdown reaches 1 ppm exhale slowly but gently into the mouthpiece. Aim to empty the lungs as far as possible.
- The LED display will show a rising ppm value.

- The highest level will hold and final reading will be indicated by a single solid LED.
- The conversion chart supplied with the piCO can be used to work out the % carboxyhaemoglobin (COHb) in the person's blood.
- To view the previous reading, press the RECALL button. A new mouthpiece should be used for each person.
- To take another reading Press GO to initiate the auto zero facility and begin the 15 second countdown.
- If no further readings are required the piCO should be turned off by holding the ON/OFF button for 5 seconds. If left on the piCO will automatically turn off after 15 minutes of not being used.

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Calibration

- Instruments are calibrated before leaving Bedfont
- The piCO should be calibrated at 6 monthly intervals.
- The calibration gas required is 50 ppm carbon monoxide in air.
- Ensure the calibration gas 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.
- With the tubing, connect the Calibration Adapter and the Flow Indicator. Insert the Calibration Adapter into the T-piece sampling system, where the mouthpiece would normally be inserted. Press & hold ON Button until the 80ppm LED flashes.
- When the green 1 ppm LED is flashing, press the ON and RECALL buttons simultaneously for more than 5 seconds to enter calibration mode.
- The LED at 50ppm will be illuminated.

- Open the fine control valve and allow the gas to flow at 0.5litres per minute. To maintain this, adjust the flow so the ball in the Flow Indicator remains at the lower line.
- Allow the gas to flow through the instrument for about 1.5 minutes to ensure accurate calibration, again monitoring the rate of flow.
- As the calibration gas is applied, a single flashing LED will climb the display. After 1.5 minutes, or until no further increase in the reading is obtained, the measured value will be shown as a solid LED and sampling will cease.
- If the user then presses the GO button again the calibration value will be stored as a current level for 50 ppm. If the calibration has been successfully stored a ✓ will be displayed across the 3 vertical LED strips. If the calibration fails a X will be displayed.
- Turn off the gas flow, remove the T piece sampling system and disconnect the Calibration Adapter from the T piece sampling system.

- Unscrew the Fine Control Valve and Flow Indicator from the gas can and store safely. If the valve is left attached to the can, the gas could escape.
- The piCO is now calibrated and ready for use.

Typical
calibration
configuration



Connecting to the PC

Place one end of the connection lead into the piCO. Connect the other end to a spare communications port on the PC. When the software is installed, set the communication port to the one the piCO is connected to.

Before starting the software, ensure the piCO is connected to the PC and switched on. Once the sensor has stabilised, double click the DataCO icon to start the programme.

The calibration function can only be accessed from the piCO.



13 Troubleshooting

- If the display shows "E" then a fault has occurred with the sensor and the user should contact Bedfont Scientific or their local representative.
- If the display shows "X" this indicates that either a) the batteries are low and should be replaced immediately to prevent damage to the unit, or b) the calibration has not been completed successfully. Allow the unit to purge with air by removing the sampling system, press the GO button and try the calibration again. If problems still occur, the unit should be returned to Bedfont for checking.
- If after the 15 second countdown the green 1 ppm LED starts to flash, this indicates that the unit has timed out as the patient did not commence exhalation within 10 seconds. To re-initialise the countdown, press the GO button again.
- When in calibration mode, the user has 30 seconds to apply the gas. If the solid 50ppm LED extinguishes, the unit has timed out. Press the GO button and re-enter calibration mode. An "X" will be displayed, as the gas level will be outside the limits for calibration.

Routine Maintenance

It is recommended that the following be carried out every six months:

- Calibration using Bedfont calibration gas
- Replace batteries
- Replace T-Piece

Cleaning and Sterilisation

The case of the instrument may be cleaned by wiping with a cloth moistened with water.

NEVER use alcohol or cleaning agents containing alcohol or other organic solvents.

Under no circumstances should the instrument be immersed in liquid.

The T-Piece can be cleaned using a soap and water solution; to clean under the valve seats lift the white flaps using a cotton bud. Care should be taken not to crease or damage the white flap valves as this may prevent correct operation.

Once the T-Piece has been cleaned it can be sterilized a maximum of 2 times by autoclaving at 121°C for 15 minutes. Ensure that the white flap valves are in place and free from distortion after the procedure.

Ensure the T-Piece is completely dry before refitting to the instrument.

Alternatively the T-Piece can be cost effectively replaced. Bedfont recommend the use of one-way valve, single use, mouthpieces when there is particular concern about possible cross contamination. Additional technical information can be made available on request; please contact Bedfont or its distributor.

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15 Specification

Concentration Range:	0-80ppm (0- 200 ppm using piCO-CHART)
Display:	LED - 1ppm increments (0-40ppm) 2ppm increments (42-80ppm)
Detection Principle:	Electrochemical sensor
Accuracy:	+/- 2%
H ₂ Cross Interference:	<15%
Power:	3x AA (LR6 or equivalent) alkaline batteries
Response Time:	Typically <45 seconds to 90% FSD
Operating Temperature:	0-40°C (Storage 0-50°C)
Operating Humidity:	10-90% (Storage 0-95%)- non-condensing
Sensor Operating Life:	5 years, 2 year warranty
Sensor Sensitivity:	1ppm
Dimensions:	Approx. 45 x 75 x 115 mm
Weight:	Approx. 200g including batteries
Construction:	Case - ABS, T-piece - Polypropylene



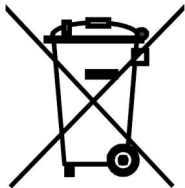
Meets the essential requirements of the Medical Device Directive
93/42/EEC Annex V. Certificate No. CE:58024

17 Warranty

Bedfont Scientific Limited warrants the piCO Smokerlyzer® (batteries excepted) to be free of defects in materials and workmanship for a period of two 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, 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.

At the end of the product's life, do not dispose of any electronic instrument in the domestic waste, but contact Bedfont or its distributor for disposal instructions.



picO Conversion Chart*

COppm to COHb(%)



Very Addicted Smoker (80-100ppm): This level is uncommon. It is found in smokers who are rarely seen not smoking! Above this level serious carbon monoxide poisoning and permanent damage can occur.

Addicted Smoker (41-79ppm): This includes pipe and cigar smokers, as these contain high levels of CO.

Heavy Smoker (21-39ppm): These readings are only found in smokers and indicate that the red blood cells are carrying a lot less oxygen than the body needs. The heart has to work harder and with less oxygen to help it.

Light Smoker (11-20ppm): Each cigarette raises the CO level.

Non smoker (7-10ppm): Lives and works with smokers or spends time in traffic fumes. It can be higher for non-smokers who work with cars or who are exposed to a very smoky atmosphere. Smokers can have readings under 10ppm if they have not smoked for some time or do not inhale.

Non smoker (5-6ppm): Lives in a town. There are at least 1-2 ppm in the air as a result of industry and vehicle exhausts.

Non smoker (1-4ppm): Living in an unpolluted environment.