

# Operating Manual



**Bedfont**  
• SCIENTIFIC • LTD •

pico Smokerlyzer®

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ENGLISH



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piCO Smokerlyzer<sup>®</sup>

# 1

# Introduction

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The piCO Smokerlyzer® is a Breath CO Monitor for use in smoking cessation programmes, CO poisoning diagnosis and ambient air monitoring.

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 COppm, but can be converted to COHb using 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.

Many government bodies stipulate a maximum CO exposure in industrial environments as 50ppm CO for no more than eight hours time-weighted average.

### 3 Instrument Layout

Mouthpiece

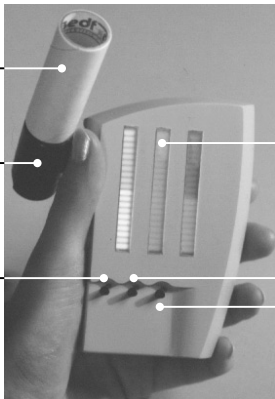
T-piece

ON/OFF Button 

LED Display

 GO Button

 RECALL Button



# 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 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.

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## Getting Started

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- 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.

# 7 Operation

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- 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

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- 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 0.5 litres 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. If the calibration fails a ✘ 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.



## 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.



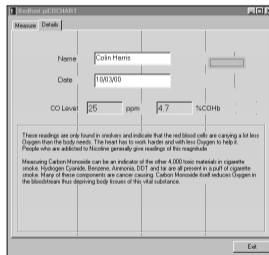
Before starting the software, ensure the piCO is connected to the PC and switched on. Once the sensor has stabilised, double click the piCO chart icon to start the programme.

The calibration function can only be accessed from the piCO.

## Using piCO-CHART

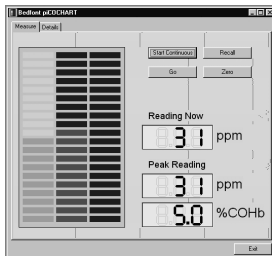
The programme window has 2 tab bars at the top of the display. One is for the virtual piCO display, marked 'measure', the other one is the printout form, marked 'details'.

The details screen allows the operator to input the patients name and test date. The peak CO and COHb levels are displayed together with a paragraph giving an analogy of the patients sample. A print button is provided, allowing the operator to print the information displayed.



The measure screen allows a 'virtual' LED display, the current ppm level, the peak ppm level and COHb levels.

Four buttons are available, Zero, Go, Recall and Start Continuous.



The Go and Recall buttons are copies of the functions provided on the piCO itself. The Start Continuous button places the piCO into a continuous measurement mode, allowing the instrument to be used for environmental or ambient measurements. The Zero button will allow the instrument to be remotely re-zeroed without having to turn the instrument on and off.

## 15 Troubleshooting

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- 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.

# Cleaning & Sterilisation

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

Under no circumstances should the piCO be immersed in liquid.

The T-piece can be sterilised a maximum of 10 times by autoclaving at 126°C for 11 minutes. Ensure the T-piece valve is in place after the procedure.

piCO Smokerlyzer®

# 17 Specification

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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 <sub>2</sub> 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

<b>Part Number</b>	<b>Description</b>
piCO-T-piece	Disposable T-piece, pack of 10
EC50-MP	Disposable mouthpieces, pack of 250
PI-Batts	Replacement batteries, pack of 3AA
020-08-04010K	Calibration kit with 20 litre cylinder
050-08-04010K	Calibration kit with 5 litre can
020-08-04010	Replacement 20 litre cylinder for calibration kit
050-08-04010	Replacement 5 litre can for calibration kit

The above accessories are available from Bedfont Scientific Ltd, UK. For spares availability in all other countries contact your local distributor.

# 19 Warranty

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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.

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