covita™
tools for treatment professionals

bedfont

OPERATOR'S MANUAL

FOR THE

MINI AND MICRO II SMOKERLYZERS®

BREATH TESTING CARBON MONOXIDE MONITORS FOR SMOKING EDUCATION AND CESSATION PRACTICE

Scientific contributions to
industrial and international health

Bedfont Instruments Ltd is
A Division of Bedfont Scientific Ltd
Bedfont House, Holywell Lane,
Upchurch, Kent ME9 7HN. England.

ISO 9001
BSI REGISTERED FIRM
NATIONAL ACCREDITATION OF CERTIFICATION BODIES
FM 31664

THE BEDFONT SMOKERLYZERS®

1. INTRODUCTION:

1.1 The Smokerlyzer® :

WELCOME to the Smokerlyzer® . It is probably the most user-friendly, non-invasive, accurate and rapid lung-breath Carbon Monoxide (CO) and bloodstream Carboxyhaemoglobin (COHb) monitoring system yet developed. In a single operation, it enables you to show smokers the potential damage they are doing to themselves and others, counsel them on stopping and illustrate their progress when giving up smoking.

Working without blood or saliva samples, Smokerlyzers® help build patient confidence. Clear, rapidly displayed readings give instant feedback of results, generating confidence and maintaining the will to persevere – and all from a single breath.

1.2 You and the Smoker:

As the Cessation Counsellor, you are privileged. Patients seek your help and guidance. Smokers are addicts of nicotine, but it is the CO that does the real damage.

Smokers need help, not lectures. The Smokerlyzer® offers a vital opportunity for real patient contact. To maximise that opportunity, you must understand the smoker, which is why this manual was written by a former heavy smoker who knows the difficulties of giving up.

Not all smokers come to you willingly. Some, pressured into quitting by employers, workmates, family or medical advisers, may well feel anger and resentment. Their view may well be that they have done nothing "illegal".

Others may be frightened. They know they should stop, but do not know how they will manage without tobacco. They look to you for confidence, understanding and answers. With Smokerlyzer® you can provide all of this and more .

Willpower is vital in stopping smoking. But it has to be generated and maintained. When the going gets rough, willpower needs boosting. Smokerlyzers® are invaluable, charting progress and thus, maintaining the determination to succeed.

1.3 Other Applications:

Bedfont Smokerlyzers® can be used in any situation where Carbon Monoxide (CO) has been inhaled, or there is a danger of it. A quick and simple check will confirm exposure and give an accurate CO absorption analysis.

1.4 Operators and the Smokerlyzer® :

Technical qualifications and refined, expensive training are not necessary to operate a Smokerlyzer® . Anybody can use one after only minimal training – training accomplished by reading this manual carefully and following the steps described. It's that easy! A video is also available from Bedfont for further training help.

Smokerlyzers® are ideal for doctor and practice nurse use; hospitals and research centres; public service, personnel safety monitoring and occupational health programmes; schools, cessation groups, place-of-work groups and health centres. Operators can be doctors, nurses, health education or health and safety officers, shift supervisors, secretaries or housewives and husbands.

Equipment accuracy makes Smokerlyzers® reliable and invaluable aids in the surgery, clinic, place of work, school or even private smoking cessation group.

They rank among the most patient-friendly medical equipment in existence. Asking no more than a single breath sample, results appear quickly on a clear, readable digital display. In cessation work, Smokerlyzers® can be fun, too, involving whole groups, creating a comfortably competitive effect with individuals striving to achieve the best results. They also allow operators to develop individual approaches best suited to their personality and patients.

Smokerlyzers® are more than machines. They are the core of a carefully designed and skilfully constructed total package aimed at enhancing smoking education and cessation practice in a wide range of environments. The optional extras include a valuable training video; a hard-hitting slide presentation; computer programs to enable patients to construct their personal picture of smoking cost and damage; and a constantly updated range of information leaflets, aimed at specific community sectors. It really is a total smoking cessation package.

With or without the additional elements, Bedfont Smokerlyzers® present a sobering picture of smoking damage and graphic reasons for stopping – with enough shock effect to attract and concentrate the attention.

1.5 Carbon Monoxide (CO)/Carboxyhaemoglobin (%COHb) correlation:

Carbon Monoxide is a toxic, odourless, colourless, tasteless gas. Harmful in any concentration, it can kill. It is formed from incomplete combustion at high temperatures with an insufficient oxygen supply – at the end of a cigarette. When inhaled, CO competes successfully with Oxygen in the bloodstream to form COHb. This starves body tissue of the oxygen vital to repair, regeneration and general living. To compensate, the heart works harder constantly – a contributory factor in heart disease.

Although natural CO in the body varies between individuals and with surroundings – town or country – smokers have much higher CO levels than non-smokers.

CO concentration is time-related, at its highest just after a cigarette or pipe. Concentration also increases with tobacco consumption throughout the day. Further, CO can remain in the bloodstream for up to 24 hours, depending on a range of factors including, physical activity, sex of smoker and inhalation intensity.

Carbon Monoxide is measured in parts per million (ppmCO) and Carboxyhaemoglobin in percentages (%COHb). But the two are comparable and convertible, CO relating lung/breath and COHb to blood gas.

Clinical research has demonstrated that a useful relationship between Carbon Monoxide (CO) and Carboxyhaemoglobin (%COHb) is obtained after a short period of breath-holding by the subject.

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 conversion chart on page 5 may be copied to provide each patient with a personal record for reference and for future use as a measure of progress.

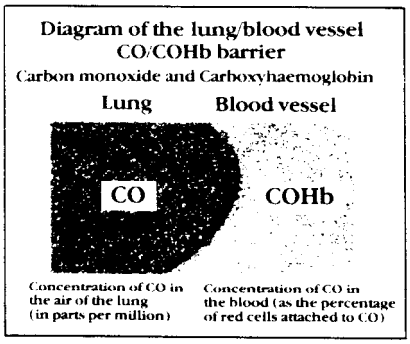
The leaflet entitled *"Stopping Smoking and Carbon Monoxide"* may also be used for this purpose.

As a general rule of thumb, ambient CO levels in air should not exceed four parts per million (4 ppmCO). The average for smokers is about 33 ppmCO, with heavy smokers returning even higher readings.

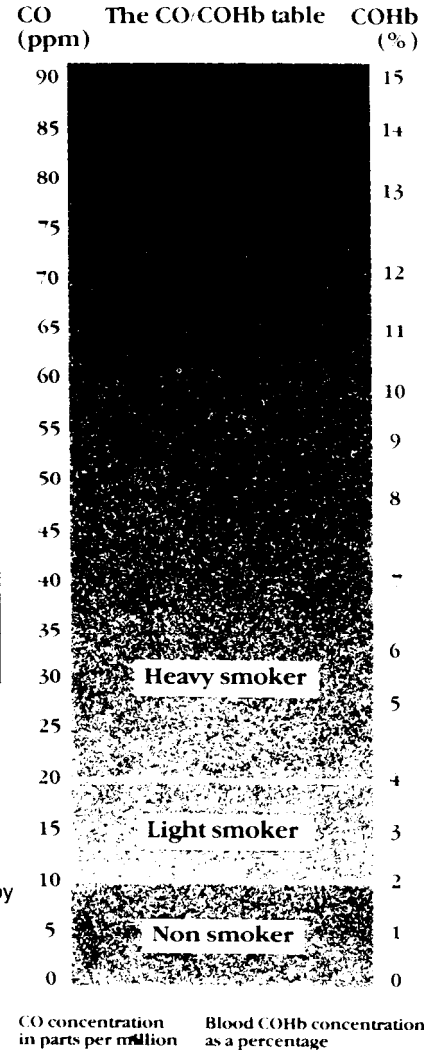
The British Health and Safety Executive (a government body) stipulates maximum CO exposure in industrial environments as: 50 ppmCO for no more than eight hours time-weighted average; and 40 ppmCO for no more than 10 hours time-weighted average. Many smokers expose themselves to more than 40 ppmCO for years at a time!

1.6

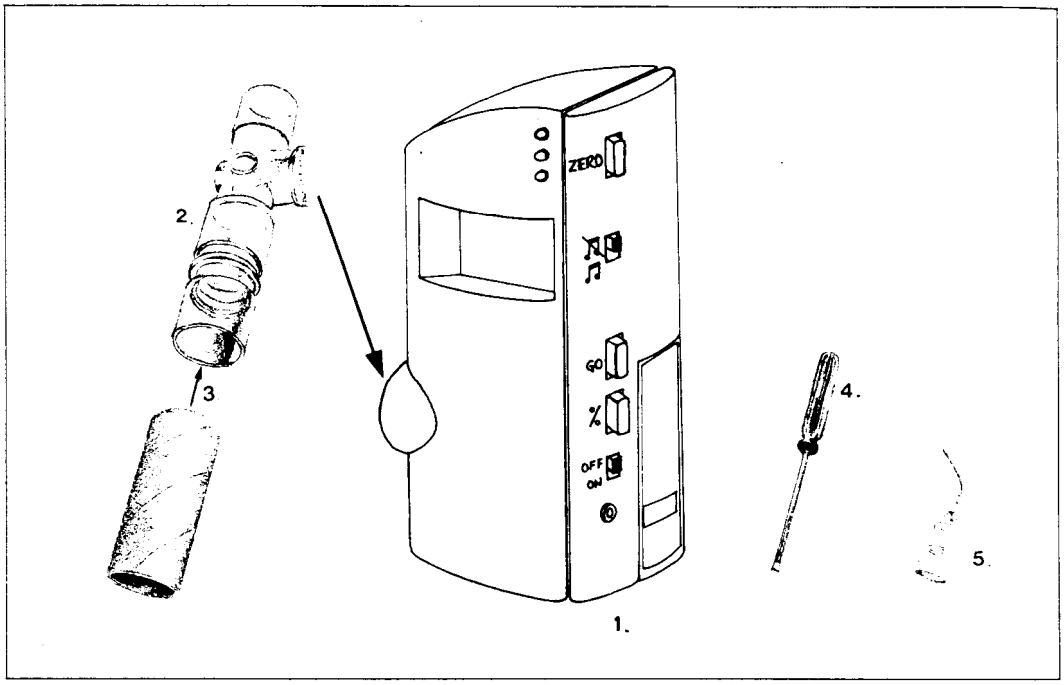
The table shows the equivalent values of breath carbon monoxide (CO) and carboxyhaemoglobin (COHb).



Note: As a very rough guide, CO in parts per million can be obtained by multiplying COHb by 6.



3. THE 'NEW' MICRO SMOKERLYZER®



3.1 The 'NEW' Micro Smokerlyzer® has been designed to incorporate the latest technology in design and electronics. Its compactness and portability makes it ideal for use anywhere.

Your **'NEW'** Micro Smokerlyzer® basic pack should contain the following items:

1. ● **'NEW'** Micro Smokerlyzer® with LCD/LED displays and integral sensor
2. ● T piece sampling system (2 section assembly)
3. ● Cardboard disposable mouthpiece (x1)
4. ● Calibration screwdriver
5. ● Calibration adaptor

Familiarisation:

LAY all the parts out on a table. Compare them with the illustration above and become thoroughly familiar with them. As many smokers will be nervous, the more confident you are with the equipment, the greater the confidence you will create in the patient.

3.2 Displays and Functions

The **Liquid Crystal Display (LCD)** gives a 3 digit display plus low battery symbol, "ppm" and % indicators. It displays the patient's/user's lung/breath CO reading in parts per million (ppm) and blood CO reading in percentage (%CoHb).

The **3 LED's** (Red, Amber and Green) give an immediate indication of the patient's/user's smoking habit, providing additional psychological impact to the patient's/user's LCD reading. The lights will flash and stay on in sequence depending on the ppm/%CoHb reading showing on the LCD, as follows:-

	GREEN LED	AMBER LED	RED LED
LCD reading 0–10ppm CO (non-smoker)	FLASHES	OFF	OFF
LCD reading 11–20ppm (light-smoker)	ON	FLASHES	OFF
LCD reading 21+ppm CO (heavy smoker)	ON	ON	FLASHES

The **Audible Bleeper** () has been incorporated to provide additional psychological impact to the patient's/user's LCD reading. The bleeper will bleep repetitively but slowly when the LCD reading passes 10ppm, increasing in rate with an increasing ppm reading on the LCD. (The bleeper is automatically inhibited above 100ppm). The bleep can be muted by sliding the switch to the () (off) position.

The audible bleeper will also bleep at the last 3 seconds of the 15 second breath hold countdown timer (refer to "GO" function for full details).

The **AUTO ZERO** allows the operator to zero the LCD reading before each breath sample is taken, so that an accurate reading can be obtained every time. **However,** this function must be used **carefully and only** in accordance with the operating instructions as it is only effective within certain parameters (see operating instructions) – pushing the auto zero outside these parameters will cause the LCD

to display "Err". A breath sample can only be initiated when by pressing and releasing the Auto-Zero "Set" then **"GO"** is displayed in the LCD, and subsequent instructions followed. Pressing and holding the Auto-Zero button will initiate the internal calibration routine which will precede the **"GO"** display by displaying "CAL" for a short period.

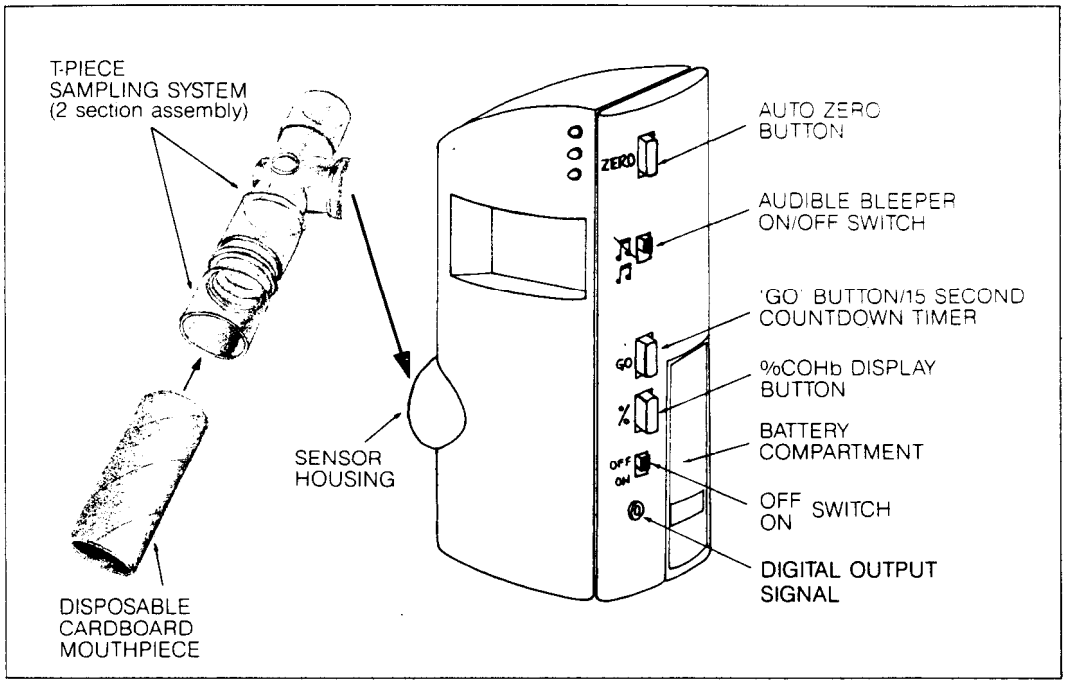
The **"GO"** function is used to initiate a 15 second countdown timer. When the **"GO"** button is pressed and released, the LCD will countdown from 0:15, 0:14, 0:13 etc., in 1 second intervals. As an additional warning to the user, the audible bleeper (if selected) bleeps at 0:03, 0:02 and 0:01 with an extra long bleep at 0:00. This 15 second period is used by instructing the patient/user to inhale deeply and hold his/her breath and at the end to breathe out through the cardboard mouthpiece. The **"GO"** button is ineffective unless **"GO"** is shown on the LCD.

The **"%"** function (push-button) enables the operator to show the patient/user his/her blood CO (%CoHb) reading in direct correlation to their lung/breath CO (ppm) reading all from the one breath sample into the smokerlyzer® .

The Digital Output Signal. With appropriate interfacing, this signal can be used to drive either an external digital chart recorder or milliameter, or an external printer unit. The output signal from the unit is 10mV per ppm CO.

3.3 OPERATING INSTRUCTIONS

The 'New' Micro Smokerlyzer® :



NOTE: Please read carefully and thoroughly.

1. Insert 1 x 9 volt alkaline battery into the compartment at side of instrument and switch on using the slide ON/OFF switch. At this point, the instrument will go through a self-diagnostic check; the LCD displays 888 for approximately 1 second, the LED's ignite temporarily and if the bleeper switch is in the 'ON' position, a short bleep will be heard. If the low battery symbol appears on the LCD, replace battery at once, using the above specified type.
2. Insert the sampling system into the sensor housing. **It is very important that this is fitted correctly (see illustration).**
3. Fit a cardboard disposable mouthpiece into the clear section of the sampling system.
4. Select the audible bleep in the ON (♪♪) or OFF (♪♪) position.

5. a) Press and release the zero button to display **"SET"** then **"GO".**

then b) Hand the Smokerlyzer® to the patient/user. Ask him/her to inhale deeply and hold breath whilst at the same time pressing the **"GO"** button which will initiate the 15 second countdown. If the audible bleep is selected the unit will bleep for the last 3 seconds with an extra long bleep at 0:00 to indicate to the patient/user that it is time to exhale into the cardboard mouthpiece. **The breath out from the patient/user should be controlled and gentle** (not like blowing through a peak blow meter) **emptying the lungs as much as possible,** ensuring a tight seal is made with the lips around the mouthpiece, so that no breath can escape down the sides and reduce the important CO and %CoHb reading. Exhalation of as much of the lung contents as possible gives the best sample of alveolal air.

Obviously for people with lung diseases, chest ailments etc., the 15 second breath-hold is sometimes impossible. In these circumstances, it is best to initiate the 15 second countdown, wait for 0ppm to show on the LCD and then instruct the patient/user to inhale, hold their breath for as long as possible, and then exhale through the cardboard mouthpiece.

6. Wait for the maximum reading to show on the LCD and note the results.

7. If the patient's/user's carboxyhaemoglobin (%CoHb) level is required then at any time while there is a ppm reading displayed by pressing the % push button (coloured BLACK) will alter the ppm reading to the %CoHb reading. This reading will continue for as long as the % button is depressed.

8. To initiate the next breath sample firstly take the sampling system out of the sensor housing and discard the cardboard mouthpiece.

It is important at this stage to allow the instrument reading to decrease as much as possible (ideally to zero) or until a very stable reading is reached – this should always be below 5ppm. Whilst the reading on the LCD decreases naturally to an acceptable level this time can be used effectively by yourself to explain to the patient/user his/her CO/%CoHb reading and what this means etc.

9. Once a steady reading on the instrument has been achieved, to effect another reading, the **ZERO** button **MUST** be pressed again and instructions 2 to 8 repeated.

DO NOT: (a) attempt to auto zero the instrument before it has reached below 10ppm. This prevents substantial inaccuracies in subsequent readings.

DO NOT: (b) try to take a breath sample whilst the instrument shows **"GO"** – you will not get one!

DO NOT: (c) attempt to take a breath sample if after the 15 second countdown the LCD shows **"NEG"** – it must show 0ppm (after the 15 second countdown) to be able to register a reading.

If either **"Err"** or **"NEG"** are displayed, then press the zero button again and repeat sequence.

By using the instrument correctly and following the above instructions carefully, you should not experience any of the above problems.

3.4 Demonstrations

DEMONSTRATIONS are vital in achieving maximum equipment effect and patient attention.

- Obtain a general CO reading for the room by removing the T-Piece Sampling System, and exposing the sensor to air.
- Take a mouthful of cigarette smoke (better still, have a patient do it), blow into the mouthpiece and watch the reading go off the scale.
- Repeat the demonstration just holding a burning cigarette near the sensor (T-piece removed).
- Sample a non-smoker to show the low levels of CO to be attained by a smoker after stopping.

Comparison of the three reading give positive, visible proof of toxic intake from cigarette smoking.

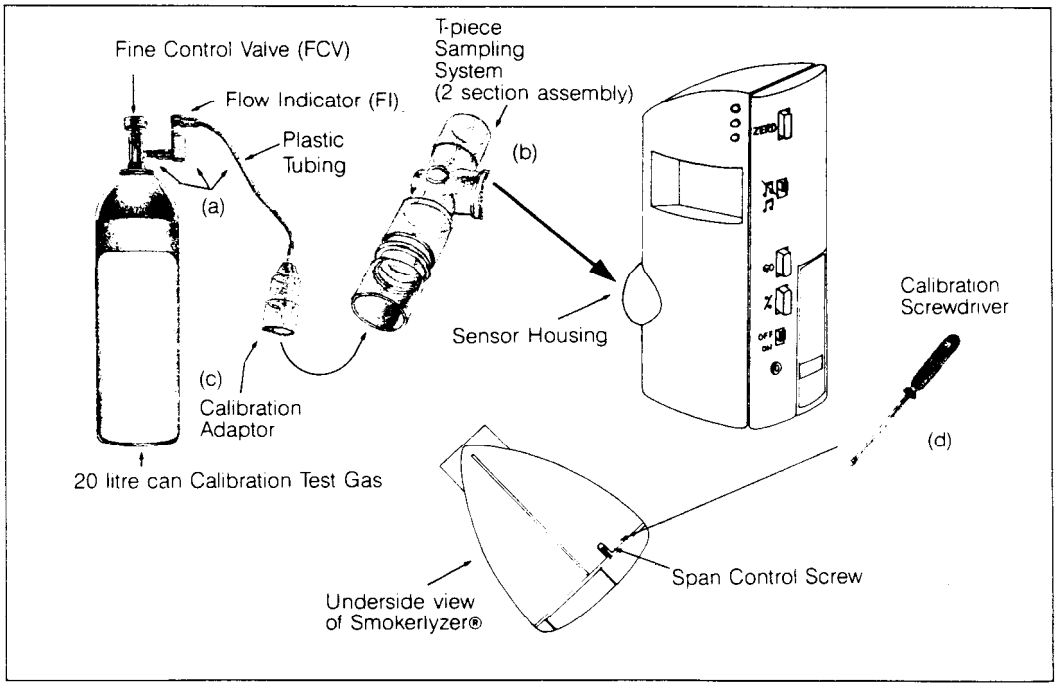
4.3 Calibrating the 'New' Micro Smokerlyzer®

Calibrating your 'New' Micro Smokerlyzer® at 6 monthly intervals will ensure accurate readings are maintained throughout the life of the instrument.

This is a simple operation which should take approximately 5 minutes.

Before you start, make sure you have all the required accessories as follows:–

(a) The Bedfont calibration kit consisting of a 20 litre can of 50ppm Carbon Monoxide (CO) in air, complete with fine control valve (FCV), flow indicator (FI) and length of plastic tubing.
(b) T-piece sampling system (2 section assembly).
(c) Calibration adaptor
(d) Screwdriver



Familiarisation:

LAY all the parts out on a table. Compare them with the illustration above and become thoroughly familiar with them.

IF YOU ARE USING THE CO-CALIB-34-50 TO CALIBRATE YOUR MONITOR, DO NOT USE THE CALIBRATION INSTRUCTIONS BELOW. CALIBRATION INSTRUCTIONS CAN BE FOUND ON OUR WEBSITE AT WWW.COVITA.NET, ON THE RESOURCES PAGE

READ CAREFULLY AND UNDERSTAND THE INSTRUCTIONS BELOW. DO NOT TAKE ANY SHORT CUTS.

1. Making sure the valve is in the off position, screw the fine control valve (FCV)/flow indicator (FI) onto the can of gas.
2. Attach the calibration adaptor to the tubing running from the flow indicator.
3. Push the calibration adaptor into the clear section of the T-piece sampling system.
4. Switch on the Smokerlyzer® **N.B.** If the low battery symbol shows on the liquid crystal display (LCD), replace the battery at once. **Do not attempt to calibrate when the low battery symbol is showing.**
5. Press the **ZERO** button until **"GO"** is displayed on the LCD.
6. Press the **"GO"** button until **0:15** is displayed on the LCD. This initiates a 15 second countdown.
7. At the end of the 15 seconds, 0ppm will appear on the LCD. If 0ppm does not show, repeat the sequence from 5. At this stage, the Smokerlyzer® is ready to be introduced to the 50ppm CO within the gas can.
8. Insert the sampling system into the sensor housing on the Smokerlyzer® **Make sure this is fitted correctly.**
9. Open the fine control valve and allow the gas to flow at a rate between 0.5-1.0 litre/minute indicated by the ball-bearing in the flow indicator between the bottom and middle lines. **Keep an eye on the flow-rate and adjust as necessary.**
10. Allow the gas to flow through the instrument for at least 4 minutes to ensure an accurate calibration, **again keeping an eye on the flow-rate.**
11. If after the 4 minutes, the LCD does not display 50ppm, an adjustment can be made using the screwdriver, turning the span control screw, situated on the underside of the unit. Turn anti-clockwise to increase or clockwise to decrease the reading shown, to that of 50ppm.

12. Turn off the gas supply, remove the sampling system from the Smokerlyzer® and disconnect the calibration adaptor from the sampling system.
13. Unscrew the fine control valve from the gas can and store safely.
14. Allow the Smokerlyzer® to stand for approximately 2 minutes to allow the reading to decrease before further use.

Your Smokerlyzer® is now correctly calibrated and ready for another 6 months use.

NOTES:

a) Your Smokerlyzer® has been calibrated prior to despatch.

b) **Always** use a good quality alkaline battery.

c) **Do not** attempt to calibrate when the low battery symbol is showing on the LCD.

d) Only zero **once** during calibrating.

e) Only use Bedfont calibration kits containing a known gas mixture of 50ppm Carbon Monoxide (CO).

f) The **Span** adjustment control is **only** used when calibrating under gas. It should **never** be used for any other reason.