



# **Joint Industry Programme on carbon monoxide issues**

A market survey of portable carbon  
monoxide detection equipment

Prepared by  
**Advantica Technologies Limited**  
*(formerly BG Technology)*  
for the Health and Safety Executive

**CONTRACT RESEARCH REPORT**  
**378/2001**

# **Joint Industry Programme on carbon monoxide issues**

**A market survey of portable carbon  
monoxide detection equipment**

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This report details the results of a survey of portable CO detecting equipment available on the British market. The details represent a snapshot of most of the available portable ambient air CO monitors and flue gas analysers available in early 2000.

The survey covered portable CO detecting equipment that might be considered relevant to situations where emergency response engineers attend or investigate sites where there has been a report of fumes. Such situations are in the remit of emergency service providers, who are legally required to make gas appliances safe following attendance at a fumes related incident, which may entail the isolation of the gas supply.

The use of portable CO detection equipment may help in the identification of the source of fumes and speed up the reinstatement of the gas supply. Such equipment can also alert the user to the presence of harmful concentrations of CO.

The results are relevant to the possible introduction of a code of practice for the use of such equipment to measure CO and CO<sub>2</sub> levels, both in the domestic ambient air and in the combustion products from different gas appliances.

This report and the work it describes were funded by the Health and Safety Executive (HSE). Its contents, including any opinions and/or conclusions expressed, are those of the authors alone and do not necessarily reflect HSE policy.

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First published 2001

ISBN 0 7176 2119 7

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## **SUMMARY**

This report contains relevant information on portable Carbon Monoxide Detection equipment and flue gas analysers available on the British market. The survey was split into nominal categories - Ambient Air CO Monitors and Dataloggers, Hand-Held Flue Gas Analysers. Such equipment has potential for use by emergency response personnel attending reports of fumes related escapes; and by service engineers, as a tool to assist in identifying sources of excessive CO production in a property.



# **1 INTRODUCTION**

As part of the BG Technology initiative addressing CO issues, the response of engineers attending or investigating a report of fumes has been examined. In particular, the benefits of equipping such personnel with portable CO detectors or flue gas analysers.

At present, the emergency service provider is legally required to make gas appliances safe following attendance at a fumes related incident, and this may necessitate the isolation of the gas supply. The use of portable CO detection equipment may help in the identification of the source of fumes and speed up the reinstatement of the gas supply. The equipment will also alert the user to the presence of harmful concentrations of CO.

The British Standard Institution is currently preparing a code of practice for the use of equipment to measure CO and CO<sub>2</sub> levels, both in the domestic ambient air and in the combustion products from different gas appliances. The Code is intended for use with equipment manufactured to performance standard BS 7927, or to a minimum specification defined in the Code.

To inform potential users, a survey of the detection equipment available on the market has been carried out, and is reported here. This includes portable CO detecting equipment which might be considered relevant to the situations that might be faced by engineers in the field.



## 2 BACKGROUND

The detectors available were split into two groups:-

### 2.1 CO DETECTOR GROUPS

#### 2.1.1 Group 1 – Detectors that are worn

Equipment that can be worn by the engineer. It includes modules that could be clipped to the lapel or pocket. Some of the larger instruments may be clipped to a belt. They would provide a warning to the engineer that he was entering an environment that contained hazardous levels of carbon monoxide. Some alarms can be user programmed to agreed preset levels.

This group also includes equipment that could be placed in a room, and left to log levels of CO in the local environment for a predetermined period following an incident. It could be used to demonstrate that the problem had been successfully resolved or to show that the problem was intermittent or cyclical.

#### 2.1.2 Group 2 – Detectors that are held

Detectors that would normally be hand held, and which incorporate a sampling probe. These might be used to identify the source of emissions. Many hand-held detectors can sense up to four additional gases, and are therefore more complicated than required for this application and more expensive. This group also includes Flue Gas Analysers.

### 2.2 DETAILS BY GROUP

Details of equipment have been specified for each group in the following way:-

#### 2.2.1 Group 1 Classification Categories

- **Supplier Details-** Denotes the supplier of equipment in this country, and a contact telephone number. In some cases more than one supplier exists for a brand.
- **Model-** Self explanatory.
- **Alarm-** This could be audible or visual.
- **Range-** denotes concentration range of sensor, without saturation.
- **Calibration-** Calibrations may be carried out automatically by the instruments internal software when switched on. In other cases an external calibration kit is required.
- **Sensor replacement-** most instrument's sensors are reusable. They are either returned to the supplier for recalibration and service, or the sensor is replaced by the owner. However in cheaper models it is not cost effective to renew only the sensor and therefore the whole instrument is disposed of.
- **Cost-** This is the one off cost. If a large order were involved, a discounted cost is likely.
- **Visual display-** Generally LCD or LED at this price range. There is an audio/visual alarm where no display is denoted.
- **Battery type-** Self explanatory
- **Data logging output-** May be included as an optional accessory.

- **Typical Life of sensors & batteries**-The cost of replacing the sensor and the number of hours operation, where supplied by the literature.
- **Comments**- Contains any information intrinsic to the equipment.

### 2.2.2 Group 2 Classification Categories

Most categories are the same as group 1. Except:

- **Cost**- Many hand held detectors are capable of sampling up to four different gases. For this they are therefore equipped with four sensors. Costs listed in the Tables are for the purchase of a detector with only the CO sensor fitted. This makes many detectors appear uncompetitive, as not all the facilities will be fully utilised. Some consideration may need to be made as to whether a use may be found for these additional sensors in the field.
- **Software**- where applicable the volume of data that can be stored is shown here. Also whether the downloaded data format is Windows compatible.
- **Comply with BS 7927**- This standard is only applicable to flue gas analysers and their performance. Other topics covered within this standard are the equipment's Instruction manuals, methods of testing, and its performance under specific ambient conditions.
- **Integral pump**- Some products use sensors that operate by diffusion. Their speed of response will therefore be slower than for sensors where the sampled air is pumped over the sensor.

### **3 DISCUSSION.**

The potential for engineers using CO detection equipment has been discussed increasingly over the last 12 months. Whilst performance standards exist for such equipment, no procedures have yet been agreed within the industry or by the Health and Safety Executive for using them. In addition, current working conditions, e.g.. licence conditions, obligations, do not require using such instrumentation.

## **4 CONCLUSION**

This survey represents a snapshot of most of the available portable carbon monoxide detection instrumentation available on the British market in early 2000.

**Table 1i – Ambient air CO monitors & datloggers**

Supplier details	Model	Cost (£)	Alarm	Range (ppm)	Calibration	Sensor: Reuseable /disposable	Visual display	Battery type	Data logging output	Typical Lifetimes		Comments
										Sensor (years)	Battery (hours)	
Acal Auriema Ltd 01628 604353	IQ200	630	Yes	0-300	Manual	Yes/No	No	4 x AA	No	10	14	Includes sensors for H <sub>2</sub> S and O <sub>2</sub>
	IQ-250	608	Yes	0-300	Manual	Yes/No	Yes	4 x AA	No	10	14	
	IQ-350	698	Yes	0-300	Manual	Yes/No	Yes	4 x C	No	10	20	
	IQ-1000	3400 - 4100	Yes	0-5000	Auto	Yes/No	Yes	Rechargeable	Yes - 256K	10	20	SRAM upgradeable, "Gas search" software
Maester Instruments (was Alpha Electronics) 01942 874343	Miniwarn	700	Low battery, not gas	0-999	Manual	Yes/no	Yes	Alk/ NiCD/ NiMh	Yes	3		
	LOCO	129	No	0-999	Manual	Yes/no	Yes	9V PP3	No	3		Simple CO monitor, optional probe for flue sampling
	Gasbadge	250	Yes	0-100	Not needed	No/Yes	No	Lithium 6V	No	1		Alarm setting at 35 and 70 ppm
	T80	497	Yes	0-1500	Auto	No/Yes	Yes	Alkaline 9V/ Lithium	No	3	4400	Settable alarms
Anachem Ltd 01582 456666	STX70	555	Yes	0-999	Manual	No/Yes	Yes	Lithium	Version avail.	3	2000	Three configurations available
	ATX620	1405	Yes	0-999	Manual	Yes/no	Yes	Rechargeable	Yes - 60 hrs	3		1 min record, windows software
	ATX612	1276	Yes	0-999	Manual	Yes/no	Yes	Rechargeable	Yes - 110 hrs	3		Up to 4 sensors
	TMX412	964	Yes	0-999	Manual	Yes/no	Yes	Rechargeable	Optional - 110 hours	3		

**Table 1ii – Ambient air CO monitors & datloggers**

Supplier details	Model	Cost (£)	Alarm	Range (ppm)	Calibration	Sensor: Reusable /disposable	Visual display	Battery type	Data logging output	Typical Lifetimes		Comments
										Sensor (years)	Battery (hours)	
Analox Sensor Tech Ltd 01642 711400	PhD Plus	1126	Yes	0-999	Manual	Yes/no	Yes	Alk / NiCd	No	3		
	PhD 2	1203	Yes	0-900	Manual	Yes/no	Yes	Alk / NiCd	3000 intervals	3		1 sec to 1 hr logging with 4 gas capability
	PhD Ultra	1281	Yes	0-900	Manual	Yes/No	Yes	Alk / NiCd	3600 intervals	3		As for PhD 2
Anglo-Nordic Ltd 020 8979 0988	ANCO	195	No	0-999	Manual	Yes/no	Yes	NiCD	No	3		Simple CO monitor
Biral 01275 847787	Q-Check 8731	1209	No	0-500	Manual	Yes/no	Yes	4 x AA	No	3		
	Q-Trak	2275	No	0-500	Manual	Yes/no	Yes	4 x AA	63000 data memory	3		
Casella Ltd 01234 841441	MX2000	596 & 659	Yes	0-500	Manual	Yes/no	Yes	4 x R6/ NiCD	No	3		
	TX12	397	Yes	0-300, 0-999	Manual	Yes/no	Yes	9V DC / NiCd	Yes	3		
Crowcon Detection 01235 553057	Gasman II	375	50 ppm	0-500, 0-999	Manual	Yes/no	Yes	3 x AA	30-3000 hrs	3		Rechargeable version available
Dee Electronics Ltd 01244 288606	Detecta	118	No	30-200	Manual	Yes/no	Yes	Rechargeable	No	1		
D.I.(Northern) Ltd. 01563 525525	MSTox	440	Settable	0-300	Manual	Yes/no	Yes	Rechargeable	No	2		Battery 1000 times rechargeable

Table 1iii- Ambient air CO monitors & datloggers												
Supplier details	Model	Cost (£)	Alarm	Range (ppm)	Calibration	Sensor: Reuseable /disposable	Visual display	Battery type	Data logging output	Typical Lifetimes		Comments
										Sensor (years)	Battery (hours)	
Draeger Ltd 01670 352891	MicroPac	185	Yes	0-400	Manual Infra Red interface	Yes/no	Yes	Lithium	No	2		Different display options
	Toxiclip 2	199	Factory Set	0-300	Not needed	No/yes	Yes	Lithium	No	1	2 years	Claimed smallest in world - 2 oz.
	Minimax	300	User settable	0-300	One step	Yes/no	Yes	Lithium	No	2	3 years	
	Multimax	860	User settable	0-1999	Manual - 90 days	Yes/no	Yes	Alkaline C cell	Yes	2		Up to 4 sensors accommodated.
Fluke (UK) Ltd 01923 216430	Defender	789	Yes	0-500	Automatic	Yes/no	Yes	Versapak NiCd	No	2		
	CO-210	140	Yes	0-999	Automatic	No/yes	No*	Alkaline	No	3	500	*Display when attached to a multi-meter
	CO-220	195	Yes	0-999	Automatic	No/yes	Yes	Alkaline	No	3	500	Simple CO monitor
GDS Technologies Ltd 0113 2860166	Gas Scout	306	Yes - 50 ppm	0-1999	Manual	Yes/no	Yes	PP3	No	2	700	
	Gas Log	366	No	0-999	Manual	Yes/no		PP3	Yes	2	288	Win software & waterproof

**Table 1iv – Ambient air CO monitors & dataloggers**

Supplier details	Model	Cost (£)	Alarm	Range (ppm)	Calibration	Sensor: Reuseable /disposable	Visual display	Battery type	Data logging output	Typical Lifetimes		Comments
										Sensor (years)	Battery (hours)	
Kane International Ltd Kane-May 01707 375550	SGA70	99	35ppm	0-999	Auto	Yes/no	Yes	1 x PP3	No	3		Simple CO monitor
	SGA71	150	35ppm	0-999	Auto	Yes/no	Yes	1 x PP3	No	3		Displays Max & hold
	KM72	150	35ppm	0-999	Auto	Yes/no	No	Lithium	Yes	3		Datalogs for up to 3 months & transfers to Windows PC
Kidde Safety 01844 218488	Night Hawk	300	No	0-999	Manual	Yes/no	Yes	9V / AC	Yes	3		CO-Stat software for Windows '95
	Cricket	175	35/400 ppm	n/a	Not needed	No/yes	No	Lithium 3V	No	1 at 3 min alarm		
MSA (Britain) Ltd. 01236 424966	Micro Mac	400	Adjustable	0-999	Auto	Yes/no	Yes	Alkaline/ Rechargeable	IR link 1200 intervals	3	80	20hr data downloaded in <1min
	Mini Responder	260	No	0-999	Manual	Yes/no	Yes	1 x PP3	No	2	2880	Lifetime warranty except battery/sensor.
	Gasgard 2	1052		0-999	Manual	Yes/no	Yes	3.6v NiCd	Yes	3	12	Win software



**Table 1v – Ambient air CO monitors & dataloggers**

Supplier details	Model	Cost (£)	Alarm	Range (ppm)	Calibration	Sensor: Reuseable /disposable	Visual display	Battery type	Data logging output	Typical Lifetimes		Comments
										Sensor (years)	Battery (hours)	
MST UK Ltd 01202 875753	MSTox	350										For details see D.I.(Northern) Ltd
Neotronics 01279 870182	Neotox-XL CO	342	50/300/400 ppm	0-999	Manual	Yes/no	Yes	Dry cell/ Rechargeabl	40 hrs	3		Ready 10secs from switch on.
	Exotox 75	1584		0-999	Manual	Yes/no	Yes	Rechargeabl	30hrs	3		
Orbital Gas Systems 01785 857000	TX-11	472	Adjustable	0-999	Manual	Yes/no	Yes	Zinc-Carbon/ Ni-Cd(9V)	No	3		
	MX21	896	Yes	0-999	Manual	Yes/no	Yes	Rechargeabl	Yes	3		PC set up
Quantitech Ltd 01908 227722	Gas Badge											See Anachem Ltd.
	T80											See Anachem Ltd.
Regin 01480 412415	STX70	350	Yes	0-999	"One button"	Yes/no	Yes	2 x 3V Lithium	Optional >60hrs	3		
	Kanary plus	149	35ppm	0-999	Auto	Yes/no	Yes	1 x PP3	3 months	3		Displays Max & Hold
	Safegas	150	Yes-LED	0-200	Auto	Yes/no	LEDs	Charger & cigar lighter socket	No	2		Cigarette lighter socket recharge lead

**Table 1vi – Ambient air CO monitors & dataloggers**

Supplier details	Model	Cost (£)	Alarm	Range (ppm)	Calibration	Sensor: Reuseable /disposable	Visual display	Battery type	Data logging output	Typical Lifetimes		Comments
										Sensor (years)	Battery (hours)	
Square Root Ltd 0181 665 4200	Trak-It Dm Series	189	Yes	0-1999	Manual	Yes/no	Use with ext. DVM	1 x PP3	No	3	2000	Tested at BG Technology
	Sensit CMIM-1	195	35 ppm	0-1999	Manual	Yes/no	Yes	1 x PP3	No	3	>1000	
Shawcity Ltd 01367 241675	Toxi Rae	395	Yes	0-200	Manual	Yes/no	Yes	AAA Battery	No	3	1000	
	Multi Rae Plus	525	Yes	0-500	Manual	Yes/no	Yes	4 x AA / NiCd	20000 points	3		Optional pump
	Metrosonics pm-7400	1350	Yes	0-999	Manual	Yes/no	Yes	Rechargeable	57000 points	3		Measures up to 4 gases Free Metrosoft software
	Metrosonics pm-7700	1700	Yes	0-999	Auto	Yes/no	Yes	1 x PP3	1000; interval 1hr-1day	3		Free Metrosoft software
	VRAE	859	Yes	0-500	Manual	Yes/no	Yes	4 x AA / NiCd	16000 points	3		£187.50 Logging option
	SampleRae	625	Yes	0-100	Manual	Yes/no	Yes	4 x AA	No	3		

**Table 1vii – Ambient air CO monitors & dataloggers**

Supplier details	Model	Cost (£)	Alarm	Range (ppm)	Calibration	Sensor: Reuseable /disposable	Visual display	Battery type	Data logging output	Typical Lifetimes		Comments
										Sensor (years)	Battery (hours)	
Status Scientific Control 01623 651381	Mentor PGD2	527	Yes	0-999	Manual	Yes/no	Yes	NiCd	571 points	3		Windows '95 software, optional pump
	Gas Scout	879	Yes	0-999	Manual	Yes/no	Yes	NiCd	No	3		
Zellweger Analytics 01279 870182	Gas Leader	790	Yes	0-999	Manual	Yes/no	Yes	NiCd	Yes	3		
	Mini Gas-XL	637	Yes	0-999	Manual	Yes/no	Yes	4 x AA / NiCd	40 hrs	3		Optional rubber boot
	solotox	195	58-82 ppm	0-500	None Req.	No/yes	No	Disposable	No	2		No battery charging/ replacement
	solo 100	595	Yes	0-500	Manual	No/yes	Audio/ Visual	2 x AA / NiCd	Optional	3		Display with auto backlight.

**Table 2i – Hand-held flue gas analysers**

Supplier Details	Model	Cost (£)	Alarm	Range (ppm)	Running Cost	Software	Comply with BS 7927	Integral Pump?	Comments
Anglo-Nordic Ltd 0181 979 0988	Brigovision	1600	No	0-4000	NiCd recharge	Yes	Yes	Yes	Measures CO in ambient air
	Brigotronic	1495	No	0-4000	NiCd recharge	Yes	Yes	Yes	I/R printer
Anton Industrial Services 01923 256666	tpi 705	249	No	0-1999	3x'C' alkaline	No	N/A	Yes	Only measures CO
	tpi 710B	399	No	0-1999	MN1300 battery	No	N/A	Yes	
GMI Ltd 0141 812 3211	Personal Surveyor	727	Yes	0-500	Dry Cell/NiCd/LiMH	Datalog up to 1400 points	N/A	Manual pump as accessory	IR link between P.C and instrument.
Kane International Ltd Kane-May 01707 375550	KM701	375	No	0-2000	4 x AA / NiCd	No	Yes	Yes	Measures CO, O <sub>2</sub> & CO/CO <sub>2</sub> ratio – other comments as for SGA91
	SGA91	249	No	0-2000	4xAA / NiCd	No	N/A	Yes	30cm S.S probe, 1.5m tube, can use copper tubing, rubber sleeve & case
	KM900	675	Yes - user adjustable	0-10,000	Wet cell/NiCd rechargeable	Up to 150 test to pc &/or printer	Yes	Yes	30cm S.S probe, 3m tube, rubber sleeve & carry case, option software
	KM800	495	No	0-2000	MN1500 recharge	Up to 12 tests to optional printer	Yes	Yes	as for KM900 but no PC software

**Table 2ii – Hand-held flue gas analysers**

Supplier Details	Model	Cost (£)	Alarm	Range (ppm)	Running Cost	Software	Comply with BS 7927	Integral Pump?	Comments
Maester Instruments was (was Alpha Electronics) 01942 873434	Maester Single Gas Analyser	199	No	0-2000	4xAA Batteries for 6 hrs	None	N/A	Yes	Only measures CO, 375mm S.S probe, 1.5m hose & filter.
	Maester M1200	399	No	0-1999	Rechargeable or 4xAA for 12 HRS	None	N/A	Yes	Computes CO/CO <sub>2</sub> ratio and O <sub>2</sub> conc.
	Maester M1250	695	No	0-1999	Rechargeable or 4xAA for 12 HRS	Yes-stores up to 50 readings	Yes	Yes	Flue Gas Analyser. Infra red printer.
	Maester M2000	1,900-2,700	No	0-1999	Rechargeable	Calcs Comb effy	Yes	Yes	Flue Gas Analyser
Telegan 01293 528866	Sprint/Sprint Twin	245/375	No	0-10000	2xAA/alk/NiCd	RS 232 printer link	Yes*	Yes	
	Tempest 50/100 Flue Gas Analyser	665	No	0-10000	NiCd/Mains	Yes	Yes	Yes	
Testo Ltd 01420 544433	T325	495	No	0-2000	4 AA Alkaline	No	Yes	Yes	I/R link to printer
	T300	995	No	0-8000	rechargeable nicad/ 4 AA	Yes	Yes	Yes	I/R link to printer, replaceable sensors

*\*Only Sprint twin measures CO & O<sub>2</sub>*

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ISBN 0-7176-2119-7



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