



The Goodman Bentley (Spec Ops) Design & Security Company StowCheck, Gas Analyser, to Search for Human Beings hidden or buried.

STATISTICAL USER GUIDE

1. Why the analysis of air can reveal the presence of people hiding in a container, vehicle, loft or room.

Composition of fresh air (approximate values)	
Gas	Quantity (% by Volume)
Nitrogen	79
Oxygen	20.9
Argon	0.9
Carbon dioxide	0.04
Others	Trace

NOTE: 0.04 % = 400 ppm* * (parts per million)

People and animals breath out a mixture of nitrogen, oxygen and carbon dioxide. For people the content of carbon dioxide is about 4.5 %. The typical rate at which breath is released is 10 litres per minute so the rate at which carbon dioxide is released is 0.45 litres / minute. It can thus be calculated that a person occupying a space where there is 1 cubic meter of air would cause the carbon dioxide to increase by 450 ppm per minute. As **CO₂ is heavier than air** it will be found closest to the floor of vehicles or the lowest point in buildings such as loft floors.

For example: in the loading space of a lorry with the size of 2x11x2 meters (Volume = 44 m³) one person will increase the carbon dioxide within 10 minutes from 400 ppm up to 800 ppm. (It is assumed that the air is dispersed evenly throughout the space as a result of the motion of the lorry.) However, a reading will be apparent even after the shortest time period and an experienced operator will establish a human's presence relatively easily.

If we were to take in account the actual space remaining after subtraction of the volume taken by the goods we can imagine how fast the carbon dioxide value will be raised by just one person.

2. Checking a lorry

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After sampling fresh air outside the vehicle, press the “O” button on the StowCheck instrument to store the reference level. The instrument will now read zero. The probe should then be inserted between the covers or container into the loading space and the air sampled. This should be done in at least three places. If some of the readings are significantly high (about 100 to 1000 ppm) then humans, animals or biological material must be - or was a short time ago in that space. The amount depends on the conditions mentioned in part 1.

3. Does a high content of CO2 always indicate the presence of humans?

People breath out a lot of carbon dioxide during an hour and consequently can be found easily. For example, by identifying and understanding the effect of the other possible sources of carbon dioxide, and making repeated measurements with the same instrument observe the change in carbon dioxide levels after a longer period eg 10 minutes. The presence of humans will be indicated by a steady rise in carbon dioxide levels. (refer to part 1.) **DON'T FORGET CO2 IS HEAVIER THAN AIR**

* Make use of the shipment documentation to identify possible genuine sources of carbon dioxide. Perform total visual inspection of the vehicle.

Experience in handling of the analyser and probe and evaluation of the results from various situations is vital if this technique is to be used efficiently and effectively.

An invaluable tool for the Fire Departments, Law Enforcement Departments and Immigration departments, who by their very nature search for people who are injured or evading capture.

Many operations have succeeded because CO 2 is heavier than air, and therefore lies at at lower level, in such cases as the floor of a vehicle or the floor of a loft space. In the case of loft spaces, Stowcheck now changes the way in which searching officers placed themselves in danger by searching such voids. The lance probe allows for this type of search to be conducted more safely.

GOODMAN BENTLEY CO2 GAS DATA STOWCHECK DETECTOR



The Goodman Bentley Gas Data Stowcheck has been designed to provide the first line response to locating hidden persons in a variety of operational scenarios. It is capable of detecting and identifying that persons are concealed within either hard or soft sided containers. A selection of probes are available and suitable for inserting into curtain sided trailers or trucks, under doors and searching loft spaces. In addition, even a container vent search tool is available. This device is truly the most flexible and reliable tool in the world, and simple to use. The Pear Drop Rescue Probe is a fine example of this. The probe was designed to be lowered into collapsed buildings and voids in major disaster scenarios to search for those within.

"A truly flexible operational tool for the professional searcher"

TECHNICAL SPECIFICATION

Measurement ranges:	<i>0-10,000 ppm CO2 by volume 0-21 % Oxygen by volume</i>
Sample Flow Rate:	<i>Factory tested at 400ml/min</i>
Operating Temp;	<i>-20°C to 40°C</i>
Accuracy :	<i>Factory tested at +/- 40ppm at 400 ppm equivalent to 0.4% of full scale</i>
Sealing against humidity and dust:	<i>PA6 enclosure material sealed to IP65</i>
Portable and battery powered:	<i>YES</i>
Search Flexibility:	<i>Hard and soft sided lorry sheets and all Operational scenarios see probe options</i>
Long battery life when in use:	<i>Run time > 10 hours per full charge.</i>



The high quality metal hose fittings are connected to all fittings including the Pear Drop Rescue Probe

The easy to use display panel can also be used whilst wearing gloves and has been designed to meet the rigorous challenges of Military, Police and Border agencies in all conditions.

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The Goodman Bentley Gas Data underdoor CO2 probe seen being used by a UK Police Rapid Intervention Team

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Goodman Bentley Gas Data Stowcheck Co2 Loft probe seen being used to analyse a loft space for a hidden person

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