

## Frequently Asked Questions (FAQ) - and other useful information!!

We are often asked similar questions about Breathalysers - how they work, what the differences are, what the different displays mean etc - so we've gathered together some of the more typical phone enquires which you may find useful in deciding which device is the best one for you!

- [How a Breathalyser works](#)
- [How to use a Personal Breathalyser](#)
- **[DOWNLOAD your own Personal Test Sheet](#)**
- [Why buy from us?](#)
- [Sampling Methods](#)
- [Sensor Types](#)
- [Calibration](#)
- [Displays and Units of Measurement - BAC%, mg/l, BrAC etc](#)
- [Approvals - from UK and US authorities, and ASD's vs EBT's](#)
- [Limitations on the use of Personal Breathalysers \(ASD's\)](#)
- [UK Limits](#)
- [Comparison Chart](#)

### How a Breathalyser Works

When you drink, alcohol is digested in the stomach and passes through the stomach wall into the blood stream. Broadly speaking, neat alcohol (such as a straight whisky for example) drunk on an empty stomach is likely to enter the bloodstream more quickly than, say, a milk-based cocktail drunk after a fairly full meal. This does not mean you will become *more* intoxicated from the straight whisky - just that the effect is likely to be felt more quickly. Once in the blood stream it passes around the body and generates the usual effects of alcohol on the body and brain. As the blood passes through the liver it is gradually filtered from the bloodstream, reducing at each "pass" until there is no longer any residual alcohol in the body. It also passes through the alveoli in the lungs, and as you breathe and the oxygen passes into the bloodstream, so does some of the alcohol in your blood "evaporate" into the air in your lungs. It is this alcohol that a Breathalyser is designed to measure. This is why it is necessary to measure deep lung air when using a breathalyser (see "[sampling](#)" below), and why it is important not to drink within 15 minutes of testing - otherwise alcohol that remains in your mouth will be blown directly into the detector, at far higher concentrations than is the case from alcohol that has passed through the stomach, into the bloodstream, and into the air you breathe out. Clearly the concentrations are often very low and the sensors have to be very sensitive to detect the levels involved - hence why it is so important not to smoke or drink before using them and why obtaining an accurate and consistent sample of air is so important.

### How to use a Personal Breathalyser

Although personal devices like the [AL5000](#) and [AlcoMate](#) can never replicate the absolute reliability of

something like a [Draeger 6510](#) (see "[Sampling Methods](#)" and "[Sensor Types](#)" etc below) they can be very useful when used over a period of time to generate a "picture" of how you absorb alcohol. Everyone is different, and factors such as the time taken drinking, the last time you ate and your own metabolic rate can all affect quite dramatically the rate at which alcohol is absorbed. It is impossible to simply equate 1 "unit" per hour, or any other simplistic statistic, and then guess your resulting level. A recent independent test carried out by the IOC newspaper group used one of our Breathalysers to test a random sample of drinkers in Croydon one Saturday night, and the results showed just how wildly wrong people were in trying to guess their level of intoxication (for the full article, [click here](#)) Using a personal breathalyser on a regular basis means the user can build up a broad idea of the way in which they personally react, at a time when they are not going to go anywhere near a vehicle, and can help them to make sure they do not find themselves still over the limit "the morning after the night before"!

The way to get the most from your Personal Breathalyser is to use it regularly and use it to monitor the *change* in your level of intoxication, rather than looking at a single specific reading.. Always wait at least 15 minutes after drinking or smoking (or you can damage the sensor) and then test yourself, trying to blow steadily and consistently (see [sampling](#) below) so that you blow the same each time. Take 3 tests, each approximately 2 minutes apart, and compare the readings; if one is substantially different to the other two, try once more. when you have three readings that are within a reasonable difference of each other, take an average and wait 30 minutes - then test again. Don't be surprised if the reading is not exactly the same every time - see [Sampling](#), [Sensors](#) and [Displays](#) below) - carry on testing every 30 minutes until you get a zero reading. You may well find that the reading initially **INCREASES**, between the first few tests and the next - this is because it is taking time for the alcohol to be absorbed into the blood stream from your stomach. You will also probably find that the level does not drop by the same amount every half hour - this is one of the main reasons you bought your detector, to see how **YOUR** body reacts and how long it takes to absorb the alcohol. **You can use the guide to [UK limits](#) below to get some idea of how your readings compare, but if you intend to drive - do NOT drink!**

[\(back to top\)](#)

## Why Buy from Us?

- **We offer the largest range of Breathalysers of any UK supplier** - from around £20 for a simple LED-based keychain "fun" device up to a full evidential testing system with printer costing over £1700. One supplier even offers just a single product - guess which one they'd recommend?!
- **We offer a full calibration and repair service** - we don't just "shift boxes".
- **We are the *ONLY* supplier offering both Police-grade, Home Office approved EBTs *AND* Personal devices**, and we don't make hyped-up claims about "professional" levels of accuracy that you won't get in real life. We tell you straight!
- **We offer competitive prices**, with a full range of accessories and mouthpieces.
- **We offer free shipping** on all our Personal Breathalysers.
- **We are VAT registered**, so as a company you can reclaim the VAT element of your purchase.
- **We won't keep you waiting.** If we don't have the model you have ordered in stock, we will offer

you a **free upgrade** rather than fail to deliver.

- **We don't have hidden extras.** If the item needs batteries, they're included - and all our Personal Breathalysers are priced INCLUDING VAT - the price you see is the price you pay, unlike some suppliers that appear to quote lower prices - with "excluding vat" in the small print.
- **You can TALK to us!** Our lines are open from 8am to 8pm Monday to Friday and 9 to 5 on Saturday - and throughout those times, you will speak to a PERSON, not just an answering machine!

([back to top](#))

## Sampling Method

One of the biggest differences between breathalysers is the way in which they sample your Breath. Professional, police-grade Breathalysers such as the [J4x](#) and UK-Approved [Draeger 6510](#) measure an exact volume of air each time they are used - usually 1.7 litres. They incorporate a flow meter to measure the air and a physical gate to divert excess air once the required sample has been taken. This means they can obtain accurate results every time irrespective of how the user blows.

In contrast, "Personal" Breathalysers have varying methods of regulating the sample taken - some better than others! The simplest is the "Blow on" sensor - [Keychain style](#) and the compact "handbag" types like the [AL2500](#) all use this method, with a short sample of breath taken by blowing at the unit. Some are slightly better than others, with the [SafeMate](#) & [AlcAlert](#) both having a vent at the top of the unit which the user blows through instead of onto but none are able to take a full sample of deep lung air, and as a result the user must expect a reasonably large margin error with such units. The next "step up" is to make the user blow through a tube; this helps to regulate the rate of sample, and enables a better standard of measurement to be taken. The lower-priced units like the [AL5000](#), [CA2000](#) and [AlcoMate](#) are all of this type while further up the range again units like the [AL6000](#), [CA2000 Pro](#) and [AlcoMate Pro S](#) incorporate a pressure sensor which ensures a minimum air flow is maintained during sampling (though none will limit the maximum sample that can be taken)

When used regularly by a single individual, who develops a consistent blow of around 1.5 litres of air, the "blow-through" types can obtain a reasonably good level of accuracy, however anyone considering using a Breathalyser to test others should only really look at the [J4x](#) or [6510](#) or similar in order to be certain that the sample is identical and reliable every time.

([back to top](#))

## Sensor Types

Traditionally Breathalysers were all designed around a device called a Fuel Cell. These are relatively expensive to manufacture (often £200 or more just for the Fuel Cell) but are highly accurate and

reliable over a wide range and breathalysers certified for evidential use (known in the US as EBT's) use these sensors. In order to produce a more economic device for personal and home use various semi-conductor based sensors have been developed, which use varying levels of software complexity to translate their readings into equivalent values such as BAC%, mg/l and Microgrammes. These sensors are more susceptible to drift (where the values produced gradually vary as the unit gets older and is used more often), saturation/contamination (for example if the user has been smoking or drinking recently) and variations in temperature but for general home use, provided some margin for error is allowed by the user, can produce some perfectly acceptable results. Semi conductor based sensors also have a narrower range of sensitivity and are more complex to calibrate (see below) so for Employers or Enforcement agencies, who must have a reliable and consistent reading over the full range of use, only Fuel Cell, EBT-approved devices like the Draeger 6510 are going to produce the required levels of accuracy and reliability although the recent introduction of the [J4x](#), which uses a SnO2 Electrode Sensor provides the very best level of accuracy possible short of a Fuel Cell device.

Users should also bear in mind that the accuracy of a particular sensor quoted in the specifications has been measured under strict laboratory conditions immediately following calibration. Due to the variations listed above, and particularly the limitations of sampling, it is unlikely that such specific accuracy is likely to be obtained on a repeatable basis by the user "in real life" and sensor saturation with alcohol, or contamination with smoke during a test, can quickly destabilise the sensor software and lead to unreliable results. Anyone using a "personal" breathalyser should leave a substantial margin of error and take into account general factors such as what and when they've been drinking - *you cannot rely solely on a Personal Alcohol Detector to determine your level of intoxication!*

[\(back to top\)](#)

## Calibration

There are two methods of calibration - dry gas, and wet bath simulation and all Breathalysers can only remain accurate for so long before they need to be "reset" - or calibrated - against a known benchmark concentration level of alcohol. On the whole a personal detector will remain accurate for as much as 12 months with light use and provided it is used properly, but once consecutive readings start to drift by an unacceptable degree then it will need to be recalibrated.

Fuel Cell devices will generally "hold" their accuracy for longer, however because they are usually in use in an evidential environment most companies have them calibrated at least every six months. Dry gas calibration can only be carried out on Fuel Cell devices and is generally done at a single concentration level. Fuel Cells have a much more linear detection range the semi-conductor based sensors and as such are able to "predict" accurately both lower and higher concentrations from a single calibration point. The advantage of dry gas calibration is that little or no expertise is required to operate the equipment, and large-scale operators such as the police are able to have their own in-house setup in order to regularly check and calibrate their detectors. If the readings are not what you expect, first try re-testing on several occasions to see if blowing technique is an issue - see "how to use a personal breathalyser" and "sampling methods" above/

Semi-conductor devices on the other hand are calibrated using wet-bath simulators, which is a device containing water, mixed with pure alcohol at a precise level and heated to an exact temperature. A minimum of two are required, and a Customs & Excise licence is required to purchase and store the materials. Semi-conductors have a much narrower, and less linear, range than fuel cells and so are usually calibrated at two points - a "low" level and "high" level just above and below the expected key point of use - in the UK, either side of the drink drive limit of 0.08 BAC%. The software in the unit then compares these two fixed points from the air supplied by the wet bath simulator and uses them to forecast other readings up and down the range. The problem however is that it is relying on the software to predict the results, and the non-linear nature of the sensor means it can only do so to within certain limits, particularly at very high (more than 0.20 BAC%) or very low (less than 0.02 BAC%) levels. For personal use, as a general indicator of *changes* in the level of intoxication, semi-conductor based breathalysers are very useful devices but users cannot put too much store by any one specific reading and must allow reasonable margin for error (see Sensor Information [here](#)). To have a Breathalyser calibrated, see our order page [here](#).

[\(back to top\)](#)

### Displays and Measurement Units - BAC%, mg/l etc

There are three basic types of display; LED's that show a range of values (like the SafeDrive Keychain and CA1000) and either backlit LCD or Digital LED devices that produce a digital reading. These displays generally show three digits, however if calibrated to display the results in BAC% one digit is always a zero (The UK limit is 0.08%, so even someone 5 times over the UK limit would still only register a reading of 0.40%). Alternative forms of measurement include mg/L (where the limit is 0.40), mg/100ml (limit 80mg - this is the measurement reference used by UK police until around 5 years ago) and Microgrammes (the current Police standard, where the UK limit is 35 microgrammes)

Most "Personal" breathalysers sold in the UK display their results in BAC%, which is the standard most commonly used in the US. The problem with this standard is that between zero and the drink-drive limit of 0.08, the unit only displays a change of 8 "steps" of 0.01%, and approximates the values in between. For example, 3 tests taken 2 minutes apart may produce sensor values of 0.045, 0.050, and 0.055 - but all would display as 0.05. On a unit displaying mg/100ml however, the full reading would be displayed in full as 045, 050 and 055 allowing the user to make a more informed decision. Bearing in mind the comments made above with regard to sampling, it also gives the user more feedback as to the consistency with which they are using the Breathalyser. The mg/L standard of the [AL5000 Pro](#) and [AL6000 Pro](#) falls between the two above, providing 5 times the "steps" of a BAC device (from 0.00 to 0.40) and is a good "halfway house" for someone wanting more detailed results than a typical BAC device, but not wanting to spend as much as some of the detectors that display an 80mg limit can cost.

Certain websites claim that their devices actually "read" a sample in BrAC - "Breath Alcohol Content". Clearly this is nonsense - every sensor merely outputs an electrical signal, which is then converted by the software in the unit to correspond to an accepted value of measurement. Whether that is BAC%, mg/L, mg/100ml or Microgrammes is irrelevant - different standards have been adopted by different countries and all are as valid as each other provided the device is used correctly and properly

calibrated at the time. It is the same as weighing an apple in grams, pounds, kilos, stones etc - the apple still weighs the same!

[\(back to top\)](#)

### Approvals - UK & USA approval standards, ASD's vs EBT's

In the UK, the Home Office ONLY approve devices for Evidential use, and as yet only Fuel Cell, fixed-volume sampling devices like the [6510](#) have so far been approved. In the USA, the Department of Transportation (DoT) approve two types - [ASD's](#) (Alcohol Screening Devices) and [EBT's](#) (Evidential Breath Testers). Again, only Fuel Cell devices have been approved in the US as EBT's, but there are a substantial number of semi-conductor based devices that have been approved as ASD's, including the AL5000, CA2000, AlcoMate Pro S etc. All these devices are the blow-through type (see above) and all sample for at least 3 seconds, but users must remember that the US DoT approval is only limited to their ability to detect the PRESENCE of alcohol. They are NOT assessed for their ability to accurately measure a specific alcohol LEVEL, in the way that an EBT is. They are expected to be used only for general screening, with anyone that indicates *anything* over zero being re-tested using a properly approved EBT. This makes them a very useful "morning after" device for home use and for measuring the comparative rate that an individuals' body metabolites the alcohol but users must realise that something costing in the region of £50 - £100 is not going to reproduce the level of specific accuracy and reliability of an EBT costing £700 or more.

[\(back to top\)](#)

### Limitations of Personal Breathalysers (non-EBT's)

All "personal" Breathalysers (ie. those based around semi-conductor sensors) are either non-approved, or at most approved in the USA as Alcohol Screening Devices (ASD's) and as such the US DoT that approves them advises *"The exact alcohol content in the blood of the test subject cannot exactly be determined by using an Alcohol Screening Device. Only an Evidential Breath Tester or Blood test can be relied upon for accurate determination. Do not Drink and Drive"*. In addition, the following limitations must be considered:

- The result can be affected by variations in Blow Technique & Temperature
- The unit's calibration can only be certified when issued; it cannot be guaranteed over time and can become contaminated by a single use involving smoke or excessive mouth alcohol (saturation)
- The test reflects only the levels detected at a single point in time and levels of intoxication will often peak sometime AFTER the last drink.
- Regular use of the detector over a period time (see "[how to use a personal breathalyser](#)") is the best way to use a breathalyser and learn how alcohol affects the individual person. This can then be used, along with a suitable safety margin, to help ensure the user is clear of alcohol

before undertaking critical tasks or driving.

- **Personal Breathalysers can only be used to give an indication of the possible presence of alcohol in the blood. The user must NOT rely solely upon the indications provided by this equipment and must use his/her own judgment, taking all factors into account, to determine whether it is safe and/or legal to operate a vehicle.**

[\(back to top\)](#)

## UK Limits

The legal limit for alcohol levels in the body while in control of a vehicle vary from country to country and can be defined by several different standards, the following of which are the most common:

- **35 microgrammes** - as used by professional breathalysers such as the Draeger 6510, XT & 7410
- **80 mg/100ml** - as displayed by the AlcoMate Pro S and CA2000 Pro
- **0.40 Mg/L** - as displayed on the AL5000 Pro
- **0.08% BAC** - used by the majority of "consumer" breathalysers

For those involved in the transportation industry, much stricter limits apply (for full details see [here](#)) but in principle aircrew, maritime and railway employees are all subject to a limit that is just one quarter of the above, ie:

- **9 microgrammes** - as used by professional breathalysers such as the Draeger 6510, XT & 7410
- **20 mg/100ml** - as displayed by the AlcoMate Pro S and CA2000 Pro
- **0.10 Mg/L** - as displayed on the AL5000 Pro
- **0.02% BAC** - used by the majority of "consumer" breathalysers

At these low levels only Fuel Cell Evidential Testers are able to provide accurate readings. Although the mg-based Pro S & CA2000 Pro may provide enough resolution to be useful as a general to those working in these industries, they should **not** be used for testing employees as the results at these levels cannot be relied upon. BAC-based devices are reading to within just two places of a zero reading and are therefore ineffective at these levels.

[\(back to top\)](#)