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BLOOD ALCOHOL CONTENT DETECTION BY BREATHALYZER

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ABSTRACT

Drivers are initially tested for alcohol impairment at the roadside with a screening device. If this produces a positive test, evidential breath testing is performed at the police station. Motorists can be stopped and required to take a breath test by police at the scene of a road traffic accident, if a police officer suspects a motorist may be driving under the influence of alcohol, or if a motorist commits a moving traffic offence. Screening devices are about the size of old fashioned mobile phones. The driver blows into a disposable mouthpiece for each test. The whole process takes about a minute for the device to record the result. Screening devices offer four result categories: ***zero (0.001–0.029%/volume, 0.030–0.059%/volume)****,* ***pass (0.060–0.099%/volume, 0.100–0.199%/volume)****,* ***warn (0.200–0.299%/volume, 0.300–0.399%/volume)*** *and* ***fail (0.400–0.500%/volume, >0.50%/volume)****. Anyone who fails the test is arrested and is required to perform an evidential breath test at a police station. The maximum permissible limit of alcohol in 100ml blood is 0.035%. The blood alcohol content (BAC) legal limit is 0.03% or 30µL alcohol in 100ml blood. Breathalyzers detect alcohol in blood through alcohol detection tests. The legal reading in 30 and above for drunk driving. This means per deciliter of blood, 30µL and above.*

KEYWORDS: Blood Alcohol Content, Breath Alcohol Content, Estimated Peak Blood Alcohol Concentration, Standard Drinks, Body Water Constant, Body Weight, Metabolism Constant, Drinking Period.

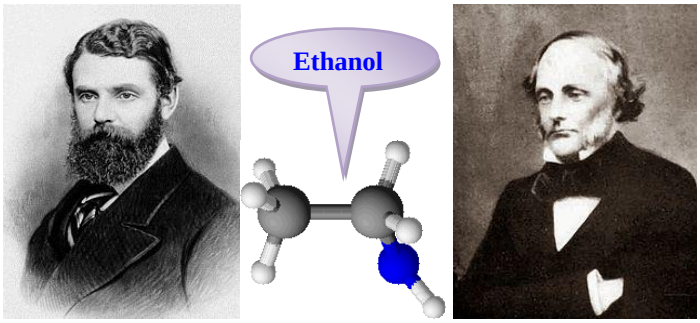
INTRODUCTION

A breathalyzer (breath and analyzer) is a device for estimating blood alcohol content (BAC) from a breath sample. Breathalyzer is the brand name for the instrument that tests the alcohol level developed by inventor **Robert Frank Borkenstein** (August 31, 1912–August 10, 2002) was an American police officer and scientist, and inventor of the Breathalyzer. It was registered as a trademark on May 13, 1954, but many people use the term to refer to any generic device for estimating blood alcohol content.

Figure–1: Robert Frank Borkenstein (Breathalyzer inventor) and Emil Bogen (BAC discoverer).

Origins

A 1927 paper produced by **Emil Bogen**, who collected air in a football bladder and then tested this air for traces of alcohol, discovered that the alcohol content of 2 litres of expired air was a little greater than that of 1 cc of urine. However, research into the possibilities of using breath to test for alcohol in a person's body dates as far back as 1874, when **Francis E. Anstie** made the observation that small amounts of alcohol were excreted in breath.[1]



Figure–2: Francis E. Anstie (Alcohol detection scientist) and William Duncan McNally (Breathalyzer inventor).

Francis Edmund Anstie (11 December 1833–12 September 1874) was an English doctor, medical author and journalist. He was the first editor of medical journal *The Practitioner*, established in 1868. He is notable for proposing Anstie's limit, an amount of alcohol that could be consumed daily with no ill effects also, in 1927 a Chicago chemist, **William Duncan McNally** (8 July 1882–29 June 1961), invented a breathalyzer in which the breath moving through chemicals in water would change color. One use for his invention was for housewives to test whether their husbands had been drinking. He was the chief chemist in the Cook County Department of Public Health and the chief chemist for the Cook County Medical Examiner's office. He invented an early breathalyzer in 1927.

Chemistry: This is based on oxidation–reduction reaction. When the user exhales into a breath analyzer, any ethanol (CH_3CH_2OH) present in their breath is oxidized to acetic acid at the anode:
$CH_3CH_2OH_{(gas)}+H_2O_{(liquid)}\rightarrow CH_3COOH_{(liquid)}+4H^+_{(aqueous)}+4e^-$. This acetic acid is converted into carbonic acid (H_2CO_3) by aerial oxidation which after breakdown produces carbon dioxide (CO_2) and water (H_2O) and chemical energy in Joules is recorded in breathalyzer instrument.

$CH_3COOH_{(liquid)}+2O_{2(gas)}\rightarrow 2H_2CO_{3(liquid)}$

$2H_2CO_{3(liquid)}\rightarrow 2CO_{2(gas)}+2H_2O_{(liquid)}+$Chemical energy (Joules)

At the cathode, atmospheric oxygen is reduced:

$O_{2(gas)}+4H^+_{(aqueous)}+4e^-\rightarrow 2H_2O_{(liquid)}$

The overall reaction is the oxidation of ethanol (CH_3CH_2OH) to acetic acid (CH_3COOH) and water (H_2O).

$CH_3CH_2OH_{(liquid)}+O_{2(gas)}\rightarrow CH_3COOH_{(aqueous)}+H_2O_{(liquid)}$

The reaction releases proton (H^+) and electron (e^-) which again consumed in next step process. The electric current produced by this reaction is measured by a microcontroller and displayed as an approximation of overall blood alcohol content (BAC) by the Alco sensor.[2]

Figure–3: Alco sensor.

Blood alcohol content (BAC), also called blood alcohol concentration, blood ethanol concentration, or blood alcohol level, is most commonly used as a metric of alcohol intoxication for legal or medical purposes. Blood alcohol concentration is usually expressed as a percentage of ethanol in the blood in units of mass of alcohol per volume of blood or mass of alcohol per mass of blood, depending on the country.[3]

To calculate estimated peak blood alcohol concentration (EBAC), a variation, including drinking period in hours, of the Widmark formula was used. The formula is:

$$\mathbf{EBAC=[\{(0.806\times SD\times 1.2)/BW\times Wt\}-MR\times DP]\times 10}$$

Where:

(a) **0.806** is a constant for body water in the blood (mean 80.6%). (b) **SD** is the number of standard drinks, that being 10 grams of ethanol each (c) **1.2** is a factor to

convert the amount in grams to Swedish standards set by The Swedish National Institute of Public Health (d) **BW** is a body water constant (0.58 for males and 0.49 for females) (e) **Wt** is body weight (kilogram) (f) **MR** is the metabolism constant (0.015 for males and 0.017 for females) and (g) **DP** is the drinking period in hours. **10** converts the result to permillage (Per mille: parts per thousand) of alcohol.

Regarding metabolism (**MR**) in the formula; Females demonstrated a higher average rate of elimination (mean: 0.017; range: 0.014–0.021g/210L) than males (mean: 0.015; range: 0.013–0.017g/210L). Female subjects on average had a higher percentage of body fat (mean: 26.0; range: 16.7–36.8%) than males (mean: 18.0; range: 10.2–25.3%). Additionally, men are, on average, heavier than women but it is not strictly accurate to say that the water content of a person alone is responsible for the dissolution of alcohol within the body, because alcohol does dissolve in fatty tissue as well. When it does, a certain amount of alcohol is temporarily taken out of the blood and briefly stored in the fat. For this reason, most calculations of alcohol to body mass simply use the weight of the individual and not specifically his/her water content. Finally, it is speculated that the bubbles in sparkling wine may speed up alcohol intoxication by helping the alcohol to reach the bloodstream faster.[4]

Table–1: BAC levels and their adverse effects.

BAC (% by volume)	Behavior	Impairment
0.001–0.029	Average individual appears normal	Subtle effects that can be detected with special tests
0.030–0.059	Mild euphoria, Relaxation, Joyousness, Talkativeness, Decreased inhibition	Concentration
0.060–0.099	Blunted feelings, Reduced sensitivity to pain, Euphoria, Disinhibition, Extraversion	Reasoning, Depth perception, Peripheral vision, Glare recovery
0.100–0.199	Over–expression, Boisterousness, Possibility of nausea and vomiting	Reflexes, Reaction time, Gross motor control, Staggering, Slurred speech, Temporary erectile dysfunction
0.200–0.299	Nausea, Vomiting, Emotional swings, Anger or sadness, Partial loss of understanding, Impaired sensations, Decreased libido, Possibility of stupor	Severe motor impairment, Loss of consciousness, Memory blackout
0.300–0.399	Stupor, CNS depression, Loss of understanding, Lapses in and out of consciousness, Low possibility of death	Bladder function, Breathing, Disequilibrium, Heart rate
0.400–0.500	Severe CNS depression, Coma, Possibility of death	Breathing, Heart rate, Positional alcohol nystagmus
>0.50	High possibility of death	

Table–2: BAC values in male/female.

BLOOD ALCOHOL CONTENT (BAC)
Table for Male (M) / Female (F)

Number of Drinks		Body Weight in Pounds								Driving Condition
		100	120	140	160	180	200	220	240	
0	M	.00	.00	.00	.00	.00	.00	.00	.00	Only Safe Driving Limit
	F	.00	.00	.00	.00	.00	.00	.00	.00	
1	M	.06	.05	.04	.04	.03	.03	.03	.02	Driving Skills Impaired
	F	.07	.06	.05	.04	.04	.03	.03	.03	
2	M	.12	.10	.09	.07	.07	.06	.05	.05	
	F	.13	.11	.09	.08	.07	.07	.06	.06	
3	M	.18	.15	.13	.11	.10	.09	.08	.07	
	F	.20	.17	.14	.12	.11	.10	.09	.08	Legally Intoxicated
4	M	.24	.20	.17	.15	.13	.12	.11	.10	
	F	.26	.22	.19	.17	.15	.13	.12	.11	
5	M	.30	.25	.21	.19	.17	.15	.14	.12	
	F	.33	.28	.24	.21	.18	.17	.15	.14	

Subtract .01% for each 40 minutes that lapse between drinks.
1 drink = 1.5 oz. 80 proof liquor, 12 oz. 5% beer, or 5 oz. 12% wine.
Fewer than 5 persons out of 100 will exceed these values.

Examples:
80 kg male drinking 3 standard drinks in two hours:
EBAC=(0.806×3×1.2)/(0.58×80)–(0.015×2)=0.032534483 [approx 0.033g/dL]
70 kg woman drinking 2.5 standard drinks in two hours:
EBAC=(0.806×2.5×1.2)/(0.49×70)–(0.017×2)=0.036495627 [approx 0.036g/dL]

Legal limits: For purposes of law enforcement, blood alcohol content is used to define intoxication and provides a rough measure of impairment. Although the degree of impairment may vary among individuals with the same blood alcohol content, it can be measured objectively and is therefore legally useful and difficult to contest in court. Most countries disallow operation of motor vehicles and heavy machinery above prescribed levels of blood alcohol content. Operation of boats and aircraft is also regulated. The alcohol level at which a person is considered legally impaired varies by country. These are typically blood alcohol content limits for the operation of a vehicle.[5]

0% effective tolerance: It is illegal to have any measurable alcohol in the blood while driving in these countries. Most jurisdictions have a tolerance slightly higher than zero to account for false positives and naturally occurring alcohol in the body. Some of the following jurisdictions have a general prohibition of alcohol.

Figure–4: Alcohol in World & World in Alcohol.

Australia—Learner drivers or those drivers with a Provisional/Probationary License, *Bangladesh*, *Brazil*, *Brunei*, *Canada*—new drivers undergoing graduated licensing in *Ontario*, *British Columbia* and *Newfoundland* and *Labrador*; drivers under the age of 22 in *Manitoba*, *New Brunswick*, *Northwest Territories*, *Nova Scotia*, *Ontario*, *Saskatchewan*, *Quebec* and in *Alberta* receive a 30–day suspension and 7–day vehicle seizure, *Colombia*—Zero Alcohol Tolerance law is effective since December 2013, *Czech Republic*, *Estonia*, *Fiji*, *Hungary*, *Israel*—24 µg per 100 ml (0.024%) of breath (penalties only apply above 26 µg per 100 ml (0.026%) of breath due to lawsuits about sensitivity of devices used). New drivers, drivers under 24 years of age and commercial drivers 5 µg per 100 ml of breath.(0.005%), *Italy*—for drivers in their first two years after gaining a driving license, *Japan*—drivers under the age of 20 because of not reaching legal drinking age. *New Zealand*—drivers under the age of 20 and convicted drivers required to gain a zero–limit license. *Nepal*, *Oman*, *Qatar*, *Pakistan*, *Paraguay*, *Romania* (beyond 0.08% drivers will not only receive a fine and have their license suspended, the offense will also be added to their criminal records), *Russian Federation* (0% introduced in 2010, but discontinued in September 2013, *Saudi Arabia*, *Slovakia*, *Uruguay*, *United Arab Emirates*.[6]

0.02% effective tolerance: *China*, *Netherlands* (for drivers in their first five years after gaining a driving license), *Norway* (road vehicles and sea vessels over 15 m), alternatively 0.1 mg/L of breath, *Poland*, *Puerto Rico*, *Sweden*, *Ukraine*, *United States*—drivers under the age of 21 may have up to 0.02%, on the federal level, however most states have Zero Tolerance laws emplaced.

0.03% effective tolerance: *Belarus*, *Bosnia* and *Herzegovina* (0.031%), *Chile*, *India* (In the state of Kerala, a policy of zero tolerance has developed.), *Serbia*, *Japan*, *Russia* (since September 2013).

0.04% effective tolerance: *Lithuania* (0.00% for car drivers in their first two years after gaining a driving license, motorcycle and truck drivers).

0.05% effective tolerance: *Argentina* (0.02% for motorbikes, 0.00% for truck, taxi and bus drivers, 0.00% in the provinces of Cordoba and Salta), *Australia* (0.00% for Australian Capital Territory learner, provisional and convicted DUI drivers (changed down from 0.02% on December 1, 2010), 0.02% for truck/bus/taxi, 0.00% for learner drivers, provisional/probationary drivers (regardless of age), truck and bus drivers, driving instructors and DUI drivers in all other states), *Austria* – no limit for pedestrians; 0.08% for cycling; 0.05% generally for cars <7.5 t (driving license B) and motorbikes (A); but 0,01% during learning (for driver and teacher or L17–assistant). During probation period (at least the first 3 years) or up to the age of 21, when license was handed out after 1st July 2017, when older (at least the first 2 years) or up to the age of 20 (A1, AM, L17, F), trucks (C >7.5 t), bus (D), drivers of taxi and public transport, *Belgium* (also for cyclists), *Bulgaria*, *Canada*: *Alberta*, *British Columbia*, *Ontario*, *Manitoba*, *Newfoundland*, *Nova Scotia*, *New Brunswick*—provincial

offence. Drivers have not committed a criminal offense, however a 3–day license suspension and 3–day vehicle seizure occurs, *Costa Rica*, *Croatia*—professional drivers, driving instructors and drivers of the vehicle categories C1, C1+E, C, C+E, D, D+E and H; the limit for other drivers is 0.50 mg/g, but they do get an additional separate fine if they cause an accident while having a blood alcohol level between 0 and 0,50 mg/g, *Denmark*, *Finland*, *France* (0.025% for bus drivers), *Germany* (0.0% for learner drivers, all drivers 18–21 and newly licensed drivers of any age for first two years of license; also, if the BAC exceeds 0.03%, driving is illegal if the driver is showing changes in behavior (unfit to drive), *Greece*, *Hong Kong*, *Iceland*, *Ireland* (0.02% for learner drivers and professional drivers), *Israel* 24 µg per 100 ml (0.024%) of breath (penalties only apply above 26 µg per 100 ml (0.026%) of breath due to lawsuits about sensitivity of devices used). This is equivalent to a BAC of 0.05. New drivers, drivers under 24 years of age and commercial drivers 5 µg per 100 ml of breath. This is equivalent to a BAC of 0.01, *Italy* (0.00% for drivers in their first two years after gaining a driving license), *Latvia* (0.02% for drivers in their first two years after gaining a driving license), *Luxembourg*, *Macedonia* (0.00% for drivers in their first two years after gaining a driving license), *Mauritius*, *Netherlands* (0.02% for drivers in their first five years after gaining a driving license), *New Zealand*, *Peru*, *Philippines* (0.00% for taxicab and public transport drivers), *Portugal* (0.02% for drivers holding a driver's license for less than three years, professional drivers and drivers of taxis, heavy vehicles, emergency vehicles, public transport of children and carrying dangerous goods), *Scotland* (Scotland's drink–drive limit was reduced, by law, on 5 December 2014 from 0.08 to any of the following: 22 microgram of alcohol in 100 ml of breath, 50 mg of alcohol in 100ml of blood, or 67 mg of alcohol in 100 ml of urine), *Slovenia* (0.00% for drivers in their first two years after gaining a drivers license, drivers under 21 and professional drivers, such as buses, trucks), *South Africa*, *Spain* (0.03% for drivers in their first two years after gaining a driving license and common carriers, such as buses, trucks), *Switzerland* (0.01% for drivers in their first three years after gaining a drivers license and for driving instructors), *Thailand*, *Taiwan* (breath alcohol limit decreased from 0.25 to 0.15 from 13 June 2013), *Turkey*.

0.06% effective tolerance: *The Bahamas.*

0.07% effective tolerance: *Honduras.*

0.08% effective tolerance: *Canada Quebec* (provincial law), *England and Wales* (0.02% for operators of fixed–wing aircraft), *Malaysia* (0.00 for Probationary Driving License holders), *Malta*, *Mexico*, *New Zealand* Criminal offence. *Norway* (legal limit for sea vessels under 15 m), *Northern Ireland* (The government of Northern Ireland intends to reduce the general limit to 0.05%.), *Puerto Rico* (for drivers 21 years and older), *Singapore*, *Trinidad and Tobago*, *United States*—all states impose penalties for driving with a BAC of 0.08% or greater. Even below those levels drivers can have civil liability and other criminal guilt (e.g., in *Arizona* driving impairment to any degree caused by alcohol consumption can be a civil or criminal offense in addition to other offenses at higher blood alcohol content levels). Drivers under 21 (the most common U.S. legal drinking age) are held to stricter standards under zero tolerance laws adopted in varying forms in all states: commonly 0.01% to 0.05%. Federal Motor Carrier Safety Administration: 0.04% for drivers of a commercial vehicle requiring a commercial driver's license and 0.01% for operators of common carriers, such as buses.[7]

0.1% effective tolerance: *Cayman Islands*

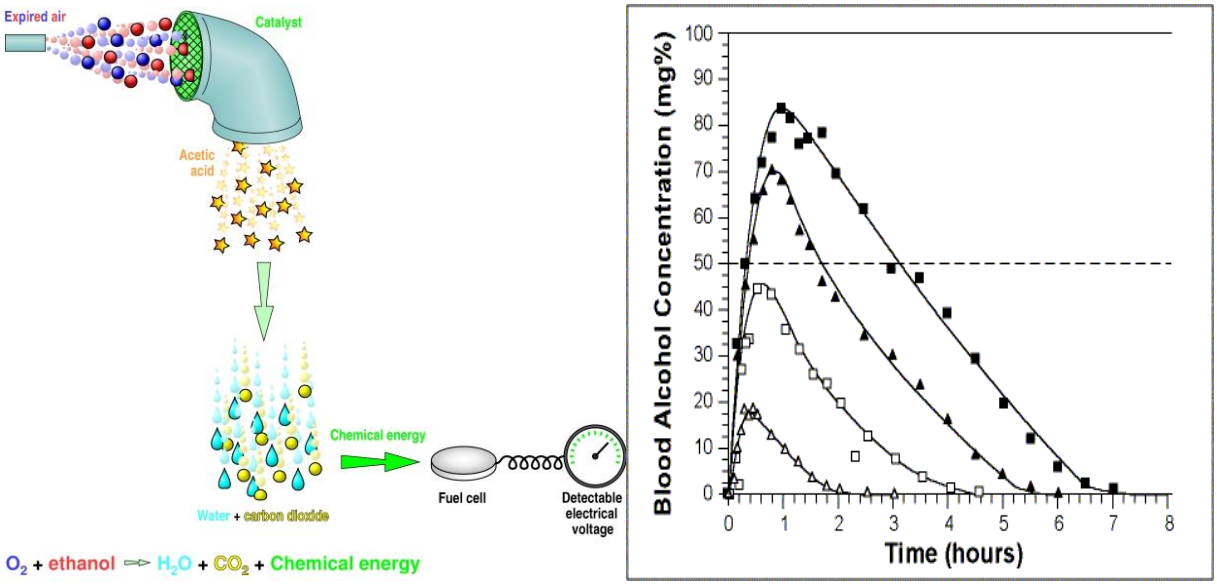


Figure-5: BAC pharmacokinetics.

Limits by country (BrAC: Breath Alcohol Content)
In certain countries, alcohol limits are determined by the breath alcohol content (BrAC), not to be confused with blood alcohol content (BAC). In *Greece*, the BrAC limit is 250µg of alcohol per litre of breath. The limit in blood is 0.50g/l. The BrAC limit for drivers in their first two years after gaining a driving license and common carriers are more restricted to 100 µg per litre of breath. BrAC 250–400µg/L=€200 fine. BrAC 400–600µg/L=€700 fine, plus suspension of driving license for 90 days (introduced in 2007). BrAC>600µg/L=2 months imprisonment, plus suspension of driving license for 180 days, plus €1,200 fine. In *Hong Kong*, the BrAC limit is 220µg/L of breath (as well as other defined limits). In *The Netherlands and Finland*, the BrAC limit is 220µg/L alcohol per litre of breath (µg/L). In *New Zealand*, the BrAC limit is 250µg/L of alcohol per litre of breath for those aged 20 years or over, and zero (meaning illegal to have any measurable breath alcohol content) for those aged less than 20 years. In *Singapore*, the BrAC limit is 350µg/L of alcohol per litre of breath. In *Spain* the BrAC limit is 250µg/L of alcohol per litre of breath and 150µg/L of breath for drivers in their first two years after gaining a driving license and common carriers. In *England and Wales* the BrAC limit is 350µg/L of alcohol per litre of breath (as well as the above defined blood alcohol content). In *Scotland* the BrAC limit is 220µg/L micrograms of alcohol per litre of breath (as well as the above defined blood alcohol content). In *Trinidad and Tobago* the BrAC limit is 35µg/L of alcohol per 100 millilitres of breath (as well as the above defined blood alcohol content).[8]

Other limitation schemes: For South Korea, the penalties for different blood alcohol content levels include: 0.01–0.049µg/L=No penalty; 0.05–0.09µg/L=100 days license suspension; >0.10µg/L=Cancellation of car license.

Testing: A sample of the ambient air is tested as a blank check. This is followed by a check sample of an air/ethanol standard. This checks the calibration of the device. The concentration of alcohol in the standard sample is 35µg/100 ml air, which is the UK drink–driving limit. Two samples of breath are then taken from the motorist and tested, each separated by a sample of air. The test ends with a final air and standard check. If the results from the two actual samples differ by 15% or more of the lower reading or 5µg, whichever is the greater, the device records an error message. The driver is then asked to provide a sample of blood or urine for laboratory analysis. If the lower of the two results lies between 40µg and 50µg/100 ml breath, the driver has the right to ask for a blood sample. If the lower result is greater than 50µg/100 ml breath, the driver is prosecuted.[9]

Devices used for evidential breath testing use either a fuel cell (as with the screening devices) or an infrared cell. An infrared cell directs infrared energy through the sample and any unabsorbed energy at the other side is detected. The higher the concentration of ethanol, the more infrared absorption occurs (in much the same way that a sunglass lens absorbs visible light, alcohol absorbs infrared light). Accuracy depends on the sample of breath being deep lung air (alveolar air). As the driver breathes out, the device continuously monitors the expired air using an infrared cell. The concentration of ethanol climbs as expiration continues, and when the level of ethanol stabilizes, the sample of breath is analyzed. This ensures accurate alcohol readings and means that the volume of air each person has to blow will depend on how large his or her lungs are. Alcohol in the mouth gives a rapid peak in ethanol concentration on the evidential test. If the infrared cell that monitors the breath alcohol profile detects such a peak the test is aborted and a blood sample is required instead. These devices sometimes register "interfering substances." If this happens the test is aborted and a blood sample is required. The maximum level of alcohol that may be accurately detected by evidential breath testers is 220 µg/100 ml air. The whole process takes 10 to 15 minutes with the fuel cell based instrument, and up to 5 minutes with the purely infrared based ones. Five breath screening devices are currently approved for police use in Britain. They work on the principle that in the presence of a catalyst, oxygen in a sample of expired air converts any alcohol present into acetic acid and then to water and carbon dioxide. A fuel cell converts the chemical energy released when oxidation occurs into a detectable electrical voltage. The higher the voltage, the more alcohol is present in the sample.[10]

Figure-6: BAC detection.

There are three types of approved evidential devices. They are the size of a large printer with an attached keyboard and a small liquid crystal display with a facility for printing out the result.

CONCLUSION

When you drink alcohol, it goes into your stomach and small intestine. It gets absorbed into your blood, which carries it through your body and into your brain and lungs. You exhale it when you breathe. A breath alcohol test measures how much alcohol is in the air you breathe out. The device uses that measurement to estimate how much alcohol is in your blood. That number is known as your BAC, or blood alcohol content. It may go up as soon as 15 minutes after drinking. BAC is usually highest about an hour after you drink.

Why Is It Used? As your BAC rises, you can get clumsy and take longer to react. You may not make good choices, either. These things make driving dangerous. In every state but one, it's illegal for a driver over the age of 21 to have a BAC above **0.08%.** As of December 2018, Utah's BAC level will be 0.05%. All states have zero tolerance laws for drivers under 21. If you're speeding, in an accident, or weaving on the road, local police may suspect you of driving under the influence, or DUI. They can use a device known as a Breathalyzer to test your BAC right at the scene of an accident or on the side of the road if they pull you over.

Are There Different Kinds of Tests? Tests can also be manual or electronic. Most police use an electronic device about the size of a walkie–talkie. You blow into a mouthpiece and it gives an immediate reading. You may be asked to repeat this a few times so the officer can get an average reading. It takes about a minute and it doesn't hurt. The most common manual test includes a balloon and a glass tube filled with yellow crystals. You blow into the balloon and release the air into the tube. The bands of crystals in the tube change color from **yellow** to **green** depending on how much alcohol is in your system. Check the instructions included with the device to read results. Generally, one green band means your BAC is under **0.05%**, which is within the legal limit to drive. Two green bands indicate that your BAC is between **0.05%** and **0.10%** and three bands means it's over **0.10%**. You can buy either type of test for yourself if you want to make sure you're safe before you get behind the wheel. The manual ones are less expensive.

Is It Accurate? Not always. There are a few things that could cause an error in the reading. If you had a drink 15 minutes before the test, trace amounts of alcohol in your mouth could lead to an inaccurate result. Smoking can also affect results. So can products that contain alcohol, like mouthwash and breath fresheners. Sometimes the machines need to be recalibrated or have batteries replaced. These possibly could affect the reading. Some tests have software that needs to be updated occasionally and can cause glitches. Professional breath alcohol tests, like the ones police officers carry, use fuel cell technology. They're the most accurate. But no breath test is as accurate as a blood or urine test. Things That Affect BAC: How fast your BAC rises and how long it says that way depend on several things:

Your weight. The heavier you are, the more water is in your body. The more water, the more the alcohol gets diluted.

Your gender. Alcohol doesn't affect men and women the same. Men have higher levels of a stomach enzyme that helps break down alcohol, so they process it faster. Women typically have less water and more fat. Hormonal changes in women also can affect the BAC.

How many drinks you had, how strong they were and how fast you drank them. The more you drink each hour, the faster your BAC rises. How much you ate. A full belly, especially high–protein foods, will slow the processing of alcohol.

What Do the Results Mean? If a police officer gives you a breath alcohol test and your BAC is over the legal limit of 0.08%, you may be arrested and charged with driving under the influence. You also may be asked to provide a blood or urine sample for further testing to determine a more accurate BAC.

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