

Breathalyzers

For police officers, highway safety is of the utmost importance. Intoxicated drivers make the roads unsafe. How does an officer determine, at the scene of an incident, if a driver is intoxicated? They use a breathalyzer. The breathalyzer is a device that allows a chemical reaction to take place, determining the level of alcohol in someone's breath, known as the **blood alcohol concentration (BAC)**. Alcohol gets absorbed into the bloodstream and ends up in a person's lungs, where the alcohol eventually evaporates. A breathalyzer uses the person's breath and a chemical reaction to determine the level of alcohol in a person's lungs prior to the alcohol being completely evaporated. Being in use for over 30 years and invented by a police captain with the Indiana State Police, a breathalyzer is one of the best options for a police officer to determine the BAC of a driver at the scene of a traffic stop.

Process: How can you tell if someone is intoxicated?

The Offender Gets Stopped

The police officer suspects that a driver is intoxicated and, with the use of his vehicle lights, motions the driver to pull over to the curb.



Figure 1: Example of breathalyzer that might be used by the police.

The officer then requests that the driver get out of the car for roadside tests. There is a suspicion that the driver has been drinking. Of the number of tests given, the breathalyzer is the best determination if the driver has been drinking.

The Offender is Ordered to Breathe into the Breathalyzer

Figure 1 shows a unit that might be used by a police officer that will complete a chemical process. This chemical process will convert the alcohol in someone's breath to gauge the level of drunkenness.

The Breathalyzer Completes the Chemical Reaction

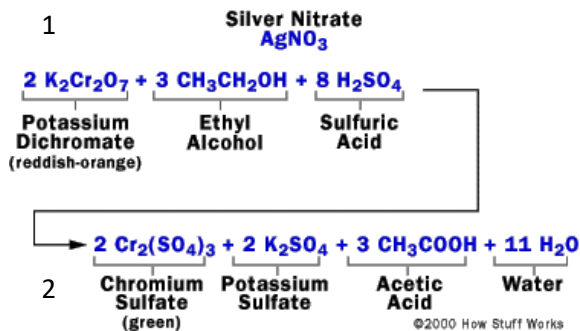


Figure 2: Chemical process used to convert alcohol to determine level of drunkenness.

Figure 2 shows the chemical process used in determining the BAC.

The machine uses two test tubes, a base tube, sealed and untouched by human breath and the second tube that the driver will breathe into.

The second tube contains certain chemicals, potassium dichromate, sulfuric acid, and silver nitrate. The

driver then breathes into the tube, adding the component of the ethyl alcohol from the breath. The silver nitrate is a catalyst. As a catalyst, the silver nitrate does not add any chemicals to the reaction, allowing only the overall reaction to accelerate.

The result, **2 in Figure 2**, of the reaction contains four chemicals: chromium sulfate, potassium sulfate, acetic acid, and water. The most important reaction result is the chromium sulfate, which is the alcohol converted to a liquid and is a green-colored chemical. The breathalyzer has a color-sensing portion, called a photocell that is calibrated to look for the green coloring of the chromium sulfate. Based on the intensity of the green coloring, the breathalyzer will display a number, telling the police officer the amount of BAC.

The Results of the Test

Each state has its own legal standard in determining the BAC of an intoxicated person. The average for most states has been .10; however, recently many states have tightened up that amount, lowering the level to .08. This means for every 100 ml of a person's blood, there should be no more than .08 grams of alcohol. If a person tested has been determined to be above the legal limit for BAC, they will be arrested for being **driving while impaired (DWI)** or **driving under the influence (DUI)**.