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Breath Alcohol Testers - Prevents Road Accidents

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Abstract

Four types of Breath Alcohol devices: Semiconductor Models (Breathalyzer), Fuel Cell Models (alcosensors), Infrared (IR) Spectroscopy Models (intoxilyzers), and Gas Chromatography (GC) Models (intoximeters) are described. Their function and work are examined and their effectiveness and possibility of error in DWI and DUI evaluations is discussed.

Keywords: *Alcosensors, BAC, BrAC, DUI, DWI, intoximeters, intoxilyzers.*

Introduction

Absorption of alcohol into the blood stream affects people by making them intoxicated. Alcohol intoxication in drivers can cause road accidents. When is the driver drunk? When is the driver under the influence of alcohol? Technically it is determined by the driver's blood alcohol level called the '*blood alcohol concentration*' *(BAC),* which indicates the degree of intoxication. In most countries 0.08 grams of alcohol per 100 mL of blood (BAC 0.08) is set as the legal limit beyond which the driver is considered to be legally drunk. Any driver with BAC > 0.08 can be considered to be driving under the influence of alcohol (DUI) or driving while intoxicated (DWI) and should not be allowed to drive.

Blood alcohol levels may be evaluated by using the Breathalyzer (DUI Attorney Lawyer 2005; Craig Medical Distribution Inc. 2005). There are two ways of measuring BAC (1) invasively by drawing a blood sample, and (2) non-invasively via breath, salvia, or urine samples. The latter is used mainly by law enforcement officials, and the former is generally performed by specialists at health care institutions.

Breath testing being quick and inexpensive is the most common non-invasive test.

How does a person's breath reveal the amount of alcohol consumed? When a person blows air into a breathalyzer the *breath alcohol content* (*BrAC*) is measured and converted into the corresponding BAC. In other words, BrAC is correlated with BAC. Continuous mixing of inhaled and exhaled air occurs in the lungs. Exchange of chemicals and air occur in the air-sacs called alveoli, which are surrounded by a fine network of capillary blood vessels. This is the path via which alcohol enters the blood stream.

Various types of electronic devices with alcohol specific sensors, such as lead selenide sensor (Hungler & Stevens 1997), can measure BAC. They commonly consist of a mouth piece and a sample chamber. The four basic types of instruments are described and their effectiveness is discussed.

The Breath Alcohol Testers

Breath alcohol testing devices were first developed for use by police in the 1940s. The Breathalyzer was invented by Dr. Robert Borkenstein of the Indiana State Police in 1954. An older model of the breathalyzer is shown in Fig. 1. (Breathalyzer.net 2005). Some prefer to classify breathalyzers based on color change due to alcohol chemical reaction.

The Models

There are four types of breathalyzers (Camping Survival 2005).

1. Semiconductor Models (breathalyzer)
2. Fuel Cell Models (alcosensors)