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The Effect of Diethyl Ether on the Intoxilyzer 5000C

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results were due to the inhalation of diethyl ether.

Simulator tests were conducted on an Intoxilyzer 5000C in the recirculation mode, using aqueous concentrations of diethyl ether of 14.2, 7.1, 2.8 and 1.4 mg/L. Two simulator tests were conducted at each concentration. In addition a simulated breath test was conducted by blowing through the simulator into the breath inlet tube. The results are shown in the Table. At all diethyl ether concentrations, INTERFERENT was detected for the simulator tests. For the breath tests INVALID SAMPLE was displayed as the diethyl ether was removed from the solution very rapidly, which results in a negative slope for the slope detector. It is also noticeable that the apparent results (continuously displayed by the instrument) changed rapidly during sampling.

A review of the scientific literature showed two human subjects who inhaled 400 mL of diethyl ether in an unventilated room for one hour the blood diethyl ether concentrations 10 minutes after exposure were 25 and 2 mg/L respectively(1). Forty-two minutes after exposure the blood diethyl ether concentrations rapidly decreased to 12 mg/L and traces respectively.

The Intoxilyzer 5000C has three ways of determining the presence of diethyl ether:

1. Acetaldehyde detector
2. Slope detector
3. Poor duplication of breath results.

In this case it was concluded that diethyl ether was not present in significant concentrations in the subject at the time of the Intoxilyzer 5000C tests. In Intoxilyzer 5000 instruments without the acetaldehyde detector, the slope detector and poor duplication of breath results could indicate the presence of diethyl ether.

Diethyl Ether conc., mg/L	1st Cal Check g/100 mL*	2nd Cal Check g/100 mL*	Simulated Breath Test, g/100 mL+
14.2	0.450	0.345	0.250
7.1	0.232	0.170	0.122
2.8	0.092	0.070	0.044
1.4	0.047	0.035	0.020

* All results were detected as INTERFERENT

+ All results were detected as INVALID SAMPLE

Table of the Intoxilyzer 5000C results for two calibration checks in the recirculation mode and a simulated breath test, at various diethyl ether simulator concentrations. The Intoxilyzer results were obtained from the screen and were not printed.

Reference: (1) Bell, C.M., Gutowski, S. J., Young, S., and Wells, D., "Diethyl Ether Interference With Infrared Breath Analysis", *J. Analytical Toxicology*, 16: 166-168, 1992 *

The Effect of Diethyl Ether on the Intoxilyzer 5000C

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The Intoxilyzer 5000C used in Canada not only has an acetone detector but also an acetaldehyde detector. The acetone detector determines the change in the 3.39 μm / 3.48 μm wavelength ratio in a positive direction, the acetaldehyde detector determines the change in a negative direction.

In Ontario the acetaldehyde detector is set for "INTERFERENT" at an aqueous simulator concentration of 40 mg/L acetaldehyde. The acetaldehyde detector will not only detect acetaldehyde but also other volatiles such as diethyl ether as

seen in the following case.

Diethyl ether (also known as ethyl ether or ether) is a very volatile, flammable liquid that is found in some automotive products and is used by a number of industries, such as in the manufacture of plastic.

In this particular case, a 46 year old man allegedly used 2 cans of "Kleen Flow" (40-70 percent diethyl ether) throughout the day to defreeze an automotive engine. At 2:43 p.m. he was found passed out behind the wheel of a parked truck that was idling. His clothes and hands smelled of vomit. At 3:34 p.m. and 3:54 p.m., Intoxilyzer 5000C tests were conducted with results of 0.182 and 0.199 g/100 mL respectively. Defense raised the issue that the Intoxilyzer

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