

Chemical Tests for Intoxication

Training Course for Breath Test Operator Certification

**Indiana State Department of Toxicology
550 West 16th Street
Indianapolis, Indiana 46202
Telephone: 317-921-5000
Fax: 317-925-9430
www.in.gov/isdt**

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**Chemical Tests for Intoxication
Training Course for Breath Test Operator Certification**

Schedule

- 0830 – 0850 Dept. of Toxicology / Indiana Administrative Code (IAC) 260
- 0850 – 0950 Pharmacology and Toxicology of Alcohol / Evidence Submission
- 0950 – 1050 Legal Aspects of Breath Testing for Alcohol / Recent Case Law
- 1050 – 1205 Instrumentation and Approved Method for Breath Test Analysis
- 1205 – 1305 LUNCH
- 1305 – 1700 Laboratory Exercises / Evaluations / Written Examination / Final Laboratory Exercise

Breaks will be provided between blocks of instruction as time permits.

**Chemical Tests for Intoxication
Training Course for Breath Test Operator Certification**

State Department of Toxicology (Course Schedule, Requirements, Course Staff)

Course Schedule

(See Course Schedule – page 3)

Requirements:

Must be present for entire course

Course Staff:

Inspectors

Lou Brown
Dwight Holbrook

Breath Test Program Supervisor

Dana Bors, PhD
dbors@isdt.in.gov

General Counsel

Teri Kendrick
tkendrick@isdt.in.gov

Indiana Administrative Code Title 260

Objective:

To provide the training required under 260 IAC 2.5-2-2 for breath test operator certification:

- (1) The pharmacology and toxicology of alcohol
- (2) The legal aspects of breath testing for alcohol
- (3) The theory, operation, and care of breath test equipment
- (4) The use of a breath test instrument using reference materials

Duties of the Department:

IC 10-20-2 (enacted 2011)

- Conduct analyses for poisons, drugs, and alcohols upon human tissues and fluids
- Report analytical findings of the department
- Consult with Indiana coroners regarding interpretation of analytical findings
- Furnish expert testimony
- Provide instruction in toxicology to law enforcement officers
- Certify law enforcement officers as required by law for administration of breath chemical tests
- Provide instruction and technical assistance to prosecutors and defense counsel regarding ISDT lab results
- Provide instruction to judges on toxicology and alcohol and drug testing

IAC 260 (See Article 2.5 of Title 260 for current provisions)

A complete copy of Title 260 is available at: http://www.in.gov/legislative/iac/iac_title?iact=260

IAC Title 260 regulates:

- Selection, training, certification, and recertification of breath test operators
- Selection, inspection, and certification of breath test instruments and chemicals used in the performance of evidentiary breath tests
- Approved methods for administering breath alcohol tests

Reference: IC 9-30-6-5

260 IAC 2.5-2-1 Selection of breath test operators

- Must be employed by a law enforcement agency
 - “Law enforcement agency” means an agency or department with authority to apprehend criminal offenders

260 IAC 2.5-2-3 Recertification of breath test operators

- Must be recertified at least every two years from month of certification or recertification.
Your operator card expires on the last day of the month.
- Must demonstrate competence by passing an examination approved by ISDT
- A person who fails the recertification exam may be given a second exam if previous certification has not been expired for more than 30 days
 - **During time between first and second exams, person is not certified**
- Director may suspend or revoke certification at any time

260 IAC 2.5-2-4 Authorization of certified breath test operators

- Administer breath tests
- Make replacements and adjustments to breath test instruments excluding calibration adjustments

260 IAC 2.5-3-1 Selection of breath test equipment

- The department shall select breath test equipment for use for evidentiary breath testing to ensure the accurate analysis of breath specimens for the determination of breath alcohol concentrations.
- Equipment selected by the department must analyze breath samples and report a numerical value expressed as grams of alcohol per two hundred ten (210) liters of breath.

260 IAC 2.5-3-2 Inspection of breath test instruments

- ISDT must inspect each instrument at least every 180 days
- If the location of the instrument is changed, the instrument must be inspected and certified prior to use
 - Moving an instrument past the length of its electrical cord is a location change
- The numerical analytical results of Intox EC/IR II breath test instruments shall not deviate more than 5% or 0.005 g/210L, whichever is greater, from the value of the reference material or the value of the reference material as adjusted for ambient barometric pressure
 - Reference material: traceable material or substance having known properties

***Permitted deviation is plus or minus 5% or 0.005, whichever is greater.

Example: If the “dry gas target” is 0.077, the instrument reading of the ethanol content of the dry gas must fall within the range of 0.072 to 0.082.

Indiana Code

- ISDT publishes certifications of breath test operators and instruments on its website.
- IC 9-30-6-5(b): Failure to publish a certificate does not invalidate any test.
- ISDT maintains records of certifications at its administrative office.

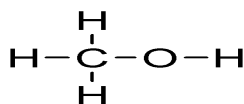
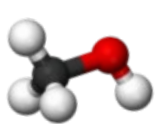
Pharmacology and Toxicology of Alcohol

History of Alcohol Testing

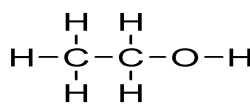
- **Sir Edward Mellanby (1884 - 1955):**
Established relationship between BAC and intoxication. (1919)
- **Erik M.P. Widmark (1889 - 1945):**
Described mathematical terms (rho and beta) for alcohol distribution and elimination. (1932)
- **Goran Liljestrand (1889 - 1968):**
Determined that expired air contained an ethanol concentration ~ 1/2000 that of blood. (1931)
- **Rolla N. Harger (1890 - 1983):**
Developed first practical breath test instrument: Drunkometer (1938)
- **Robert Forney (1916 - 1997):**
First Director of State Department of Toxicology. (1957)
- **Robert Borkenstein (1912 - 2002):**
Creator of the Breathalyzer (1954); conducted first study to demonstrate relationship between BAC and the likelihood of being in a motor-vehicle accident: Grand Rapids Study (1964) supported changing the legal blood alcohol content for vehicle operation from 0.10 to 0.08.

Types of Alcohols

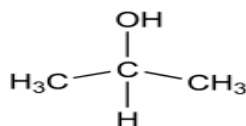
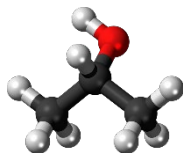
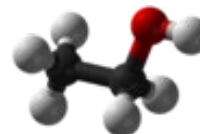
Alcohols are characterized as a chemical class of molecule having a carbon atom bound to an oxygen-hydrogen (-OH) bond.



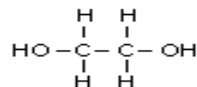
Methanol



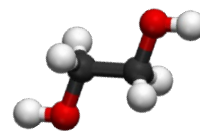
Ethanol



Isopropanol



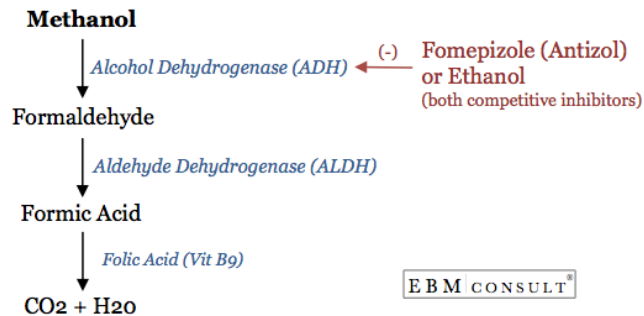
Ethylene Glycol



Methanol

- Wood alcohol
- All types of alcohol can cause central nervous system (CNS) impairment
 - Methanol intoxication symptoms mirror those of ethanol
- Extremely toxic even at low doses (0.02-0.03 g/100mL)

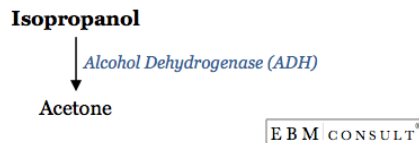
Methanol Metabolism



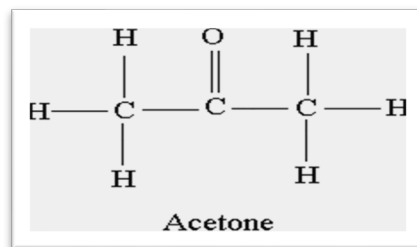
Isopropanol

- Rubbing alcohol
- All types of alcohol can cause central nervous system impairment
 - Isopropanol intoxication symptoms mirror those of ethanol
- Toxic (>0.04%) – metabolized to acetone
 - Acetone causes central nervous system impairment as well

Isopropanol Metabolism



Acetone (ketone)



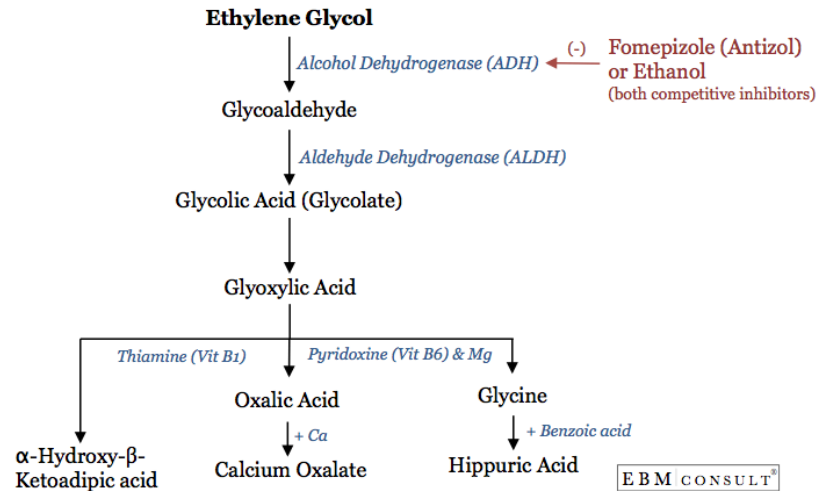
Sources of Acetone

- Metabolite of Isopropanol
- Solvent
- Compromised liver function
- Diabetic Ketoacidosis
- Starvation Ketoacidosis

Ethylene Glycol

- Component in antifreeze
- Can also cause central nervous system impairment
- Extremely toxic
 - Metabolites lead to severe acidosis
 - Metabolites also lead to acute renal failure

Ethylene Glycol Metabolism



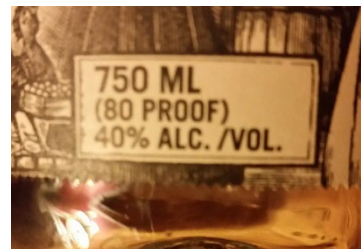
Ethanol

Proof:

Spirit	Alcohol Content (%)	Proof
Vodka	40-50	80-100
Tequila	45-50	90-100
Whiskey	40-75	80-150
Gin	40-85	80-170
Rum	40-95	80-190

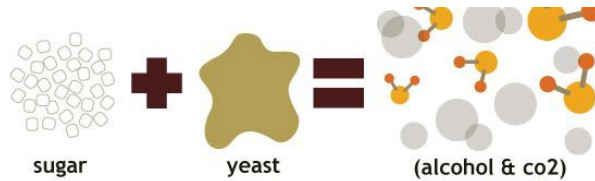
Uses:

- Flavoring: extracts
- Disinfectant: hand sanitizer, mouthwash
- Fuel: E85



Fermentation

A biological process in which sugars such as glucose, fructose, and sucrose are converted into cellular energy—this conversion produces ethanol and carbon dioxide.



Distillation

A physical process by which ethanol is separated and purified from a mixture.

Alcoholic Beverages

These beverages contain the **same amount** of alcohol:

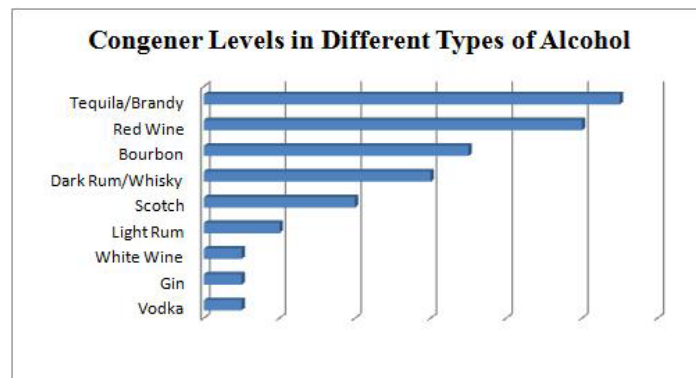
- One beer (12 oz, 4.5%)
- One glass of wine (4.5 oz, 12%)
- One mixed drink (containing 1.5 oz, 80 proof)



The total amount of alcohol consumed, not the type of beverage, is important.

Congeners

A minor chemical constituent, especially one that gives distinctive character to a wine or liquor or is responsible for some of its physiological effects (non-impairing); produced during fermentation or added during production (e.g. methanol, fusel oil, tannins, acetaldehyde).



Congeners are present in insufficient amount to produce noticeable pharmacological effects.

Pharmacology

Study of mechanisms by which drugs alter biological systems in an attempt to improve health and alleviate disease.

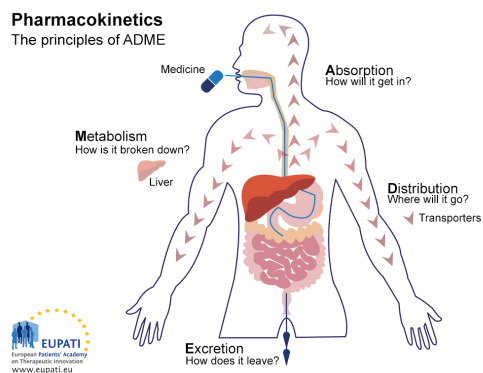
Pharmacokinetics of Alcohol = what the body does to the drug.

Absorption: how it gets in

Distribution: where it goes

Metabolism: what happens to it

Elimination: where/how it leaves



Absorption

Routes of absorption: Mouth - Esophagus - Stomach - Intestine

Mouth:

- Alcohol can be absorbed from the mouth, but very slowly; not significant.
- A mouth rinsed with a solution containing alcohol will be alcohol-free in about 10-12 minutes (MOUTH ALCOHOL).

Stomach:

- Alcohol can be absorbed directly from the stomach.
- The stomach normally absorbs about 20% of ingested alcohol.
- Stomach has thick lining, not really designed for absorption.
 - Small size of alcohols permit passage via diffusion.

Intestine:

- The upper intestine normally absorbs about 80% of ingested alcohol.
- The lower intestine and lower bowel readily absorb alcohol; most alcohol is absorbed, however, from the upper GI tract before it reaches the lower intestine.
- **ABSORPTION** primarily occurs in the **INTESTINES**

Skin:

- Alcohol has not been demonstrated in the blood as a result of absorption through the skin. If it is absorbed, the rate is lower than the rate of metabolism.
- Alcohol absorption defense: absorption rate through the skin < elimination rate = NO net BAC accumulation

Factors that affect rate of alcohol absorption:

- Presence of food in the stomach - *****Most Important*****
 - Most foods will delay gastric emptying - ↓ absorption
- Exercise – Effects vary; some studies show no effect
 - Mild exercise can increase gastric emptying - ↑ absorption
 - Strenuous exercise can decrease gastric emptying - ↓ absorption
- Excitement of fear - ↓ absorption
- Drugs – Effects vary
- Smoking - ↓ absorption
- GI pathologies – Effects vary, depending on the pathology



The rate of alcohol absorption depends on the rate of gastric emptying. Increased gastric emptying will increase absorption of alcohol and result in higher peak blood/breath alcohol concentrations. Decreased gastric emptying will decrease absorption of alcohol and result in lower peak blood/breath alcohol concentrations.

Impact of Food on Alcohol Absorption

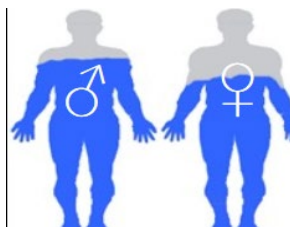


- Food in the stomach delays absorption.
 - Lower peak BAC.
- Peak occurs when the amount being absorbed equals the amount being eliminated (both occurring simultaneously)

Distribution

- Alcohol is soluble in water and is distributed throughout the body based on water content.
- Tissues and organs that have the highest concentration of water will have the highest concentration of alcohol.
- Widmark's rho (or Widmark's r): The available water content of an average male is 68%; of an average female, 55%.

For the same amount of alcohol per body weight, a woman will have a higher concentration of alcohol.



Metabolism



- Alcohol is metabolized by both the stomach and by the liver; **primarily by the liver.**
- Some alcohol is metabolized by these organs before reaching the general circulation.
- Approximately 90 - 95 % of absorbed alcohol is metabolized by the body prior to elimination, mostly in the liver.
- The rest is excreted unchanged in urine, sweat, tears, milk, and breath.

Effects of Pathological Conditions on Ethanol Metabolism

- Fatty Change (steatosis)
- Alcoholic Hepatitis
- Cirrhosis of the Liver
- Diabetes

Elimination

- Alcohol disappears from the blood at a constant rate, known as Widmark's β (beta) factor ("burn off rate").
- Rate varies between individuals:
 - Average rate: 0.015-0.019 g/100mL per hour (or g/210L per hour)
 - Range: 0.010-0.025 g/100mL per hour (or g/210L per hour)
 - Alcoholics and binge drinkers: up to 0.035 g/100mL per hour (or g/210L per hour)

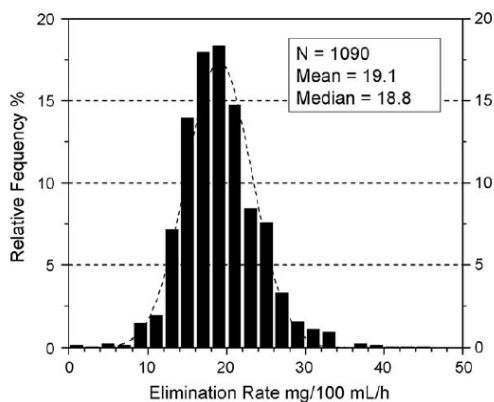
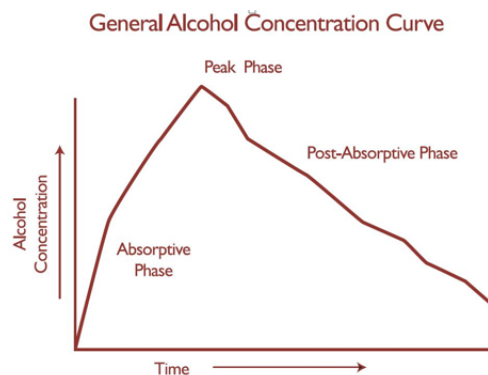


Fig. 10. Relative frequency distribution of elimination rates of alcohol from blood in apprehended drivers derived from double blood samples taken ~1 h apart [16].

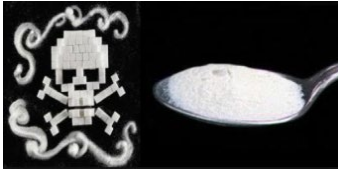
Jones, A. W. (2010). "Evidence-based survey of the elimination rates of ethanol from blood with applications in forensic casework." *Forensic Sci Int* 2010(1-3): 1-20.



Toxicology

Study of the adverse effects of chemicals on living organisms.

Principle: “All substances are poisons; there is none that is not a poison. The right dose differentiates a poison from a remedy.” Paracelsus



Toxicity Rating	Dose (mg/kg b.w.)	For Average Adult
1. Practically non-toxic	More than 15,000	More than 1 quart
2. Slightly Toxic	5000-15,000	1 pint-1 quart
3. Moderately Toxic	500-5000	1 ounce-1 pint
4. Very Toxic	50-500	1 teaspoon-1 ounce
5. Extremely Toxic	5-50	7 drops-1 teaspoon
6. Supertoxic	Less than 5	Less than 7 drops

Forensic Toxicology

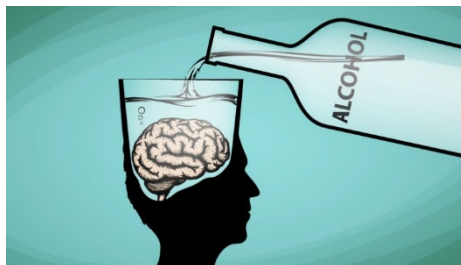
Study of the effects of chemical substances on criminal behavior or results.

- **Substances:**
 - Alcohol
 - Other Drugs
 - Poisons
- **Testing:**
 - Laboratory
 - Breath alcohol
- **Interpretation:**
 - OVWI
 - Postmortem



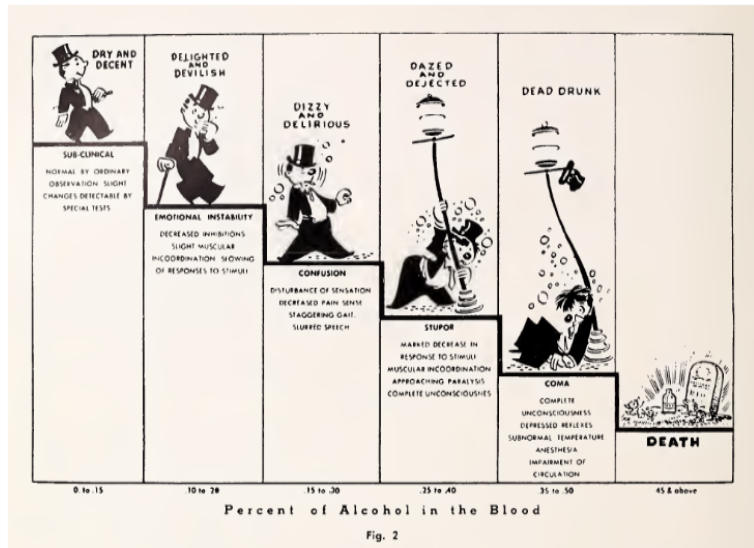
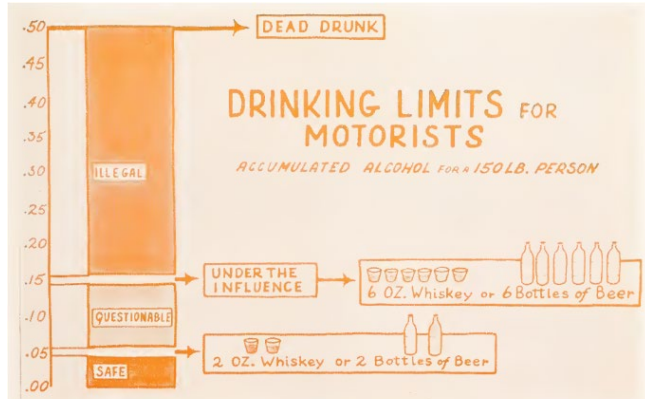
Toxicology of Alcohol

- **Alcohol is a CNS Depressant**
- CNS = Central Nervous System
Depressant = slows function
- Even though impairment has been correlated to blood and breath alcohol concentrations, impairment is caused by alcohol in the **BRAIN**.



Four Primary Types of Impairment

1. Loss of judgment and self-control
2. Impairment of vision and hearing
3. Clumsiness of voluntary muscles
4. Decreased awareness of surroundings



STAGES OF ACUTE ALCOHOLIC INFLUENCE/INTOXICATION

BLOOD-ALCOHOL CONCENTRATION grams/100 mL	STAGE OF ALCOHOLIC INFLUENCE	CLINICAL SIGNS/SYMPTOMS
0.01-0.05	Subclinical	Influence/effects usually not apparent or obvious Behavior nearly normal by ordinary observation Impairment detectable by special tests
0.03-0.12	Euphoria	Mild euphoria, sociability, talkativeness Increased self-confidence; decreased inhibitions Diminished attention, judgment and control Some sensory-motor impairment Slowed information processing Loss of efficiency in critical performance tests
0.09-0.25	Excitement	Emotional instability; loss of critical judgment Impairment of perception, memory and comprehension Decreased sensory response; increased reaction time Reduced visual acuity & peripheral vision; and slow glare recovery Sensory-motor incoordination; impaired balance; slurred speech; vomiting; drowsiness
0.18-0.30	Confusion	Disorientation, mental confusion; vertigo; dysphoria Exaggerated emotional states (fear, rage, grief, etc) Disturbances of vision (diplopia, etc.) and of perception of color, form, motion, dimensions Increased pain threshold Increased muscular incoordination; staggering gait; ataxia Apathy, lethargy
0.25-0.40	Stupor	General inertia; approaching loss of motor functions Markedly decreased response to stimuli Marked muscular incoordination; inability to stand or walk Vomiting; incontinence of urine and feces Impaired consciousness; sleep or stupor
0.35-0.50	Coma	Complete unconsciousness; coma; anesthesia Depressed or abolished reflexes Subnormal temperature Impairment of circulation and respiration Possible death
0.45+	Death	Death from respiratory arrest

KURT M. DUBOWSKI, Ph.D., D.A.B.C.C., D.A.B.F.T.
 The University of Oklahoma
 Department of Medicine
 Oklahoma City, Oklahoma

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Tolerance

- The ability of an organism to adapt.
- There are two forms of alcohol tolerance, including:
 - (1) Psychological: Increased ability to alter behavior in order to not appear intoxicated.
 - (2) Biochemical: Increased rate of degradation of alcohol to inactive metabolites.

With practice, the brain can learn to function better under the influence of alcohol. People vary in their abilities to handle alcohol, not just as a result of inherent differences, but as a result of experience.

Alcohol Involvement in Auto Crashes

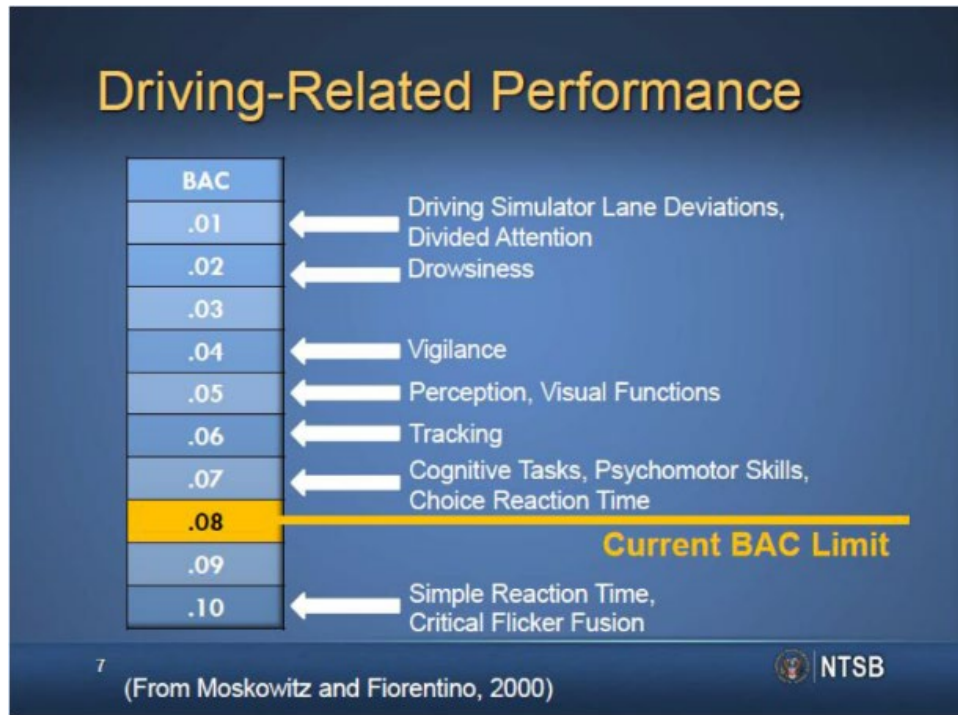
<u>% BAC</u>	<u>Enhancement Factor</u>
0.01-0.04	0.9x
0.05-0.09	1.5x
0.10-0.14	5x
0.15-0.19	14x
0.20-0.24	24x

Grand Rapids Study: Borkenstein, et al. 1964

Latest reanalysis of Borkenstein and other data reveals:

at 0.08 %	Chances are 4x
at 0.15 %	Chances are 25x
at 0.20 %	Chances are >100x

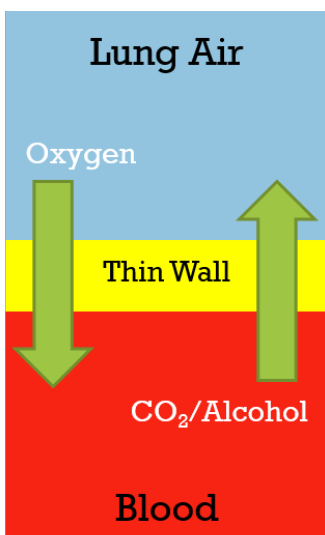




Breath Alcohol Determination

- As the blood passes through the lungs, alcohol will leave and become part of the expired breath.
- Alcohol's distribution between blood and breath obeys Henry's Law.

Henry's Law - in a closed container, at a given temperature and pressure, a material in solution will be in equilibrium with the air in the space above.



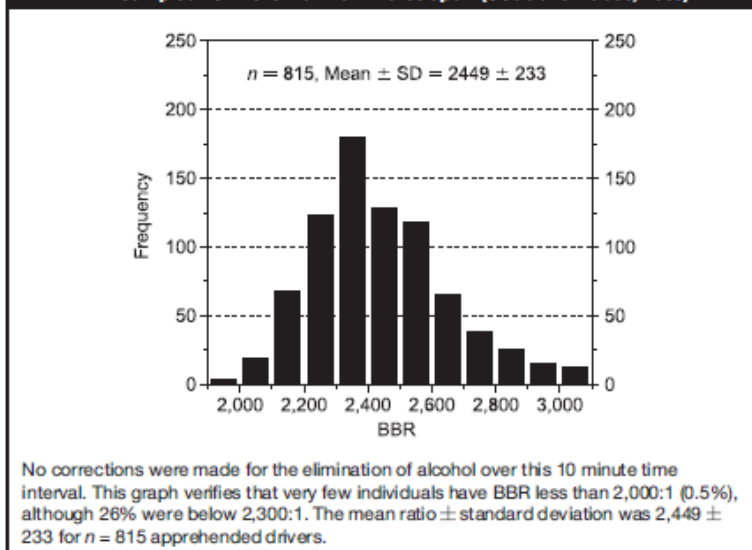
Body temp = 37° C (98.6° F)

Breath temp = 34° C (93.2° F)

- The ratio between the concentration of alcohol in the blood and that in the breath from the deepest part of the lung (alveolar air) is called the partition coefficient. The accepted ratio is 2100:1 in the United States.
- This ratio means that 2100 mL (2.1 Liters) of **alveolar air** will contain the same amount of alcohol as does 1 mL of blood.
- The amount of alcohol in **deep (alveolar) lung air** is directly related to the amount present in the blood.

- Most of the population has a breath: blood ratio greater than 2100:1.
- Breath test instruments in Indiana are calibrated at a ratio of 2100:1.
- For most of the population, Indiana breath test instruments underestimate the BAC.
- A breath test should not produce a higher result than a blood test.

Figure 5.1: Frequency distribution of BBRs of alcohol in drivers apprehended in the UK (data from the Paton Report) where blood and breath were sampled not more than 10 minutes apart (Cobb and Dabbs, 1985)



Jones, A.W. "The Relationship between blood alcohol concentration (BAC) and breath alcohol concentration (BrAC): a review of the evidence." *Road safety web publication* 15 (2010).

Alcohol reporting units:

Blood – g/100 mL

Breath – g/210 L

Breath to blood ratio : alcohol in 2100 mL (2.1 L) of alveolar air is equivalent to the alcohol in 1 mL of blood.

2.1 L of alveolar air = 1 mL of blood

210 L of alveolar air = 100 mL of blood

Common Challenges to Breath Test Results

Subject vomited or burped:

The argument may be that a subject who burped or vomited while a high concentration of alcohol existed in the stomach would exhibit falsely elevated breath alcohol levels.

Observe carefully during the 15-minute deprivation period. Record your observations, including "nothing unusual."

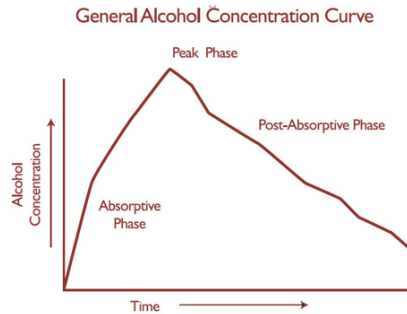
Unable to give a sufficient sample due to pulmonary disorders:

Claim that may be made in response to breath test operator indicating that subject refusal resulted in Insufficient Sample or Time Out.

Cases in which this would be true are rare.

Subject was not impaired at the time of the incident:

The argument is that the subject had recently consumed an alcoholic beverage and was still absorbing alcohol at the time of the incident.
(Rebuttal of 3-hour presumption. This is usually addressed by a toxicologist.)



Approved Method was not followed:

The argument is that the officer did not follow the Approved Method in the administration of a breath test.
MUST follow the Approved Method step-by-step for admissibility of the test (IC 9-30-6-5).


Lab Alcohol Measurement

- Indiana statutes are based on concentrations in **whole blood** and breath.
 - ISDT Lab tests whole blood and serum/plasma.
 - Most hospital labs test serum or plasma, with some exceptions.
- Other sample types can be tested, but may have no evidentiary value in Indiana (blood = impairment vs. urine = use)


Serum vs. Blood

Serum is an amber-colored, protein-rich liquid that separates out when blood coagulates.

Blood vs. Serum

Serum Separator tubes:  "Clear" yellowish Liquid is the serum/plasma when separated

Whole blood tubes: the red blood cells have settled to the bottom on the left, well mixed on the right



Separated

Not Separated, but settled

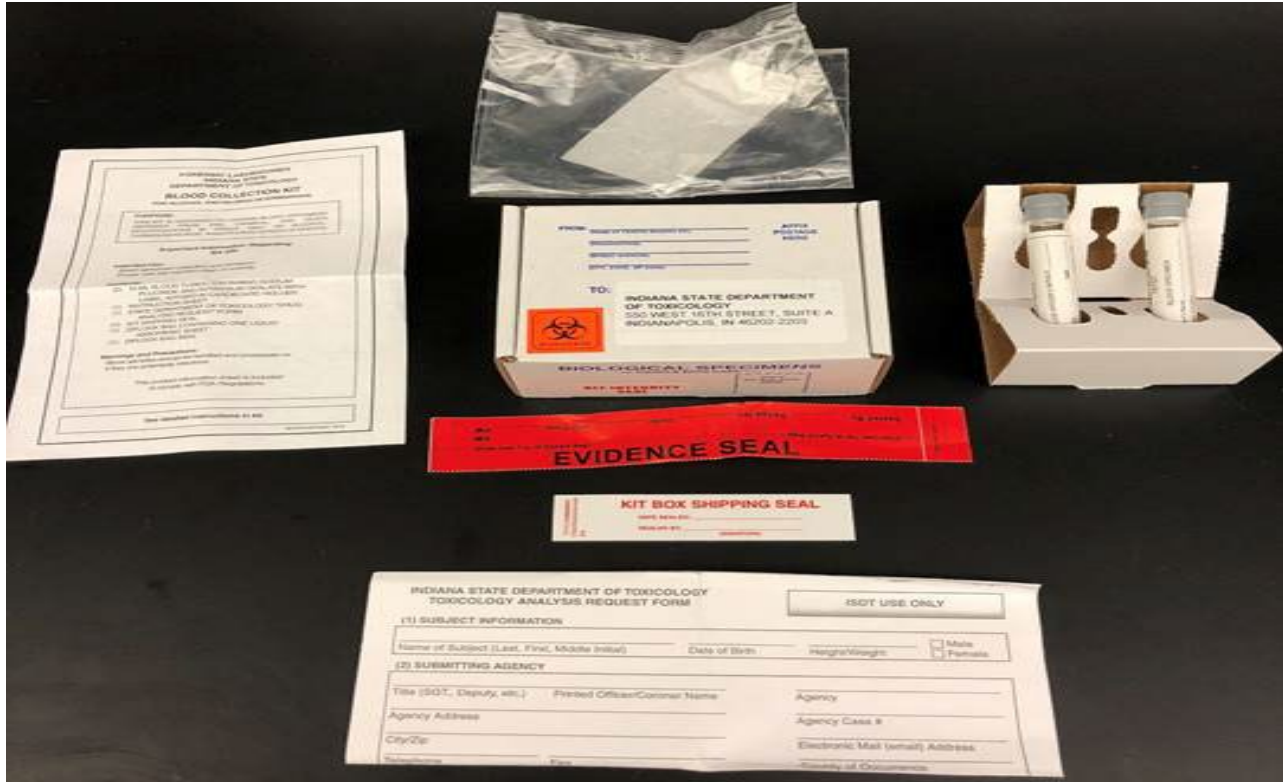
- Ratio of alcohol in other fluid to that in whole blood:

serum/plasma 1: 1.04- 1.26

saliva 1: 1.10

urine variable

Indiana State Department of Toxicology
Chemical Tests for Intoxication
Training Course for Breath Test Operator Certification



Send requests for evidence kits to: toxkits@isdt.in.gov

Available for pick-up at ISDT or shipment to departments

Indiana State Department of Toxicology
Chemical Tests for Intoxication
Training Course for Breath Test Operator Certification



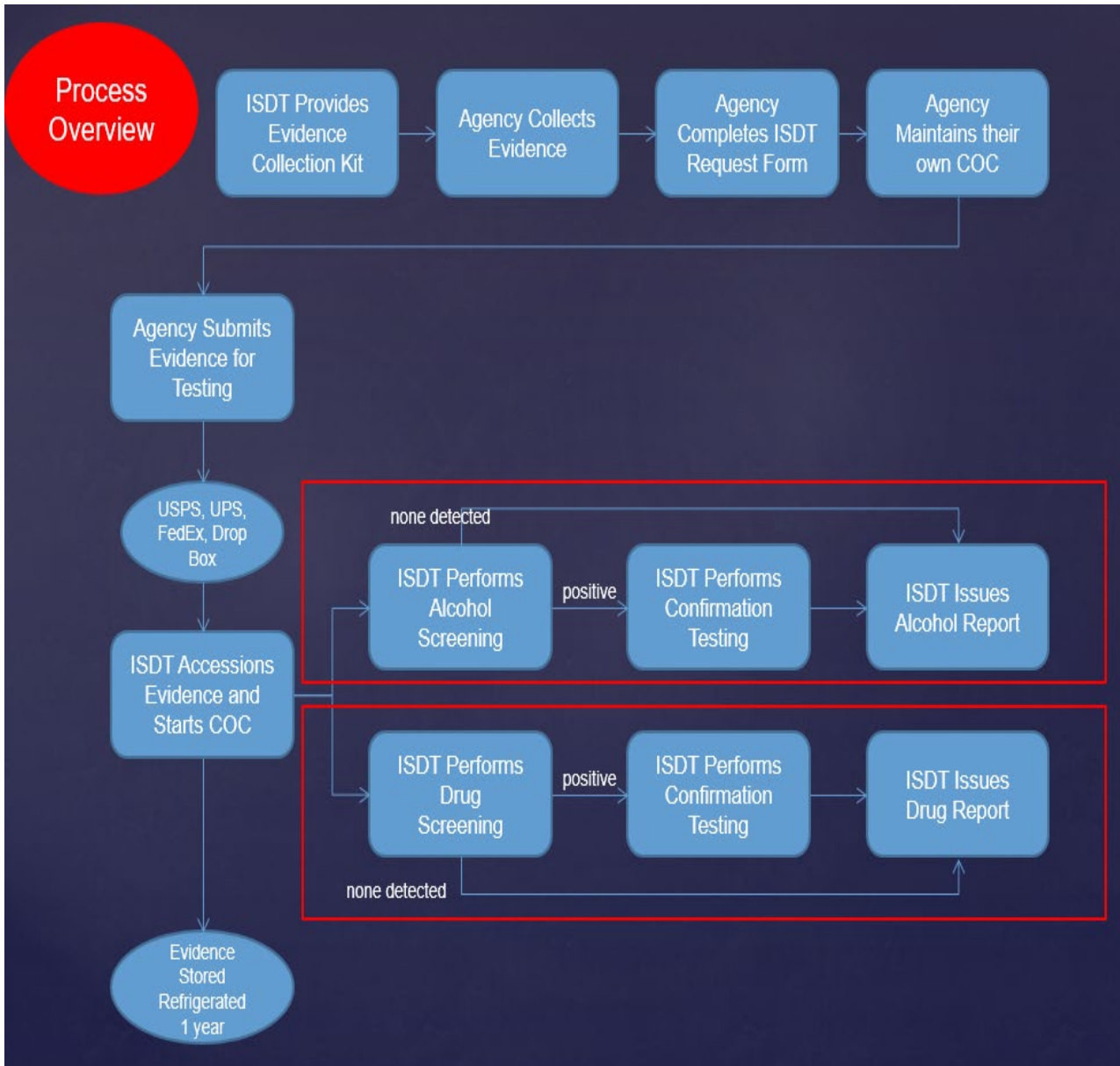
TOXICOLOGY ANALYSIS REQUEST

State Form 53043 (2-22)
Indiana State Department of Toxicology

ISDT USE ONLY

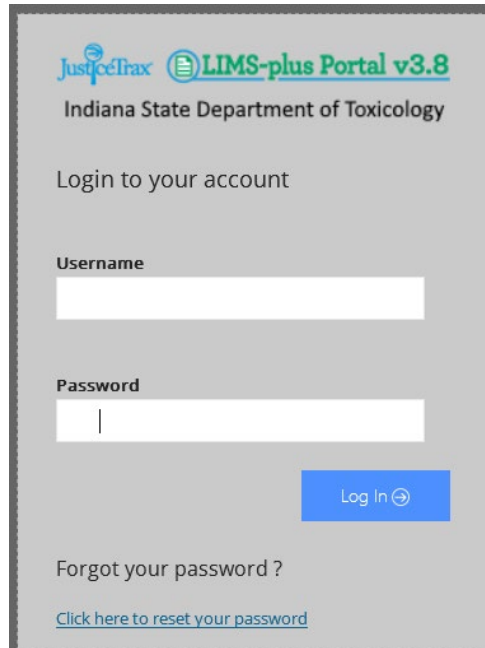
INSTRUCTIONS: 1. Print all information legibly.

SECTION 1 – SUBJECT INFORMATION					
First Name	Middle Initial	Last Name	Subject <input type="checkbox"/> Injured <input type="checkbox"/> Not injured <input type="checkbox"/> Deceased		
Date of Birth (MM/DD/YYYY)	Height (feet, inches)	Weight (pounds)	Gender <input type="checkbox"/> Male <input type="checkbox"/> Female		
SECTION 2 – SUBMITTING AGENCY					
Agency		Officer First Name	Middle Initial	Last Name	
Agency Case Number		Officer E-mail Address			
Agency Street Address		DRE Evaluation Performed <input type="checkbox"/> Yes <input type="checkbox"/> No		Oral Fluid Test Performed <input type="checkbox"/> Yes <input type="checkbox"/> No	
Agency City and ZIP code		DRE Officer First Name	Middle Initial	Last Name	
Telephone Number	County of Occurrence	DRE Officer E-mail Address			
SECTION 3 – TESTS REQUESTED (ISDT only tests whole blood, serum, and plasma specimens)					
<input type="checkbox"/> Alcohol	<input type="checkbox"/> Drugs*	Drugs suspected in your case (contact ISDT to arrange for additional testing to be completed at the expense of the requesting agency)			
*Drug analysis includes all drugs on ISDT's standard panel. Refer to www.IN.gov/isdt for a listing of drugs included. Unless notified otherwise, ISDT will select which specimen to analyze from specimens submitted.					
SECTION 4 – TYPE OF CASE					
Traffic		Non-Traffic		Involvement	
<input type="checkbox"/> Fatal Crash	<input type="checkbox"/> OWI	<input type="checkbox"/> Homicide	<input type="checkbox"/> Sexual Assault	<input type="checkbox"/> Driver	<input type="checkbox"/> Victim
<input type="checkbox"/> PD Crash	<input type="checkbox"/> PI Crash	<input type="checkbox"/> Neglect	<input type="checkbox"/> Death Investigation	<input type="checkbox"/> Passenger	<input type="checkbox"/> Accused
<input type="checkbox"/> SBI Crash		<input type="checkbox"/> Suicide	<input type="checkbox"/> Other _____	<input type="checkbox"/> Pedestrian	<input type="checkbox"/> Elderly
<input type="checkbox"/> Other _____		<input type="checkbox"/> Overdose		<input type="checkbox"/> Juvenile	<input type="checkbox"/> Officer
SECTION 5 – SPECIMEN COLLECTION AND CHAIN OF CUSTODY (section not required to be completed)					
Specimen Collection Notes					
Specimen Collected By			Collection Facility		
Date Collected (MM/DD/YYYY)		Time Collected	Witness		
Received From	Released To	Purpose	Time	Date (MM/DD/YYYY)	
Received From	Released To	Purpose	Time	Date (MM/DD/YYYY)	
Received From	Released To	Purpose	Time	Date (MM/DD/YYYY)	
<p>By submitting evidence to ISDT, the submitting agency agrees to allow ISDT to select the appropriate method of analysis, authorize deviations from a test method, outsource analysis, and destroy submitted specimens 1 YEAR after analysis is completed.</p> <p>ISDT is subject to the requirements of IC 5-15-5.1-10 and the Indiana Access to Public Records Act (IC 5-14-3).</p> <p>See www.IN.gov/isdt for ISDT policies or contact the Department: 550 W. 16th Street Indianapolis, IN 46202 (T) 317-921-5000 (F) 317-925-9430</p>					



ISDT Testing Policy

- All positive screening results will be confirmed
 - No need to request confirmation testing
- All testing requested will be performed
- Exceptions:
 - Urine alcohol and urine drug analysis
 - Drugs outside ISDT panel
- ToxResults: web-based results retrieval



The screenshot shows a login page for the LIMS-plus Portal v3.8. At the top left, there is a logo for 'JusticeTrax' and the text 'LIMS-plus Portal v3.8'. Below this, it says 'Indiana State Department of Toxicology'. The main heading is 'Login to your account'. There are two input fields: 'Username' and 'Password'. The 'Password' field has a vertical line indicating a cursor. To the right of the password field is a blue 'Log In' button with a right-pointing arrow. Below the login fields, there is a link that says 'Forgot your password?' and a blue underlined link that says 'Click here to reset your password'.

Indiana State Department of Toxicology
Chemical Tests for Intoxication
Training Course for Breath Test Operator Certification

Current Drug Testing Panel

Compound Name	Drug Classification	Confirmation Drug Class	Alternate Name	Screen cutoff	Screening Technique	Confirmation cutoff	Confirmation Technique
1 Acetone	Volatiles	Volatiles	Acetone	0.010 g/100 mL	HS-GC	0.010 g/100 mL	HS-GC *The lower of the two confirmations will be used for reporting volatile results.
2 7-Aminoclonazepam	Volatiles	Volatiles	Beer, Wine, Spirits				
3 Isopropanol	Volatiles	Volatiles	Rubbing Alcohol				
4 Methanol	Volatiles	Volatiles	Wood Alcohol				
Compound Name	Drug Classification	Confirmation Class	Trade/Alternate Name	Screen cutoff	Screening Technique	Confirmation cutoff	Confirmation Technique
1 Benzodiazepam	Benzodiazepine	Benzodiazepine	Clonazepam metabolite	10 ng/mL	LC-TOF	5 ng/mL	LC-QQQ
2 Alprazolam	Benzodiazepine	Benzodiazepine	Xanax, Zannies, Z-bars	10 ng/mL	LC-TOF	10 ng/mL	LC-QQQ
3 Clonazepam	Benzodiazepine	Benzodiazepine	Klonopin, Rivotril	10 ng/mL	LC-TOF	10 ng/mL	LC-QQQ
4 Diazepam	Benzodiazepine	Benzodiazepine	Valium, Diastat	10 ng/mL	LC-TOF	50 ng/mL	LC-QQQ
5 Lorazepam	Benzodiazepine	Benzodiazepine	Ativan	10 ng/mL	LC-TOF	10 ng/mL	LC-QQQ
6 Nordiazepam	Benzodiazepine	Benzodiazepine	Nordaz, Stihy, Madar, Vegesan, Calmday, Diazepam metabolite	10 ng/mL	LC-TOF	50 ng/mL	LC-QQQ
7 Oxazepam	Benzodiazepine	Benzodiazepine	Serax, Zaxepam, Diazepam metabolite	10 ng/mL	LC-TOF	50 ng/mL	LC-QQQ
8 Temazepam	Benzodiazepine	Benzodiazepine	Restoril, diazepam metabolite	10 ng/mL	LC-TOF	50 ng/mL	LC-QQQ
9 Zolpidem	Sedative Hypnotic	Benzodiazepine-Z-drug	Ambien	10 ng/mL	LC-TOF	10 ng/mL	LC-QQQ
10 Delta-9 THC	Cannabinoid	Cannabinoid	THC, Δ-9-tetrahydrocannabinol, Marijuana			1 ng/mL	GC-MS
11 Delta-9 Carboxy THC	Cannabinoid	Cannabinoid	11-Nor-9-carboxy-Δ-9-tetrahydrocannabinol, THC-COOH, Marijuana metabolite	10 ng/mL	LC-TOF	5 ng/mL	GC-MS
12 Benzoylcegonine	Stimulant	Cocaine and Cocaine Metabolite	Cocaine metabolite	20 ng/mL	LC-TOF	20 ng/mL	GC-MS
13 Cocaine	Stimulant	Cocaine and Cocaine Metabolite	Coke, White, Snow, Speedball	10 ng/mL	LC-TOF	20 ng/mL	GC-MS
14 6-Monoacetylmorphine	Narcotic Analgesic	Opioids	6-MAM, 6-acetylmorphine, 6-AM, Heroin metabolite	--	--	5 ng/mL	LC-QQQ
15 Acetyl fentanyl	Narcotic Analgesic	Opioids	Fentanyl analog	1 ng/mL	LC-TOF	0.5 ng/mL	LC-QQQ
16 Codeine	Narcotic Analgesic	Opioids	Codeine	10 ng/mL	LC-TOF	5 ng/mL	LC-QQQ
17 Dextromethorphan	Narcotic Analgesic	Opioids	Delsym, Robitussin, Zicam, DXM, DM	10 ng/mL	LC-TOF	5 ng/mL	LC-QQQ
18 EDDP	Narcotic Analgesic	Opioids	Methadone metabolite	10 ng/mL	LC-TOF	10 ng/mL	LC-QQQ
19 Fentanyl	Narcotic Analgesic	Opioids	Duragesic, Abstral, Subsys	1 ng/mL	LC-TOF	0.5 ng/mL	LC-QQQ
20 Hydrocodone	Narcotic Analgesic	Opioids	Vicodin, Lortab, Lorcet, Norco, Verdoret	10 ng/mL	LC-TOF	5 ng/mL	LC-QQQ
21 Hydromorphone	Narcotic Analgesic	Opioids	Dilaudid	10 ng/mL	LC-TOF	5 ng/mL	LC-QQQ
22 Methadone	Narcotic Analgesic	Opioids	Dolophine, Methadose	10 ng/mL	LC-TOF	10 ng/mL	LC-QQQ
23 Morphine	Narcotic Analgesic	Opioids	Duramorph, DepoDur, Astramorph, Heroin metabolite	10 ng/mL	LC-TOF	5 ng/mL	LC-QQQ
24 Norfentanyl	Narcotic Analgesic	Opioids	Fentanyl metabolite	1 ng/mL	LC-TOF	0.5 ng/mL	LC-QQQ
25 O-Desmethyldiamadol	Narcotic Analgesic	Opioids	Tramadol metabolite	10 ng/mL	LC-TOF	10 ng/mL	LC-QQQ
26 Oxycodone	Narcotic Analgesic	Opioids	Oxycontin, Percodan, Percocet	10 ng/mL	LC-TOF	5 ng/mL	LC-QQQ
27 Oxymorphone	Narcotic Analgesic	Opioids	Opana, Numorphan, Numorphone	10 ng/mL	LC-TOF	5 ng/mL	LC-QQQ
28 Tramadol	Narcotic Analgesic	Opioids	Ultram, ConZip, Ryzolt	10 ng/mL	LC-TOF	10 ng/mL	LC-QQQ
29 Amphetamine	Stimulant	Stimulants	Adderal, Methamphetamine metabolite	10 ng/mL	LC-TOF	5 ng/mL	LC-QQQ
30 MDA	Stimulant	Stimulants	Tenamfetamine	--	--	5 ng/mL	LC-QQQ
31 MDMA	Stimulant	Stimulants	Ecstasy	10 ng/mL	LC-TOF	5 ng/mL	LC-QQQ
32 Methamphetamine	Stimulant	Stimulants	Desoxyn, Meth, Speed, Crystal, Glass, Ice, Crank, Yaba	10 ng/mL	LC-TOF	10 ng/mL	LC-QQQ
33 Phenylethidine	Dissociative anesthetic	Stimulants	PCP, Angel dust, Sernyl	10 ng/mL	LC-TOF	5 ng/mL	LC-QQQ
34 Butalbital	Sedative Hypnotic	Barbiturates	Floracet, Fiorinal	200 ng/mL	LC-TOF	Outsourced to NMS	
35 Pentobarbital	Sedative Hypnotic	Barbiturates	Nembutal	200 ng/mL	LC-TOF		
36 Phenobarbital	Sedative Hypnotic/ Anticonvulsant	Barbiturates	Luminal, Solfoton	200 ng/mL	LC-TOF		
37 Secobarbital	Sedative Hypnotic/ Anticonvulsant	Barbiturates	Seconal	200 ng/mL	LC-TOF		
38 Buprenorphine	Narcotic Analgesic	Buprenorphine	Suboxone, Buprenex	10 ng/mL	LC-TOF		
39 Norbuprenorphine	Narcotic Analgesic	Buprenorphine	Buprenorphine metabolite	10 ng/mL	LC-TOF		
40 Carisoprodol	Muscle Relaxant	Carisoprodol	Soma	500 ng/mL	LC-TOF		
41 Meprobamate	Muscle Relaxant	Carisoprodol	Carisoprodol metabolite	500 ng/mL	LC-TOF		
42 Cyclobenzaprine	Muscle Relaxant	Cyclobenzaprine	Flexeril, Amrix, Fecmid	10 ng/mL	LC-TOF		

Alcohols, Benzodiazepines, Sedative Hypnotics, Anticonvulsants, Narcotic Analgesics, Cannabinoids, and Muscle Relaxants are all Central Nervous System Depressants

NOTE: All positive screening results will be confirmed and quantified, if possible. Analytes may be reported qualitatively if quantification is not possible.

GC-MS = Gas Chromatography / Mass Spectrometry LC-TOF = Liquid Chromatography / Time of Flight Mass Spectrometry

HS-GC = Headspace - Gas Chromatography / Flame Ionization LC-QQQ = Liquid Chromatography / Triple Quadrupole Mass Spectrometry

Cutoff = Lowest concentration of drug that will be reported

Alternate Name = Not meant to be comprehensive / inclusive; only meant to provide an example of alternate drug names

Updated: 02/15/23

SPECIMEN GUIDANCE:

Blood: Gray top preferred, but not required. Analytes may be performed on other types of blood tubes.

Indiana State Department of Toxicology
Chemical Tests for Intoxication
Training Course for Breath Test Operator Certification

Negative alcohol result



INDIANA STATE DEPARTMENT OF TOXICOLOGY
TOXICOLOGY REPORT - Alcohol Analysis

ISDT CASE: 19-XXXXX Date of Report: October 16, 2019

Submitting Officer Name
Submitting Agency Name
Submitting Agency Address
City, IN Zip

Subject Name: JOHN DOE
Agency Case: Submitting Agency Case #
County: County of Occurrence

Received: 09/18/2019
Delivered By: DROP BOX
Item Descriptions:
Item # 1: ISDT KIT
Item # 1-A: Blood Tube
Item # 1-B: Blood Tube

Screening Method: GC/MS
Screening Began On: 09/30/2019
Item(s) Screened: 1-A

None Detected

Analysis by GC/MS includes the following analytes: Ethanol, Acetone, Isopropanol, and Methanol.
Unless noted otherwise, the limit of detection for each analyte is 0.010 g/100 mL.



INDIANA STATE DEPARTMENT OF TOXICOLOGY
TOXICOLOGY REPORT - Alcohol Analysis

ISDT CASE: 19-XXXXX Date of Report: October 31, 2019

Submitting Officer Name
Submitting Agency Name
Submitting Agency Address
City, IN Zip

Subject Name: JOHN DOE
Agency Case: Submitting Agency Case #
County: County of Occurrence

Received: 10/21/2019
Delivered By: DROP BOX
Item Descriptions:
Item # 1: Envelope
Item # 1-A: Blood Tube
Item # 1-B: Blood Tube

Screening Method: GC/MS
Screening Began On: 10/23/2019
Item(s) Screened: 1-A

Confirmation Results

Analyte	Result	Item	Confirmation		Analyst
			Method	Analysis Date	
Ethanol	0.322 ± 0.023 g/100 mL	1-A	GC/MS	10/24/2019	Cheryl Anderson

Quantitative results are reported as
Result ± Measurement Uncertainty at a coverage probability of 99.73%.

Analysis by GC/MS includes the following analytes: Ethanol, Acetone, Isopropanol, and Methanol.
Unless noted otherwise, the limit of detection for each analyte is 0.010 g/100 mL.

This report has been authorized by 433761.

If this case has been resolved and all requested testing has not been completed, please notify the laboratory immediately.
Specimens will be destroyed one year after testing unless ISDT is notified in writing to retain the specimens for a longer period of time.

550 W. 16th Street Indianapolis, IN 46202
Phone No: 317-921-5000 Fax No: 317-925-9430
Website: www.IN.gov/isdt

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This report has been authorized by F367427.

If this case has been resolved and all requested testing has not been completed, please notify the laboratory immediately.
Specimens will be destroyed one year after testing unless ISDT is notified in writing to retain the specimens for a longer period of time.

550 W. 16th Street Indianapolis, IN 46202
Phone No: 317-921-5000 Fax No: 317-925-9430
Website: www.IN.gov/isdt

Page 1 of 1

Positive drug result



INDIANA STATE DEPARTMENT OF TOXICOLOGY
TOXICOLOGY REPORT - Drug Analysis

ISDT CASE: 19-XXXXX Date of Report: October 22, 2019

Submitting Officer Name
Submitting Agency Name
Submitting Agency Address
City, IN Zip

Subject Name: JOHN DOE
Agency Case: Submitting Agency Case #
County: County of Occurrence

Received: 09/16/2019
Delivered By: USPS
Item Descriptions:
Item # 1: ISDT KIT
Item # 1-A: Blood Tube
Item # 1-B: Blood Tube

Screening Method: LC-TOF
Screening Began On: 09/23/2019
Item(s) Screened: 1-A

Confirmation Results

Analyte	Result	Item	Confirmation		Analyst
			Method	Analysis Date	
Amphetamine	85 ± 10 ng/mL	1-A	LC/MS MS	10/10/2019	Megan DeSmit
Methamphetamine	> 500 ng/mL	1-A	LC/MS MS	10/10/2019	Megan DeSmit
Other		1-A			See NMS Report*

* Analysis performed by NMS Labs, Willow Grove, PA.

Quantitative results are reported as
Result ± Measurement Uncertainty at a coverage probability of 95.45%.

A list of drugs included in screening and confirmation testing is available at
www.IN.gov/isdt/2330.htm

This report has been authorized by L346391.

If this case has been resolved and all requested testing has not been completed, please notify the laboratory immediately.
Specimens will be destroyed one year after testing unless ISDT is notified in writing to retain the specimens for a longer period of time.

550 W. 16th Street Indianapolis, IN 46202
Phone No: 317-921-5000 Fax No: 317-925-9430
Website: www.IN.gov/isdt

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Legal Aspects of Breath Testing for Alcohol

Implied Consent

A person who operates a vehicle impliedly consents to submit to a chemical test as a condition of operating a vehicle in Indiana.

Chemical test means an analysis of a person's blood, breath, urine, or other bodily substance for the determination of the presence of alcohol, a controlled substance or its metabolite, or a drug or its metabolite.

Implied Consent Advisement

If the person refuses to submit to a chemical test, you **shall** inform the person that refusal will result in the suspension of the person's driving privileges.

Indiana cases: *State v. Schulze* (Court of Appeals of Indiana, 2014)

Kingma v. State (Court of Appeals of Indiana, 2020)

Burnell v. State (Supreme Court of Indiana, 2016)

Miranda Warning

- Miranda warning must be given when suspect is in custody AND is being interrogated.
- Miranda warning is often given after the suspect fails the breath test.
- Once subject is in custody, officer should not question subject about vehicle operation, impairment, crash details, etc., until *Miranda* warning is given.

In custody

- Gray area – Not clearly delineated
- Handcuffing suspect is placing “in custody.”
- Putting suspect in police car may constitute “in custody.”
- Traffic stop and asking subject to get out of car, in and of itself, is not “in custody.”

Sobriety checkpoints: *State v. Brown* (Supreme Court of Indiana, 2017)

Interrogation

- Neither Portable Breath Tests (PBT) nor Field Sobriety Tests (FST) are statements. They alone, therefore, do not constitute an interrogation.
- If you administer a PBT or FST’s without interrogating the suspect, you are not required to give the *Miranda* warning.
Similarly, breath and blood samples do not require *Miranda* warning. The implied consent advisement is not interrogation, and IC 9-30-6-3(b) specifically provides that a person’s refusal to submit to a chemical test is admissible into evidence.

Field Sobriety Tests

Ackerman v. State (Court of Appeals of Indiana, 2002)

Police are not required to advise of right to counsel before administering field sobriety tests.

Administering a Breath Test

- Deprivation time (use same timepiece throughout)
- Insufficient samples
Hurley v. State (Supreme Court of Indiana, 2017)

Operator must offer a second test unless subject clearly demonstrates manifest unwillingness to submit to it.

Preparation for Testimony

- Review case file
- Discuss case with other officers who witnessed or assisted
- Mentally organize elements of offense and supporting evidence
- Revisit the scene if appropriate
- Discuss case with assigned prosecutor

During Testimony

- Provide specific descriptive details
- Avoid vague language

Testimony about training

- Dates of your certification
 - Verify dates of certification with your identification card covering the period in question.
 - Keep current identification card with you and save all old/expired cards.
- Topics taught in Training Course for Breath Test Operator Certification
 - **This course has covered the areas required by 260 IAC 2.5-2-2:**
 - (1) The pharmacology and toxicology of alcohol
 - (2) The legal aspects of breath testing for alcohol
 - (3) The theory, operation, and care of breath test equipment
 - (4) The use of a breath test instrument using reference materials

Testimony regarding the breath test

- Describe administering the Approved Method
 1. Deprivation time
 2. Instructions given
 3. Subject cooperation or lack of cooperation
 4. How results are expressed

Questions officers lack expertise to answer in testimony

- Certification process
 - How instruments are certified
 - When instrument was last certified
 - Any questions regarding instrument certification materials or process
- Expert testimony regarding pharmacology/toxicology of alcohol
 - Effect of alcohol
 - How much alcohol results in impairment
- Mechanics of instrument operation and maintenance
 - How the instrument operates
 - How/when maintenance is done
 - Any other questions relating to repair and/or maintenance of instrument
- “I don’t know.”

Do not volunteer more information than necessary to answer questions asked.

Focus on answering questions succinctly

Other Issues/Relevant Statutes

- IC 9-30-5 and prima facie evidence of intoxication
 1. 0.08 gram of alcohol per 100 milliliters of blood or 210 liters of breath
 2. 0.15 gram of alcohol per 100 milliliters of blood or 210 liters of breath
- If a chemical test was administered within 3 hours of the time probable cause was developed, the Indiana code establishes a rebuttable presumption that the breath or blood alcohol content test result is the subject's breath or blood alcohol content at the time of vehicle operation.

The law also establishes a rebuttable presumption that a person who operates a vehicle with at least 0.080 breath or blood alcohol content is intoxicated. Because this presumption is rebuttable, however, evidence in addition to the chemical test result is required to prove the impairment element of the charge of operating a vehicle while intoxicated.

- IC 9-30-7 – implied consent for accident involving serious injury or death

“A law enforcement officer shall offer a portable breath test or chemical test to any person who the officer has reason to believe operated a vehicle that was involved in a fatal accident or an accident involving serious bodily injury.”
(IC 9-30-7-3)
- Blood search warrants

Metzger v. State, 6 N.E.3d 485 (Indiana Court of Appeals, 2014)

IC 34-47-3-1 Disobedience of process or order

Missouri v. McNeely (U.S. Supreme Court, 2013)

- IC 9-30-6-6(a) Subpoenas for hospital blood samples/test results

If medical personnel take a sample during the course of normal treatment, the sample or test results shall be provided to an officer who requests them as part of a criminal investigation **even if the patient does not consent.**

Indiana law exempts medical personnel from civil and criminal liability for providing law enforcement with a sample or test result under these circumstances.

Instrumentation and Approved Method for Breath Analysis for Alcohol

Intox EC/IR II

NHTSA-approved as an evidentiary breath alcohol instrument.

Theory of Operation

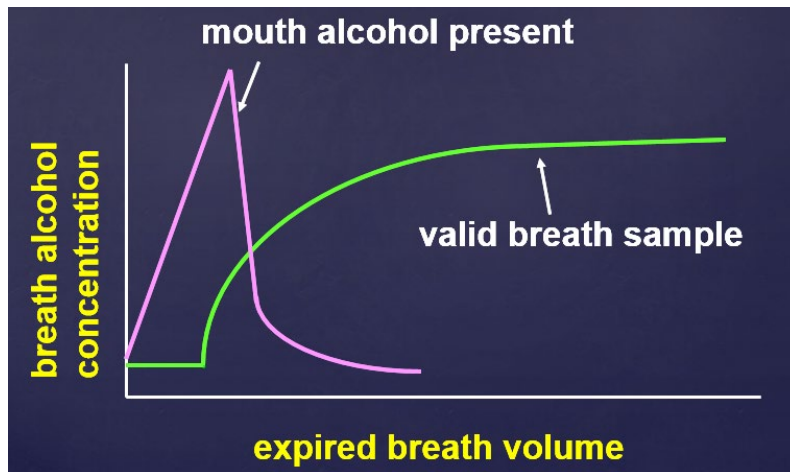
- EC = Electrochemical (fuel cell)
- IR = Infrared

Intox EC/IR II uses fuel cell technology to measure amount of alcohol in a sample

Intox EC/IR II uses infrared technology to detect mouth alcohol

The infrared system tracks the alcohol concentration in the sample in near real time to detect the presence of mouth alcohol but does not produce a BrAC measurement.

- If mouth alcohol is present, the IR system will detect that there is a higher alcohol concentration in the subject's mouth air than in the subject's deep lung air.



- When a breath sample containing alcohol is introduced into the fuel cell sample port, an electrochemical reaction occurs.
- Measurement of the electrical current produced indicates the amount of alcohol consumed by the fuel cell.
- The fuel cell is specific to alcohol, but not specific to ethanol.
 - Intox EC/IR II detects methanol and isopropanol (alcohols other than ethanol) as interferents.
- Acetone is not a fuel for the fuel cell, so the fuel cell does not react to it.

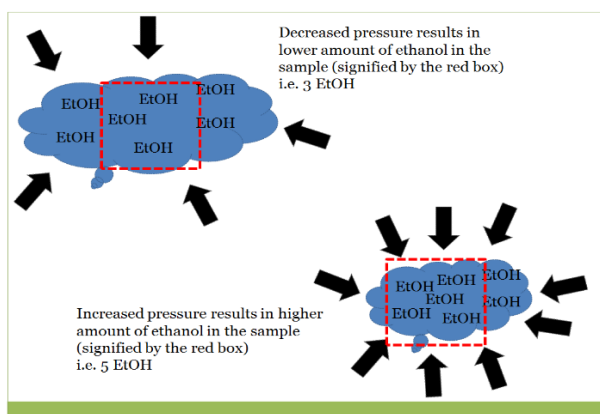
Accuracy Checks

- The Intox EC/IR II performs a calibration (accuracy) check before and after each breath test by testing a sample from an internal dry gas tank containing a certified value of ethanol.
- Instrument will disable if result of each calibration check is not within 0.005 or 5%, whichever is greater, of the dry gas target.

Dry gas target = the certified value of the ethanol in a reference material (dry gas in the instrument's internal tank) adjusted for the ambient barometric pressure

- Ethanol molecules in dry gas are affected by ambient barometric pressure: high pressure keeps the molecules closer together, resulting in a higher ethanol measurement; low pressure allows the molecules to spread, resulting in a lower ethanol measurement.

*****The target is listed on the instrument report as “Dry Gas Target.”**



The Intox EC/IR II adjusts for this effect by measuring the ambient barometric pressure to determine a target for itself when it measures the ethanol in its internal dry gas tank.

Care and Service of the Intox EC/IR II

- Instrument should be left turned on 24/7.
 - Any person can turn instrument on or off***
***This should only be done if absolutely necessary
- Only persons authorized by director of ISDT may make instrument calibration adjustments.
- The instrument should not be operated in environments heavy with alcohol vapor, cigarette smoke, high levels of radio frequencies, or magnetic interference.
 - Intox EC/IR II is designed so that none of these environmental conditions will affect test results.
 - Prolonged exposure to these conditions may shorten the life of the fuel cell.

- Instrument displays a status message indicating the condition when:
 - it fails a calibration check
 - it malfunctions
 - the dry gas tank is low
 - If this occurs, notify ISDT.

Instrument Service

To request service of an instrument, complete and email the service request form on the State Department of Toxicology website or call ISDT at 317-921-5008.

- Provide the following information:
 - Officer's name (or name of contact person at instrument location)
 - Instrument location
 - Instrument serial number
 - Description of any issues and status messages displayed or printed on instrument reports.

An inspector will be notified as soon as possible.

Approved method for Intox EC/IR II Breath Analysis

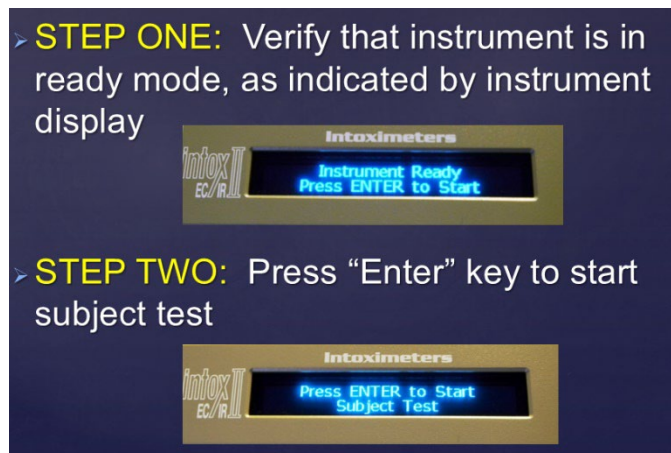
The **approved method** that **shall be followed** in making an analysis of breath for alcohol using the Intox EC/IR II breath test instrument has ten steps. (260 IAC 2.5-4-1)

***These are rules, not guidelines.**

- Person to be tested must:
 - have had nothing to eat or drink,
 - not have put any foreign substance into mouth or respiratory tract, and
 - not smoke within 15 minutes before time first breath sample is taken or at any time from first breath sample until after final breath sample.
- Fifteen-minute deprivation period can begin before subject arrives at testing site.

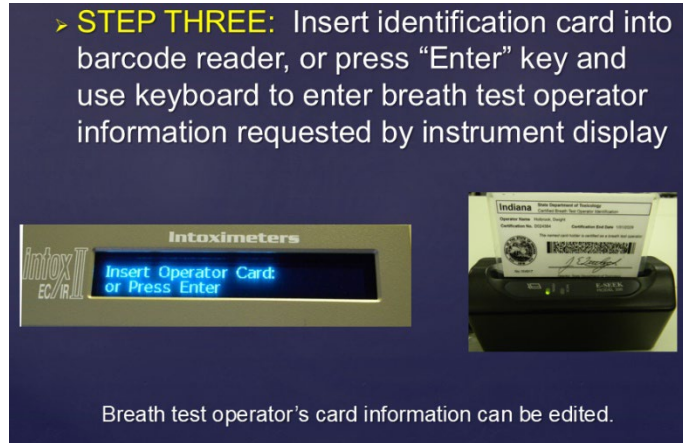
One of the common challenges to breath test results is that the subject burped or vomited prior to the test, causing an elevated breath alcohol level. Observe the subject during the 15-minute deprivation period, and record your observations, including “nothing unusual.” If the subject burps or vomits during the 15-minute period, begin a new 15-minute period, or take the subject for a blood test.

- STEP ONE: Verify that instrument is in ready mode, as indicated by instrument display.
 - Check to see that the printer is online and has paper.
- STEP TWO: Press “Enter” key to start subject test.



- **STEP THREE:** Insert identification card into barcode reader, or press “Enter” key and use keyboard to enter breath test operator information requested by instrument display.

All of the information scanned from the operator ID card may be edited by using the instrument keyboard. Any text that is highlighted on the instrument display may be edited; e.g., a last name change or a department change.

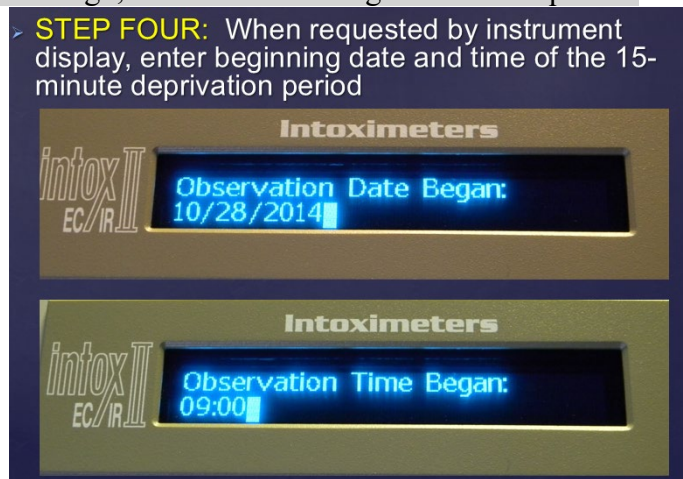


- **STEP FOUR:** When requested by instrument display, enter beginning date and time of the 15-minute deprivation period.

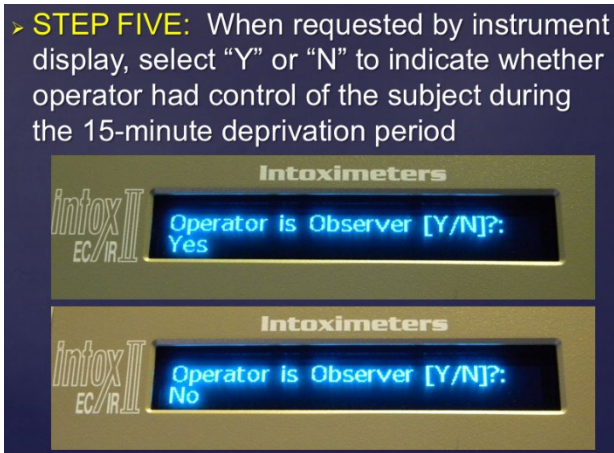
Format for date is MM/DD/YYYY

Format for time is HH:MM (military time)

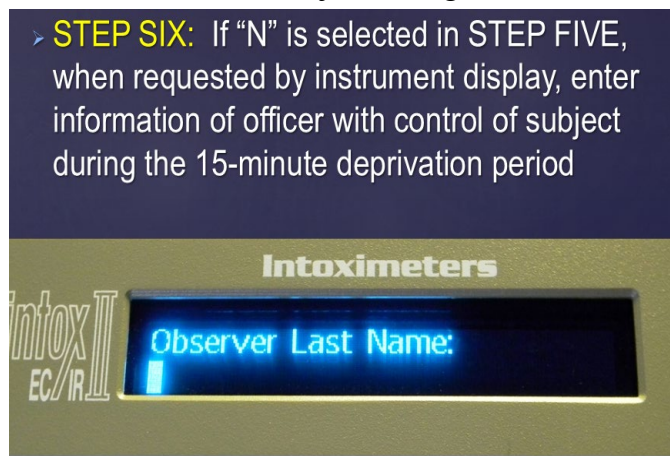
Instrument will calculate 15 minutes from the beginning time entered by the operator. If the beginning time entered was not ≥ 15 minutes ago, instrument will delay start of test sequence until 15 minutes have elapsed from the beginning time entered. Examples: If beginning time entered was 10 minutes ago, instrument will wait for 5 minutes before starting the test sequence. If beginning time entered was 30 minutes ago, instrument will begin the test sequence.



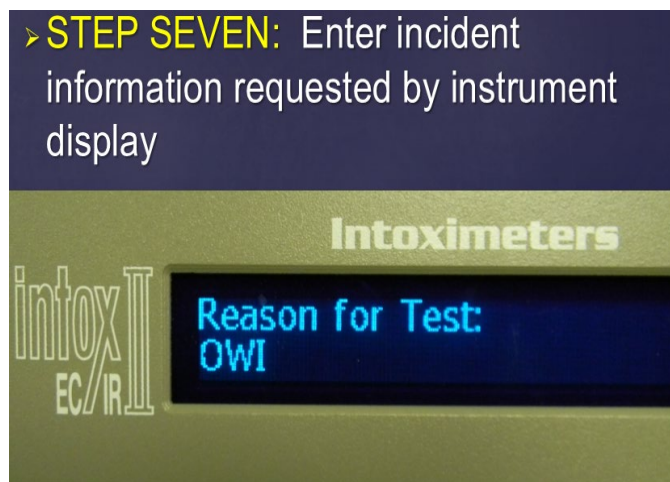
- **STEP FIVE:** When requested by instrument display, select “Y” or “N” to indicate whether operator had control of the subject during the 15-minute deprivation period.



STEP SIX: If “N” is selected in STEP FIVE, when requested by instrument display, enter information of officer with control of subject during the 15-minute deprivation period.



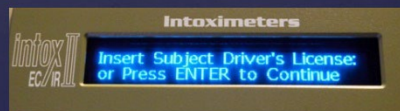
- **STEP SEVEN:** Enter incident information requested by instrument display. Use spacebar to move between “Reason for Test:” options.



- STEP EIGHT: Enter subject information requested by instrument display by:
 - inserting subject's driver/operator license or identification card into barcode reader or
 - pressing "Enter" key and using keyboard to enter available subject information requested by instrument display.

Scanned DL info cannot be edited by keyboard.

- **STEP EIGHT:** Enter subject information by:
 - inserting subject's driver/operator license or identification card into barcode reader or
 - pressing "Enter" key and using keyboard to enter available subject information requested by instrument display



Driver's license information cannot be edited.

- STEP NINE: When "Please blow" appears on instrument display, place mouthpiece on breath tube. Instruct subject to deliver a breath sample. Remove mouthpiece after delivery of sample or when prompted by instrument display. Repeat as prompted by instrument display.

Do not allow the test subject to handle the breath tube.

Instruct the subject: "Take a deep breath, make a tight seal around the tip of the mouthpiece, and then blow long, strong, and continuously until I tell you to stop."

If minimum flow is not reached within 3 minutes from time that "Please blow"/"Press 'R' for refusal" is displayed, instrument will display "Refusal? [Y/N]." The 3-minute timer resets after each "Insufficient Sample." If this occurs 3 times, test sequence ends.

Removal of Mouthpiece: The approved method requires removal of the mouthpiece from the breath tube after delivery or attempted delivery of a breath sample or when prompted by the instrument display to ensure there is not a mouthpiece on the breath tube during the instrument purge/blank cycle.

Failure to comply with the requirement to remove the mouthpiece could result in a failed Blank Check.

After delivery of the first sample there is a 2-minute delay before the next "Purging Remove Mouthpiece" prompt.

- **STEP TEN:** Print instrument report and remove from printer; check report for numerical value of subject's breath alcohol concentration reported as "RESULT" and sign report where indicated.

Two-test sequence with 0.020 agreement

Intox EC/IR-II: Subject Test

ISDT 550 W. 16th Street Indianapolis, IN 46202

Serial Number: 011082 Test Number: 47
Test Date: 08/07/2013 Test Time: 10:50 EDT

Operator Name: Bunion, Paul R
Operator Certification Number: G99999
Agency Name: Skyville
Observation Began: 08/07/2013 at 10:40
Observer Name: Bunion, Paul R
Driver License Number: 123456789
Subject Name: Sober, Stone
Subject D.O.B.: 05/31/1961

Dry Gas Target: 0.077
Lot Number: AG317601 Tank Number: 4 Exp Date: 06/05/2015

System Check: Passed ← internal diagnostics

Test	g/210L	Time	
BLK	0.000	11:00	blank check
CHK	0.076	11:01	calibration check
BLK	0.000	11:02	blank check
SUBJ	0.120	11:03	1 st subject sample test
BLK	0.000	11:06	blank check
SUBJ	0.118	11:06	2 nd subject sample test
BLK	0.000	11:07	blank check
CHK	0.076	11:08	calibration check
BLK	0.000	11:09	blank check

Test Status Sample Complete

RESULT: 0.118 g/210L ← subject's breath alcohol content
11:06 EDT, (the lower of the two results)
08/07/2013

ALCOHOL READINGS ARE EXPRESSED AS
GRAMS OF ALCOHOL PER 210 LITERS OF
BREATH

Operator Signature

“System Check” is a set of internal diagnostics that looks at the baselines of all the instrument sensors. Although only the first system check appears on the instrument report, the instrument performs a system check before each function in the test sequence (i.e., before every blank check, every accuracy check, every subject test).

You may use this instrument report.

Approved method for Intox EC/IR II Breath Analysis (260 IAC 2.5-4-1)

- If the BrAC results of the two tests in the sequence are not within 0.020 of each other, the instrument prompts for an additional test by displaying, “Please blow.”

Three-test sequence with 0.020 agreement

[text omitted]
Dry Gas Target: 0.077
Lot Number: AG317601 Tank Number: 4 Exp Date: 06/05/2015

System Check: Passed

Test	g/210L	Time	
BLK	0.000	11:00	
CHK	0.076	11:01	← blank check
BLK	0.000	11:02	
SUBJ	0.130	11:03	← 1 st subject sample test
BLK	0.000	11:06	
SUBJ	0.100	11:06	← 2 nd subject sample test
BLK	0.000	11:07	
SUBJ	0.102	11:08	← 3 rd subject sample test
BLK	0.000	11:09	
CHK	0.076	11:10	
BLK	0.000	11:11	

Test Status Sample Complete

RESULT: 0.100 g/210L ← subject's BrAC
[text omitted] (lower of the two results within 0.020 of each other is reported)

Three-test sequence with no 0.020 agreement

[text omitted]

Dry Gas Target: 0.077

Lot Number: AG317601 Tank Number: 4 Exp Date: 06/05/2015

System Check: Passed ← **internal diagnostics**

Test	g/210L	Time	
BLK	0.000	11:00	blank check
CHK	0.076	11:01	calibration check
BLK	0.000	11:02	blank check
SUBJ	0.130	11:03	1st subject sample test
BLK	0.000	11:06	blank check
SUBJ	0.105	11:06	2nd subject sample test
BLK	0.000	11:07	blank check
SUBJ	0.083	11:08	3rd subject sample test
BLK	0.000	11:09	blank check
CHK	0.076	11:10	calibration check
BLK	0.000	11:11	blank check

Test Status **No 0.020 Agreement**

RESULT: *.*** g/210L ← **no BrAC reported**
[text omitted]

You may not use this instrument report to determine subject BrAC.

Approved method for Intox EC/IR II Breath Analysis (260 IAC 2.5-4-1)

- If “Interfering Substance” or “Mouth Alcohol” is printed on the instrument report:
 - obtain a blood sample for a chemical test; or
 - repeat the 15-minute deprivation period and perform an additional breath test, beginning with STEP ONE.
- If “Interfering Substance” or “Mouth Alcohol” is printed on instrument report from an additional breath test:
 - obtain a blood sample for a chemical test; or
 - sign all instrument reports where indicated if a numerical value for the subject’s breath alcohol concentration is reported as “RESULT”

Test sequence with Interfering Substance on first subject sample

[text omitted]
Dry Gas Target: 0.077
Lot Number: AG317601 Tank Number: 4 Exp Date: 06/05/2015

System Check: Passed ← internal diagnostics

Test	g/210L	Time	
BLK	0.000	11:00	blank check
CHK	0.076	11:01	calibration check
BLK	0.000	11:02	blank check
SUBJ	*.***	11:03	1 st subject sample test
BLK	0.000	11:04	blank check
CHK	0.076	11:05	calibration check
BLK	0.000	11:06	blank check

Test Status *.*** Interfering Substance

RESULT: *.*** g/210L no BrAC reported
[text omitted]

If you get an “Interfering Substance” on the first test of a sequence, the sequence will end, and the result will be “Interfering Substance.”

You may not use this instrument report.

Test sequence with Interfering Substance on second subject sample

[text omitted]

Dry Gas Target: 0.077

Lot Number: AG317601 Tank Number: 4 Exp Date: 06/05/2015

System Check: Passed ← internal diagnostics

Test	g/210L	Time	
BLK	0.000	11:00	blank check
CHK	0.076	11:01	calibration check
BLK	0.000	11:02	blank check
SUBJ	0.120	11:03	1 st subject sample test
BLK	0.000	11:06	blank check
SUBJ	*.***	11:06	2 nd subject sample test
BLK	0.000	11:07	blank check
CHK	0.076	11:08	calibration check
BLK	0.000	11:09	blank check

Test Status *.*** Interfering Substance

RESULT: 0.120 g/210L ← subject's BrAC
[text omitted]

You may not use this instrument report unless you complete a second breath test as specified in the Approved Method, beginning with a 15-minute deprivation period.

Test sequence with Mouth Alcohol on first subject sample

[text omitted]

Dry Gas Target: 0.077

Lot Number: AG317601 Tank Number: 4 Exp Date: 06/05/2015

System Check: Passed ← internal diagnostics

Test	g/210L	Time	
BLK	0.000	11:00	blank check
CHK	0.076	11:01	calibration check
BLK	0.000	11:02	blank check
SUBJ	*.***	11:03	1 st subject sample test
BLK	0.000	11:04	blank check
CHK	0.076	11:05	calibration check
BLK	0.000	11:06	blank check

Test Status *.*** Mouth Alcohol

RESULT: *.*** g/210L ← no BrAC reported
[text omitted]

If you get a “Mouth Alcohol” on the first test of a sequence, the sequence will end, and the result will be “Mouth Alcohol.” You may not use this instrument report.

Test sequence with Mouth Alcohol on second subject sample

Intox EC/IR-II: Subject Test

ISDT 550 W. 16th Street Indianapolis, IN 46202

Serial Number: 011082 Test Number: 47
Test Date: 08/07/2013 Test Time: 10:50 EDT

Operator Name: Bunion, Paul R
Operator Certification Number: G99999
Agency Name: Skyville
Observation Began: 08/07/2013 at 10:40
Observer Name: Bunion, Paul R
Driver License Number: 123456789
Subject Name: Sober, Stone
Subject D.O.B.: 05/31/1961

Dry Gas Target: 0.077
Lot Number: AG317601 Tank Number: 4 Exp Date: 06/05/2015

System Check: Passed ← **internal diagnostics**

Test	g/210L	Time	
BLK	0.000	11:00	blank check
CHK	0.076	11:01	calibration check
BLK	0.000	11:02	blank check
SUBJ	0.120	11:03	1st subject sample test
BLK	0.000	11:06	blank check
SUBJ	*.***	11:06	2nd subject sample test
BLK	0.000	11:07	blank check
CHK	0.076	11:08	calibration check
BLK	0.000	11:09	blank check

Test Status *.*** Mouth Alcohol

RESULT: 0.120 g/210L ← **subject's BrAC**
11:03 EDT,
08/07/2013

ALCOHOL READINGS ARE EXPRESSED AS GRAMS OF
ALCOHOL PER 210 LITERS OF BREATH

Operator Signature

You may not use this instrument report unless you complete a second breath test as specified in the Approved Method, beginning with a 15-minute deprivation period.

Approved method for Intox EC/IR II Breath Analysis (260 IAC 2.5-4-1)

- If a status message not listed in the rule, excluding “Test Complete,” is printed on the report:
 - obtain a blood sample for a chemical test; or
 - perform an additional breath test, beginning with STEP ONE.

Another 15-minute deprivation period is not required.

- If a status message not listed in the rule, excluding “Test Complete,” is printed on the report from an additional breath test:
 - obtain a blood sample for a chemical test; or
 - sign all instrument reports where indicated if a numerical value for the subject’s breath alcohol concentration is reported as the “RESULT” on any instrument report.

The Intox EC/IR II indicates “Test Complete” with the status message “Test Status Sample Complete.”

If “Insufficient Sample” or “Time Out” is caused by subject’s lack of cooperation, operator should record that test was refused.

Test sequence with Insufficient Sample on first subject sample

[text omitted]
Dry Gas Target: 0.077
Lot Number: AG317601 Tank Number: 4 Exp Date: 06/05/2015

System Check: Passed ← **internal diagnostics**

Test	g/210L	Time	
BLK	0.000	11:00	blank check
CHK	0.076	11:01	calibration check
BLK	0.000	11:02	blank check
SUBJ	*.***	11:03	1st subject sample test
BLK	0.000	11:04	blank check
CHK	0.076	11:05	calibration check
BLK	0.000	11:06	blank check

Test Status *.*** Insufficient Sample

RESULT: *.*** g/210L ← **no BrAC reported**
[text omitted]

If you get an “Insufficient Sample” or “Time Out” on the first test of a sequence, the sequence will end, and the result will be “Insufficient Sample” or “Time Out.” You may not use this instrument report.

Test sequence with Insufficient Sample on second subject sample

Intox EC/IR-II: Subject Test

ISDT 550 W. 16th Street Indianapolis, IN 46202

Serial Number: 011082 Test Number: 47
Test Date: 08/07/2013 Test Time: 10:50 EDT

Operator Name: Bunion, Paul R
Operator Certification Number: G99999
Agency Name: Skyville
Observation Began: 08/07/2013 at 10:40
Observer Name: Bunion, Paul R
Driver License Number: 123456789
Subject Name: Sober, Stone
Subject D.O.B.: 05/31/1961

Dry Gas Target: 0.077
Lot Number: AG317601 Tank Number: 4 Exp Date: 06/05/2015

System Check: Passed ← internal diagnostics

Test	g/210L	Time	
BLK	0.000	11:00	blank check
CHK	0.076	11:01	calibration check
BLK	0.000	11:02	blank check
SUBJ	0.120	11:03	1 st subject sample test
BLK	0.000	11:06	blank check
SUBJ	*.***	11:06	2 nd subject sample test
BLK	0.000	11:07	blank check
CHK	0.076	11:08	calibration check
BLK	0.000	11:09	blank check

Test Status *.*** Insufficient Sample

RESULT: 0.120 g/210L ← subject's BrAC
11:04 EDT,
08/07/2013

ALCOHOL READINGS ARE EXPRESSED AS GRAMS OF
ALCOHOL PER 210 LITERS OF BREATH

Operator Signature

You may not use this instrument report unless you complete a second breath test as specified in the Approved Method. Another 15-minute deprivation period is not required.

Sample Over Range

- A “Sample Over Range” status message is displayed when the range of the IR detector is exceeded.
 - The IR detector is used to determine the quality of the delivered sample prior to analysis by the Fuel Cell detector (EC).
- If this occurs, obtain another chemical test
 - Either obtain a blood sample OR perform an additional breath test

Analytical Range of the Intox EC/IR II

- Intox EC/IR II reports between 0.006 and 0.440 g/210 L
 - The firmware of the instrument will cause alcohol results below 0.006 g/210 L to be displayed as 0.000 g/210 L and alcohol results greater than 0.440 g/210 L to be displayed as “Sample Over Range.”

Alternate Test

- This is a blood test. The sample must be taken by someone trained in phlebotomy, but a hospital is not needed.
- The drawing of the subject’s blood should be witnessed by an officer.

Print Last Test

- Press “P” (for “Print”)
- Type in Password “OPER”
- Press “Enter” key
- Press “Space” bar to print

Will print only the last test in the instrument memory.

Laboratory Exercises

You are required to submit the following instrument reports at the completion of these exercises:

Exercise 1: Personal breath test with duplicate copy

Exercise 2: Subject breath test

Exercise 3: Subject (instructor) breath test

Exercise 1: Complete a personal breath test by delivering two acceptable breath samples during a subject test sequence. Print and sign the instrument report. **Print a duplicate of this instrument report by use of the password protected “Print Last Test” command.**

Exercise 2: Complete a subject test sequence acting as the breath test operator and instructing another student in the delivery of two acceptable breath samples during a subject test sequence.** Print and sign the instrument report.

After completion of the above exercises, turn in your instrument reports to an ISDT instructor, and report to the classroom to take the written examination.

After your completed written examination is graded by an ISDT instructor, report to the laboratory to complete the final laboratory exercise below:

Exercise 3: Complete a subject test sequence acting as the breath test operator and instructing an ISDT instructor in the delivery of two acceptable breath samples during the subject test sequence.** Print, sign, and turn in the instrument report.

**** Emphasis should be placed on coaching the test subject on delivery of the samples in order to minimize the occurrence of “Insufficient sample” test results.**

260 IAC 2.5-4-1 Approved method for Intox EC/IR II breath analysis

Sec. 1. (a) The approved method that shall be followed in making an analysis of breath for alcohol using the Intox EC/IR II breath test instrument is as follows:

(1) The person to be tested must:

(A) have had nothing to eat or drink;

(B) not have put any foreign substance into his or her mouth or respiratory tract; and

(C) not smoke;

within **fifteen (15) minutes** before the time the first breath sample is taken or at any time from the taking of the first breath sample until after the taking of the final breath sample.

(2) Use the following STEPS:

STEP ONE: Verify that the instrument is in ready mode, as indicated by the instrument display.

STEP TWO: Press "Enter" key to start subject test.

STEP THREE: Insert identification card into the barcode reader, or press the "Enter" key and use the keyboard to enter the breath test operator information requested by the instrument display.

STEP FOUR: When requested by the instrument display, enter the beginning date and time of the fifteen (15) minute deprivation period described in subdivision (1).

STEP FIVE: When requested by the instrument display, select "Y" or "N" to indicate whether the breath test operator had control of the subject during the fifteen (15) minute deprivation period described in subdivision (1).

STEP SIX: If "N" is selected in STEP FIVE, when requested by the instrument display, enter the information of the officer with control of the subject during the fifteen (15) minute deprivation period described in subdivision (1).

STEP SEVEN: Enter incident information requested by the instrument display.

STEP EIGHT: Enter subject information by:

(A) inserting the subject's driver/operator license or identification card into the barcode reader; or

(B) pressing the "Enter" key and using the keyboard to enter the available subject information requested by the instrument display.

STEP NINE: When "Please blow" appears on the instrument display, place a mouthpiece on the breath tube. Instruct the subject to deliver a breath sample. Remove mouthpiece after delivery of a breath sample or when prompted by the instrument display. Repeat as prompted by the instrument display.

STEP TEN: Print the instrument report and remove it from the printer; verify that there is a numerical value for the subject's breath alcohol concentration reported as the "RESULT" on the instrument report and sign the instrument report where indicated.

(b) If any of the following status messages is printed on the instrument report, proceed as follows:

(1) If "Interfering Substance" or "Mouth Alcohol" is printed on the instrument report:

(A) obtain a blood sample for a chemical test; or

(B) repeat the fifteen (15) minute deprivation period described in subsection (a)(1) and perform an additional breath test, beginning with STEP ONE in subsection (a)(2). If "Interfering Substance" or "Mouth Alcohol" is printed on the instrument report after this additional breath test:

(i) obtain a blood sample for a chemical test; or

(ii) sign all instrument reports where indicated if a numerical value for the subject's breath alcohol concentration is reported as the "RESULT" on any instrument report.

(2) If a status message not listed in this rule, excluding "Test Complete", is printed on the instrument report:

(A) obtain a blood sample for a chemical test; or

(B) perform an additional breath test, beginning with STEP ONE in subsection (a)(2). If a status message not listed in this rule, with the exception of "Test Complete", is printed on the instrument report after this additional breath test:

(i) obtain a blood sample for a chemical test; or

(ii) sign all instrument reports where indicated if a numerical value for the subject's breath alcohol concentration is reported as the "RESULT" on any instrument report.

(c) If a subject **refuses a test, the breath test operator should record that the test was refused and sign all reports where indicated.**