Intox EC/IR II Training

Indiana Winter Conference
2013

Intox EC/IR II

Intoximeters, Inc.

- Same Company who manufactures the Alco Sensor Screening Test Devices

- Intoximeters, Inc.
- 8110 Lackland Rd.
- St. Louis, MO

Intox EC/IR II

- Intoximeters' top of the line Desktop Evidential Breath Test Instrument
- Fuel Cell Based – Offers Strengths of Fuel Cell Based Systems
- High Degree of Innate Specificity for Alcohol
- Innate Linearity of Response Throughout the Measuring Range

Intox EC/IR II

- Ambient Zeroing of the Primary Sensor (Fuel Cell)
- The EC/IR II also Offers the Advantages Provided by an Infrared Analyzer
- Mouth Alcohol Detection

Intox EC/IR II (cont.)

- End Respiration Determination
- Indication of Clean up of Sampling Chamber
- Ability to Monitor EtOH & CO_2 Simultaneously
- EC/IR II has Proven Low Need for Service

Intox EC/IR II

- Name Derived from 2 Major Analytical Components
  - EC= Electrochemical Cell (Fuel Cell)
  - IR = Infrared Energy Absorption
  - II = 2nd Generation

Intox EC/IR II

- Dual Technology
  - EC= For Alcohol Concentration
  - IR = Sample Quality

Introduction to Intox EC/IR II

- The Intox EC/IR II employs two (2) distinct analytical techniques to measure alcohol concentration. The EC/ IR II uses a fuel cell, (i.e. an electrochemical sensor), and a miniaturized non-dispersive infrared molecular absorption (IR) bench. The instrument employs both of these techniques because each offers different advantages to the sampling process.

Introduction to Intox EC/IR II

- The fuel cell sensor is specific to alcohol. It is linear, (relating to), sensing device and can be calibrated with simple one-point calibration ensuring stable calibration across the full range of its sensing capabilities. These features make this analytical device ideal for quantitating alcohol.

Introduction to Intox EC/IR II

- The Infrared (IR) sensor is able to make continuous determinations of alcohol concentration, thus allowing the EC/IR II to monitor a breath sample in (near) real time as it is delivered into the EC/IR II. This helps determine the correct moment in time to take a sample of the breath by the fuel cell for analysis and that the sample is not contaminated with mouth alcohol.

Introduction to Intox EC/IR II

- In combination these two analytical systems provide all the necessary information to make precise and accurate determinations of breath alcohol concentration as well as ensure that the instrument takes a high quality sample. This sample is one made up of alveolar, (deep lung), breath.

Electrochemical Fuel Cell

- Consumes one Electron (- charge) as it Migrates
- Upper Surface has Excess of Electrons
- Lower Surface has Deficiency in Electrons
- If the 2 Surfaces are Connected Electrically, a Current flows Through the External Circuit to Neutralize the Charge
- This Current is an Indicator of the Amount of Alcohol Consumed or Oxidized by the Fuel Cell

Electrochemical Fuel Cell

- Deep Lung Breath Sample is Captured
- Electrochemical Reaction in the Fuel Cell is Directly Related to the Alcohol Concentration in the Sample
- Non Alcohol Compounds, (Interferents), **DO NOT REACT WITH** Fuel Cell
- Fuel Cell is **SPECIFIC FOR ALCOHOL**

INTOXIMETER EC/IR II INFRARED ANALYSIS

- **The EC/IR II uses both IR and CO_2 to determine Breath Sample Quality**

Breath Sample Volume

- Captures Sample at end of Exhalation of Breath
- Flow Sensor Monitors Sample Flow Rate
- After Minimum Sample is Obtained, (1.5 L), a Reduction in Breath Flow Signifies Approaching End of Exhalation, (End Expiratory Air)
- Reduction in Flow Before Minimum Sample is Obtained will cause the EC/IR II to Reset and Request Another Sample

EC/IR II Mouth Alcohol Detection

- Provides “Real Time” Data on Alcohol Value in the Chamber
- Monitors BOTH Alcohol & Carbon Dioxide Sensors
- Mouth Alcohol Calculation Occurs in 2 Stages

EC/IR II RFI Detection

- RFI - Radio Frequency Interference
- EC/IR II Uses 2 Strategies to Address RFI
  - Immunity
  - Detection

EC/IR II RFI Detection (cont)

- Immunity - The EC/IR II is Designed, Tested, & Proven to be Immune to RFI
- EC/IR II Uses Signal From Detector to Establish if RFI is Adversely Affecting Instrument

Ethanol Dry Gas Canister
&
EC/IR II Accuracy

Ethanol Dry Gas Canister

- Piece of Allied Equipment
- Used to Verify Accuracy & Precision of EC/IR II
- Produces Alcohol-in-Inert Gas Sample at a Known Alcohol Concentration of 0.08 g/210L

Ethanol Dry Gas Canister (cont.)

- Installed by FTA Personnel in Locked Compartment in the EC/IR II
- MUST be Changed **BEFORE** Expiration Date on Canister

Pressure & Expiration of Ethanol Dry Gas Canister

- EC/IR II Monitors the Pressure & Expiration Date of Canister

Low Pressure Warning

- Instrument Scroll Notifies Analyst If Approximately 100 PSI Remaining (About 15 Tests Remain)

Low Pressure Disable

- Instrument Disables When Pressure Drops to About 50 PSI
- Scroll Will Indicate “Disabled”
- Instrument Remains Disabled Until Canister is Replaced

Gas Standard Pressure Gauge & Connection

Expiration Warning

- Expiration Date Programmed by FTA Personnel
- Instrument Scroll Notifies Analyst If Within 15 Days of Expiration Date
  - i.e. 12 days …11 days, etc.

Expiration Disable

- Instrument Disables When Canister Expires
- Scroll Will Indicate Disabled
- Remains Disabled Until Canister is Replaced

Intox EC/IR II Measurement Range

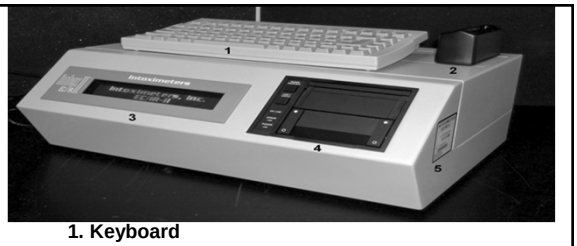
- The Intox EC/IR II is capable of Measuring Breath Alcohol in the Range from 0.00 g/210L to 0.50 g/210L of Breath

Intox EC/IR II Accuracy & Precision

- Meets or Exceeds all US DOT Specifications
- Analytical System is Specific for Alcohol; **DOES NOT REACT WITH OTHER SUBSTANCES**
- +/- .005 (Federal Requirement)

Intox EC/IR II

NOMENCLATURE



1. Keyboard
2. Barcode Scanner
3. Digital Display
4. Thermal Printer – Training Units Only
5. Serial Number Decal

6. Exhaust Fan	7. Mouthpiece	8. Breath Tube
9. Power Switch	10. Power Jack	11. Fuse
12. Modem Jack	13. Serial Port 2	14. Serial Port 1
15. External Printer Port	16. 12V Supply	17. Keyboard Conn.

States currently using Intox EC/IR II

- Wisconsin
- West Virginia
- Illinois
- Tennessee
- Guam
- Maryland State Police
- Wyoming
- Missouri
- Pennsylvania
- NY DOC
- Nuclear Reg. Auth.
- LAPD
- San Diego
- Sipan
- Botswanna
- United Kingdom

Special Thanks

- North Carolina Department of Health and Human Services
- Indiana State Department of Toxicology