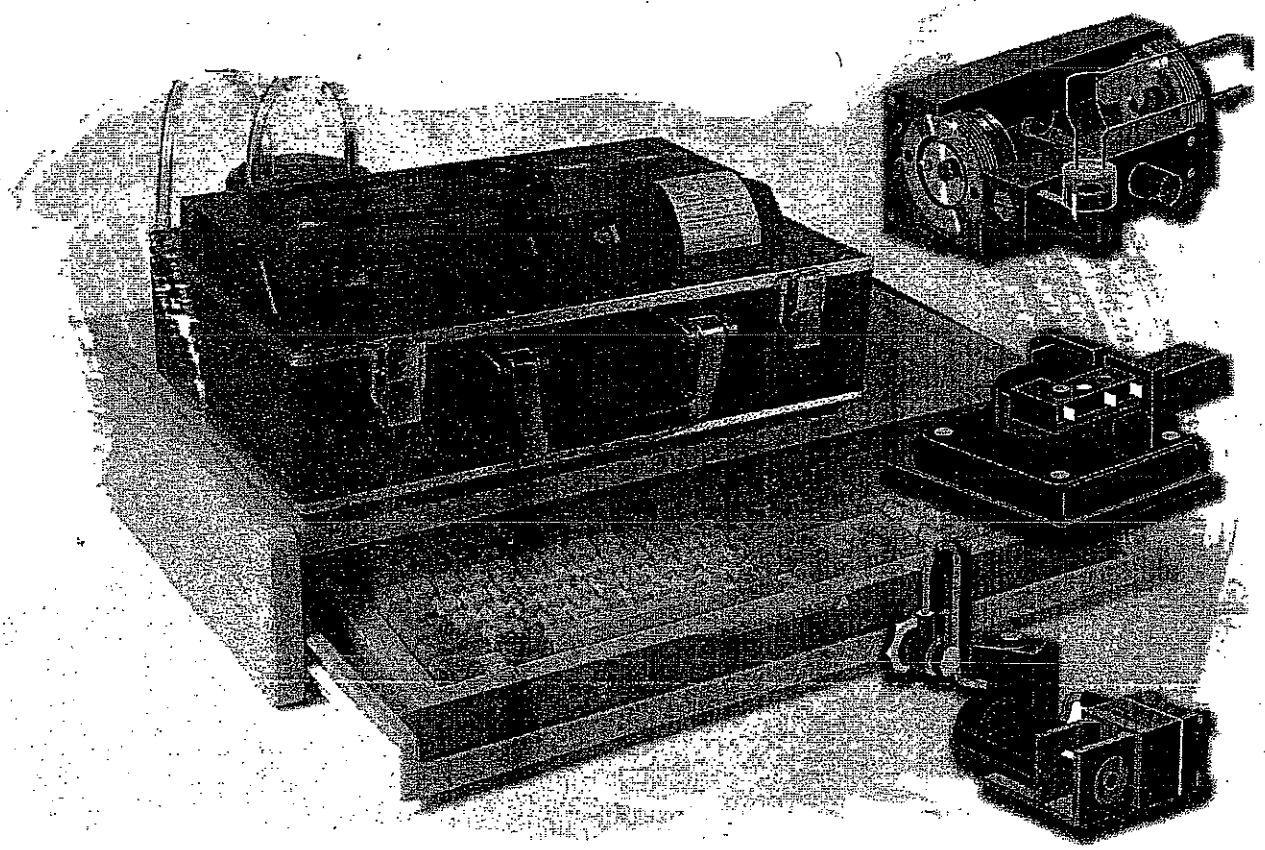
Technology for life Dräger

ALCOTEST® 7110 MK III



INSTRUCTOR TRAINING MANUAL

Alcotest® 7110 MKIII C Supervisor Training
New Jersey State Police
January 28, 29,30 & February 2, 3, 4

Day One

8:30am - 9:00am	Introduction	Instructors Don Pouliot and Gregg Miller Draeger Safety, Inc. Course outline
9:00am - 10:00am	Initial Preparation, Uses, General Data	
10:00am - 10:15am	Break	
10:15am - 11:30am	Introduction To Infrared Technology	
11:30am - 12:00am	Electrochemical Technology	
12:00am - 12:30am	Lunch	
12:30pm - 1:00pm	Benefits of Dual Sensing Technology	
1:00pm - 3:00pm	Systems and Components	
3:00pm - 3:15pm	Break	
3:15pm - 3:45pm	7110 MKIII set-up	
3:45pm - 4:00pm	Start-up phase	
4:00pm - 4:15pm	Data entry prior to testing	
4:15pm - 4:30pm	Re-cap of first day, questions and answers	

Day Two

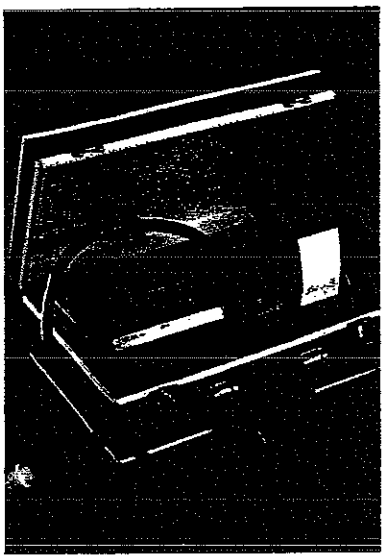
8:30am - 10:00am	Live testing
10:00am - 10:15am	Break
10:15am - 12:00pm	Live testing
12:00pm - 12:30pm	Lunch

12:30pm - 1:00pm	Uncooperative subject scenario
1:00pm - 2:00pm	Common errors, causes, remedies
2:00pm - 3:00pm	Special Functions
3:00pm - 3:30pm	Basic Servicing
3:30pm - 4:30pm	Simulator Temperature Probe set-up, and accuracy checks

Day Three

8:30am - 10:30am	Communication and Data Management Software Demonstration
10:30am - 10:45am	Break
10:45am - 12:00pm	Re-cap of course material
12:00pm - 12:30pm	Lunch
12:30pm - 1:15pm	Examination
1:15pm - 2:00pm	Break/Instructors Grade Examinations
2:00pm - 3:30pm	Discuss missed answers and questions and answers
3:30pm - 4:30pm	NJSP Policy and Procedures

ALCOTEST ®7110 MK III



Instructor
Training Manual

Draeger Safety, Inc.
Breathalyzer Division
Durango, Colorado

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Table of Contents

Addendum

Alcotest 7110
Data Retrieval and Archiving Program
Software Manual

Introduction

This guide is designed for supervisors as a reference and resource to be used for conducting Alcotest 7110 MK III Operator Proficiency Training. This guide provides the instructor with the goals and objectives of the Operator Proficiency Training and provides the materials to be used as references.

Training Goal

1. Certification of personnel for conducting operator proficiency training in the use of the Alcotest 7110 MK III.

2. Testing and field maintenance of the Alcotest 7110 MK III in order to ensure accuracy as specified by Draeger Safety, Inc.

Training Objectives

Upon completion of the Alcotest 7110 MK III Instructor Proficiency Course you will be able to:

- Explain the theory of the technologies employed in the 7110 MK III
- Explain the functional operation of the 7110 MK III
- Demonstrate the proper operation of the 7110 MK III
- Train and evaluate operators on the above information
- Conduct routine calibration checks as specified with wet bath simulators
- Conduct basic trouble shooting of the 7110 MK III
- Download test data from the 7110 MK III to a host or laptop computer

Contact persons at the Breathalyzer - Division:
(970) 385-5555

For 7110 MK III Service issues:	Joe Eckart, Service Manager
For Simulator issues:	Stephen Dukes, Technician
For engineering and legal issues:	Hansueli Ryser, Managing Director
For Sales issues:	Gregg Miller, Director of Sales
	Cheryl Davila, Sales
Regional Sales Manager	Don Pouliot, (973) 398-3228

1. General data

Application

The 7110 MK III is a breath alcohol analyzer used for evidential breath alcohol measurements in the law enforcement, workplace and other analytical environments.
It provides accurate, tamperproof BAC results which are displayed both on the instrument's LCD and the printout produced by the internal printer.

Design

The instrument is portable, fitted in a metal case, and has a flexible breath hose, a 40 character illuminated alphanumeric LC Display, an internal printer, and can operate in either AC or DC modes.

Peripheral connections

Keyboard (standard PC-AT), RS 232, RJ 11, printer port, and a security key to protect against unauthorized access to various operating functions.

Data storage

Option: Storage of more than 1000 tests

Two Independent Measuring Systems

Infrared: Detects alcohol in the 9.5µm region of the IR spectrum. Utilizes an optical chamber (cuvette) with 70 mL chamber volume, gold-coated mirrors, an electronically modulated infrared transmitter, and a pyro-infrared detector with integrated IR filter.

Electrochemical Sensor: Measures a small sample of breath from the same breath sample in the cuvette. Once ethanol reaches the sensor, a chemical reaction is triggered. The resulting current is used to determine the amount of alcohol in the sample.

Range of Measurement: 0.00% to 0.63% BAC

Resolution 0.0001% BAC

Temperature range: 32° to 104° F

Warm-up time
Typically 12 minutes at room temperature

Printer
Dot matrix impact printer with ribbon cassette and dual motor operation for printer head and paper advance. Standard paper 2 1/4" wide (58 mm) and approximately 22' long.

Clock
Month/Day/Year and Hour/Minute
Option: AM and PM or Standard and Daylight Savings Time.

Calibration interval
Recommended interval for verifying calibration and service: 12 months
Standard compliance: - NHTSA
- OIML draft III

Electrical characteristics
Operating voltages: 90-260 V, 50 - 80 Hz
10.5 V DC to 15 V DC car battery supply

Power consumption:	during warm-up time	approx. 70 Watts
	during test	approx. 30 Watts
	Standby mode	approx. 15 Watts

Dimensions
W x H x D : 15.8" x 5.1" x 10.4"

Weight Approximately 16.5 lbs

2. Initial Preparation

Choice of physical location

The 7110 should be placed on a level and solid surface free of obstructions.
Excessive vibration and drafts should be avoided.
Do not obstruct gas release port at the back of the instrument.

3. Stationary use

- Plug in the supplied power cord into the multi outlet surge protector.
- Switch on the 7110 using the main switch located at the back of the instrument.

4. Mobile use

- Connect the 12 VDC power cable to the 7110 and the vehicle's electrical system (cigarette lighter receptacle).

Remark 1: When the 7110 is connected to a vehicle's electrical system, the on/off switch of the 7110 is deactivated. The 7110 can be turned off by simply unplugging the power cord from either the electrical supply or from the 7110.

Remark 2: The vehicle's battery and charging system must be in good condition and capable of continuously delivering a minimum of 10.5 volts to the 7110. Make sure the contacts of the of the car's power supply to the unit, e.g. cigarette lighter receptacle, are clean and free of obstructions, to ensure proper operational voltage.

5. Introduction to Infrared Technology

The use of infrared technology for detection of Alcohol in the breath by Law Enforcement has been around since the late sixties. In the early 1970's, scientists from the United States and Germany combined work to develop standardization on breath testing devices utilizing infrared theory.

Definitions:

Molecule - The smallest physical unit of a compound that can exist separately and still keep the properties of the original substance.

Wavelength - The distance between two successive points in a wave.

Amplitude - The strength or height of a wave.

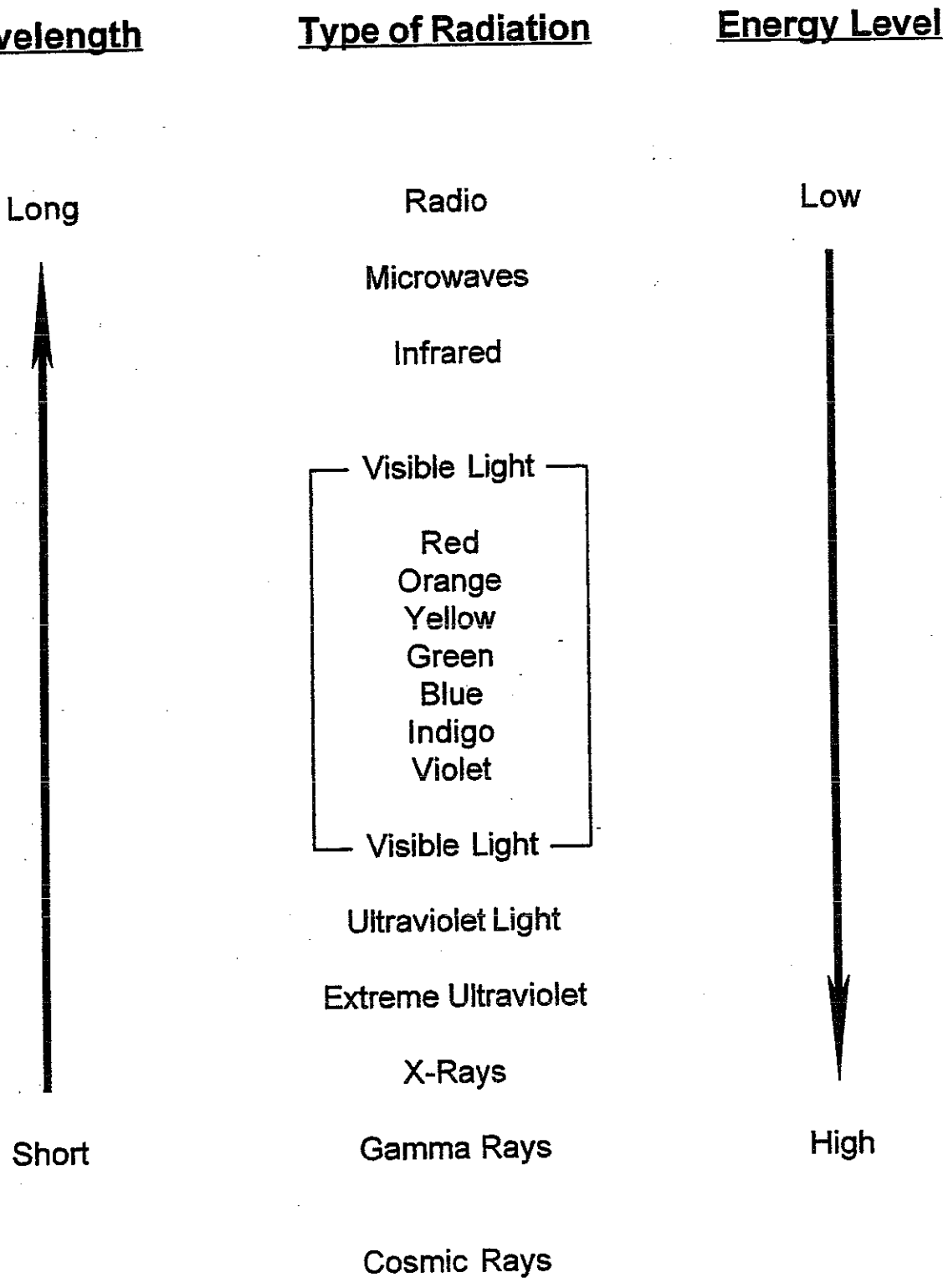
Frequency - The number of periodic oscillations, cycles or waves per unit of time (cycles per second).

Electromagnetic Radiation - A form of energy transmission through a vacuum (empty space) or a medium (glass) in which electric and magnetic fields are extended or transmitted as waves.

Electromagnetic Spectrum - The complete range of frequencies of electromagnetic radiation from the lowest to the highest frequency.

Infrared Energy - The part of the invisible spectrum, contiguous to the red end of the visible spectrum of electromagnetic radiation which travels through space in waves. Behavior of such waves is similar to that of visible light waves.

Micron - The unit of a linear measurement of electromagnetic radiation. One micron is equal to one millionth of a meter. The symbol "µm" denotes a micrometer (e.g. 9.50µm).


Wavelength
Type of Radiation
Energy Level
Long
Radio
Low
Microwaves
Infrared
Visible Light
Red
Orange
Yellow
Green
Blue
Indigo
Violet
Visible Light
Ultraviolet Light
Extreme Ultraviolet
X-Rays
Short
Gamma Rays
High
Cosmic Rays

6. IR Theory

Depending on their physical size and structure, molecules absorb energy at specific areas in the IR spectrum. Ethanol molecules absorb IR energy in two distinct areas in the IR spectrum.

If infrared energy from a source is passed through a concentration of ethanol molecules, the molecules will absorb energy at specific wavelengths. By selectively filtering the energy from the source, we may select a narrow region of the infrared spectrum over which to measure the amount of absorption. Ethanol molecules will strongly absorb infrared energy at approximately the 3.30µm to 3.60µm wavelength, and at approximately the 9.00µm to 10.00µm wavelength. Thus, we can select, by means of an optical filter, a narrow slice of energy in the near infrared region desired and send this energy through a sample chamber where ethanol molecules, if present, will absorb that energy. A breath sample containing ethanol is introduced into the sample chamber where IR energy is present. A specific amount of IR energy will be absorbed by the ethanol molecules. An IR detector will detect the drop in IR energy due to the absorption by the ethanol molecules, and will convert this change into a reading.

Law of Absorption - Beer-Lambert Law

The BEER-LAMBERT LAW states: For a defined path length (the sample chamber), containing an absorbing system (concentration of ethanol molecules), the transmitted energy (IR energy) will proportionally decrease with the increase in concentration of the absorbing system.

The Beer-Lambert Law Applied

In an IR chamber one end has an IR source and at the other end an IR detector (similar to photoelectric cells of a Breathalyzer). The IR detector converts IR energy to electrical energy. Prior to a subject test, the IR chamber contains only ambient air. The IR detector produces a voltage output from the IR source striking it.

A breath sample saturated with ethanol is introduced into the chamber, the ethanol will absorb some of the IR energy causing less IR energy to reach the IR detector resulting in a voltage decrease.

An increase in the BAC will result in a proportional decrease in the detector's voltage.

7. Measuring Technologies

Infrared Spectrum

Fig. 1 below shows a spectrum of human breath containing 200 ppm ethanol. Besides ethanol, there is the sharp absorption line of carbon dioxide at 4.2 µm and a broad absorption band of water ranging from 5 to 8 µm. Ethanol exhibits two strong absorption lines: one at 3.4 µm which corresponds to the stretching of the C-H bond, and the other centered at 9.5 µm caused by the vibration of the O-H bond.

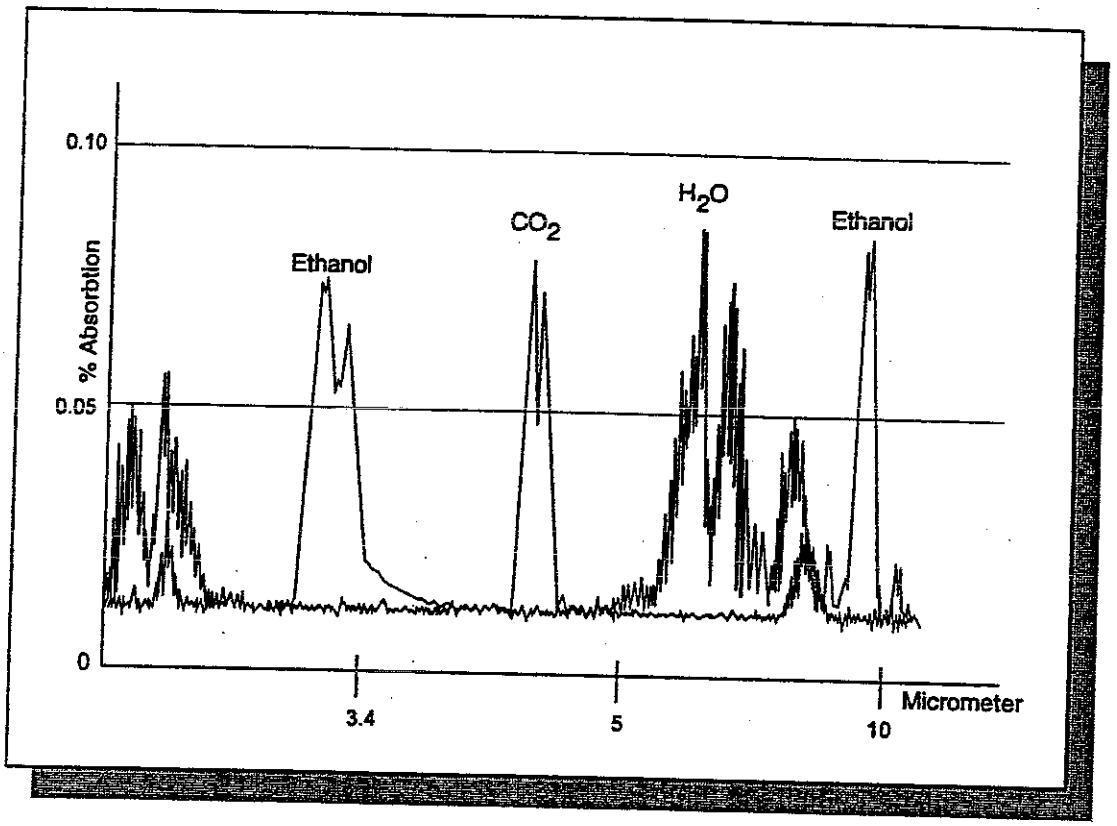


Fig. 1
IR - spectrum of a human breath sample containing 200 ppm ethanol
(approximately 0.08% BAC)

Fig. 2 below shows the absorption of ethanol. The shaded area represents the infrared filter of the 7110 MK III. It shows the central frequency as 9.5µm with a half band width of 0.50µm which significantly increases the signal to noise ratio (Resolution).
The 7110 MK III measures ethanol at 9.5µm because, in this area of the IR spectrum, the cross sensitivity to potentially interfering compounds found in the human breath are virtually non existent.

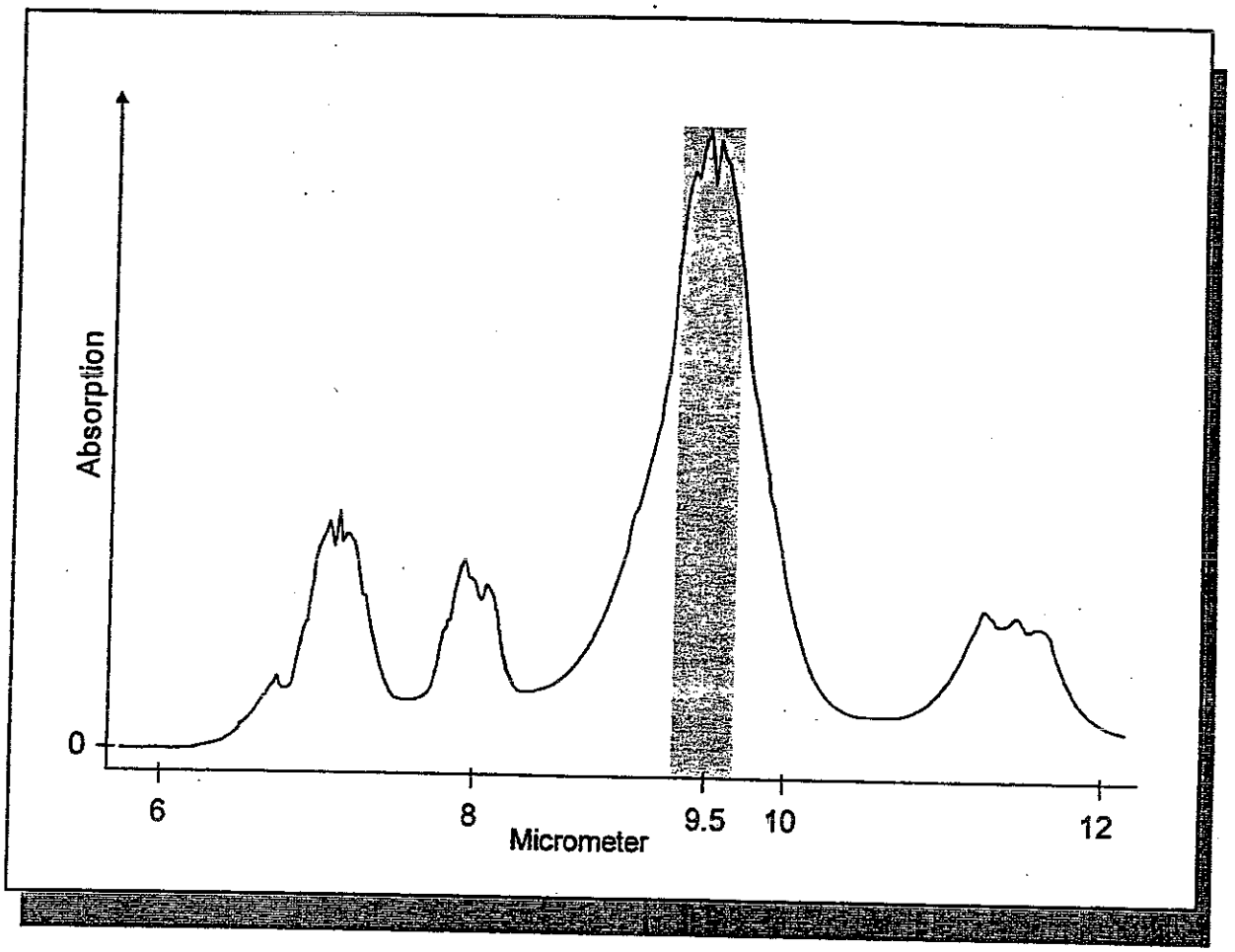


Fig. 2

8. Electrochemical Cell

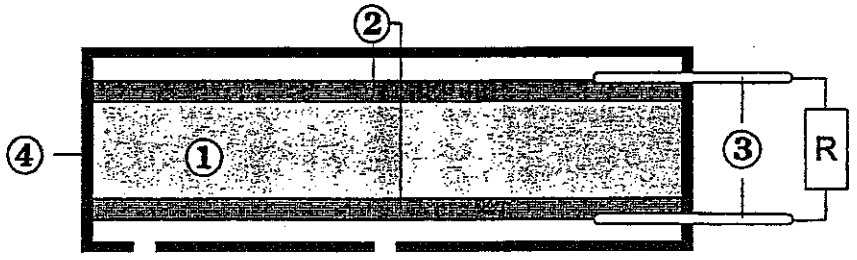
The device known as an electrochemical fuel cell was originated in 1839 by Sir William Grove. He discovered that if two platinum electrodes were immersed in a sulfuric acid electrolyte, and hydrogen was supplied at one electrode and oxygen at the other, an electric current was produced as long as gas was supplied to the device. The chemical reaction was the same as if the hydrogen were burned, but in this case, electricity was produced directly instead of heat. The fuel cell was long envisioned as a desirable electrical generator, since no moving parts were involved, the platinum (or other catalytic material) was not consumed, and no significant heat was developed in the process. High cost and many technological problems have prevented the fuel cell from fulfilling its promise as a low cost generator of electricity and its use has to date been confined to relatively exotic applications such as spacecraft and satellite power sources.

A highly important by-product of this effort has emerged in recent years; using the fuel cell as a sensor to detect the presence of chemical components that are capable of being oxidized by this process. In the early 1960s, a group at the University of Innsbruck, Austria, demonstrated a practical construction for an ethanol detector.

Electrochemical Theory

In its simplest form, the fuel cell consists of a porous, acidic membrane (electrolyte), which is laminated by two platinum black plates. An electric wire is attached to each of the platinum plates. This assembly is packed into a sealed plastic housing which has one small hole (gas inlet) leading into a sample chamber, where a breath sample is introduced.

① CATALYTIC IMBEDDED MEMBRANE
② PLATINUM PLATES
③ ELECTRODE CONNECTIONS
④ PLASTIC HOUSING



CROSS SECTION

(See page 14 for whole EC Sampling System - Diagram)

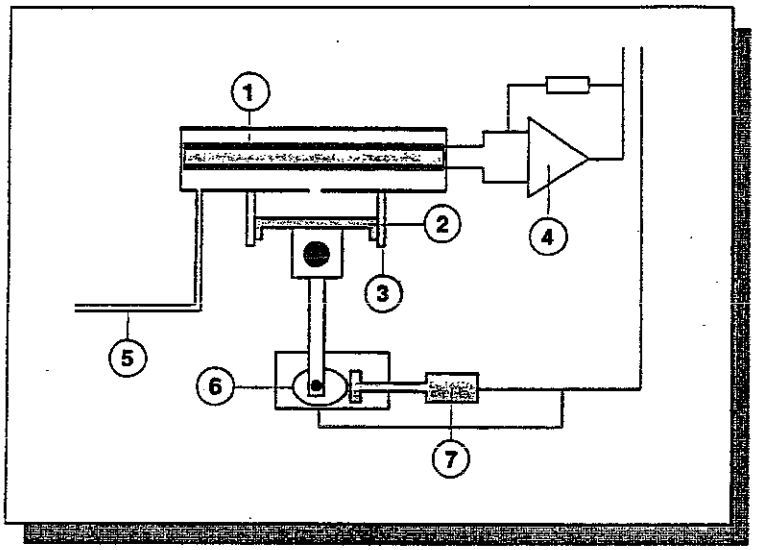
Only one platinum plate will be exposed to the breath sample. Once ethanol reaches the platinum, a chemical reaction is triggered. This chemical reaction produces an electrical current between the two platinum plates, the voltage of which is measured. This becomes the useable indicator of the amount of ethanol consumed by the fuel cell, and is directly proportional to the ethanol concentration of the breath sample. After processing, a quantitative result is determined.

A rise in BAC will result in a proportionate increase in voltage.

In the reaction that takes place in a fuel cell, it is known that ethanol is converted to acetic acid. (ethanol + oxygen = acetic acid + water).

Other alcohols will react in the cell, but because the chemistry is different, the rate of reaction is also different. (e.g. Isopropanol and Methanol)

Fuel Cell Analytical System of the Alcotest 7110 MK III



EC Sampling System

1 Fuel Cell
2 Piston
3 Cylinder
4 Current Voltage converter
5 Breath inlet pathway
6 Motor
7 Position switch

The fuel cell contained within the instrument is located directly on top of the cuvette. The fuel cell assembly consists of:

• Fuel Cell	An alcohol specific sensor.
• Piston	Draws a 1cc sample out of the cuvette and into the fuel cell.
• Cylinder	The housing for the piston.
• Current Voltage Converter	Sends the voltage change to the microprocessor.
• Breath Inlet Pathway	Allows breath sample to pass from IR sample chamber within the cuvette.
• Motor	Drives the piston.
• Position Switch	Indicates that the motor has completed its cycle.

9. Benefits of Dual Sensing Technology

By combining two distinct analytical systems to analyze a subject's breath, the 7110 MK III is able to provide two precise, accurate, and independent test results. Due to the fact that these systems are based on different technologies, it is therefore not unusual to observe slightly different results.

Infrared spectroscopy requires that a zero reference be established prior to a subject's breath test. Because the fuel cell of the 7110 MK III is "piggy backed" on the IR cuvette, we can draw a sample out of the chamber, and analyze it, to ensure that a zero set is based on one that is free of all absorbing compounds.

The dual system also allows for a greater degree of sensitivity to any possible existence of interfering substances. Because the fuel cell is alcohol specific, and the IR sensor operates at 9.5µm in the IR spectrum, the possibility of an interfering substance influencing a subject's ethanol reading is virtually imposible.

To quote A.W. Jones in his article, "Measuring Alcohol in Blood and Breath for Forensic Purposes- A Historical Review."
"The use of a higher wavelength (9.5µm) offered the advantage that the results were much less prone to interference from acetone and hydrocarbons which absorb IR radiation at 3.4µm and under some circumstances might be expelled in the breath. In the latest generation of evidential breath alcohol instruments, IR and electrochemical detectors are contained within the same unit (Alcotest 7110 MK III). As mentioned earlier, analyzing alcohol by two independent methods is a highly desirable feature for medicolegal purposes."

10. Detection of Interfering Substances

As previously mentioned, the 7110 MK III's infrared sensor operates in the 9.5µm range of the infrared spectrum. Acetone, toluene, and acetaldehyde, the most common substances brought up by the defense, can have a slight influence in breath analyzers operating at the 3.4µm range of the infrared spectrum. By shifting the operating range to 9.5µm, the 7110 MK III is free from the influence of these compounds as they relate to a living, breathing subject taking a breath test.

Furthermore...

The 7110 MK III also employs an alcohol specific electrochemical(fuel cell) sensor which is not influenced by acetone, toluene, or acetaldehyde. This fuel cell was tested by NHTSA and found to be within its specifications for use in a evidential breath tester.

Furthermore...

During either calibration or a calibration check, the fuel cell sensor memorizes its response to ethanol in the form of a curvature analysis profile. From this analysis, the presence of methanol or isopropanol can be detected by comparing the time constant of the curve of ethanol compared to methanol or isopropanol. (see Fig. 3)
If the analysis of the subject's breath reveals different curvature characteristics, "Interference" will be displayed and the test invalidated.

Furthermore...

During a test, the subject's breath is analyzed by both the infrared and fuel cell sensors. There is a preset tolerance that both readings must fall within for a test to be valid. The results must be within .008% up to a .08% BAC and 10% thereafter. If the two results are within the preset tolerance, the results are displayed and printed. If, however, the two results exceed the preset tolerance, an interference message is displayed and the test invalidated.

Detection of Interfering Substances

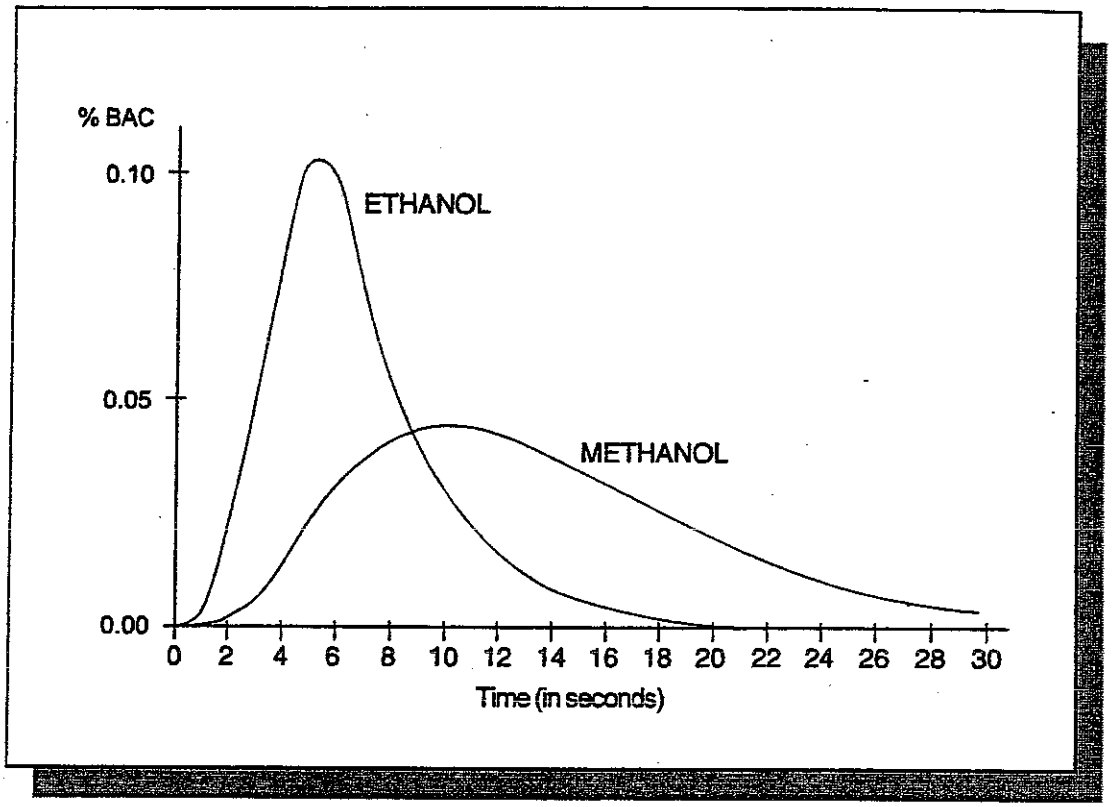
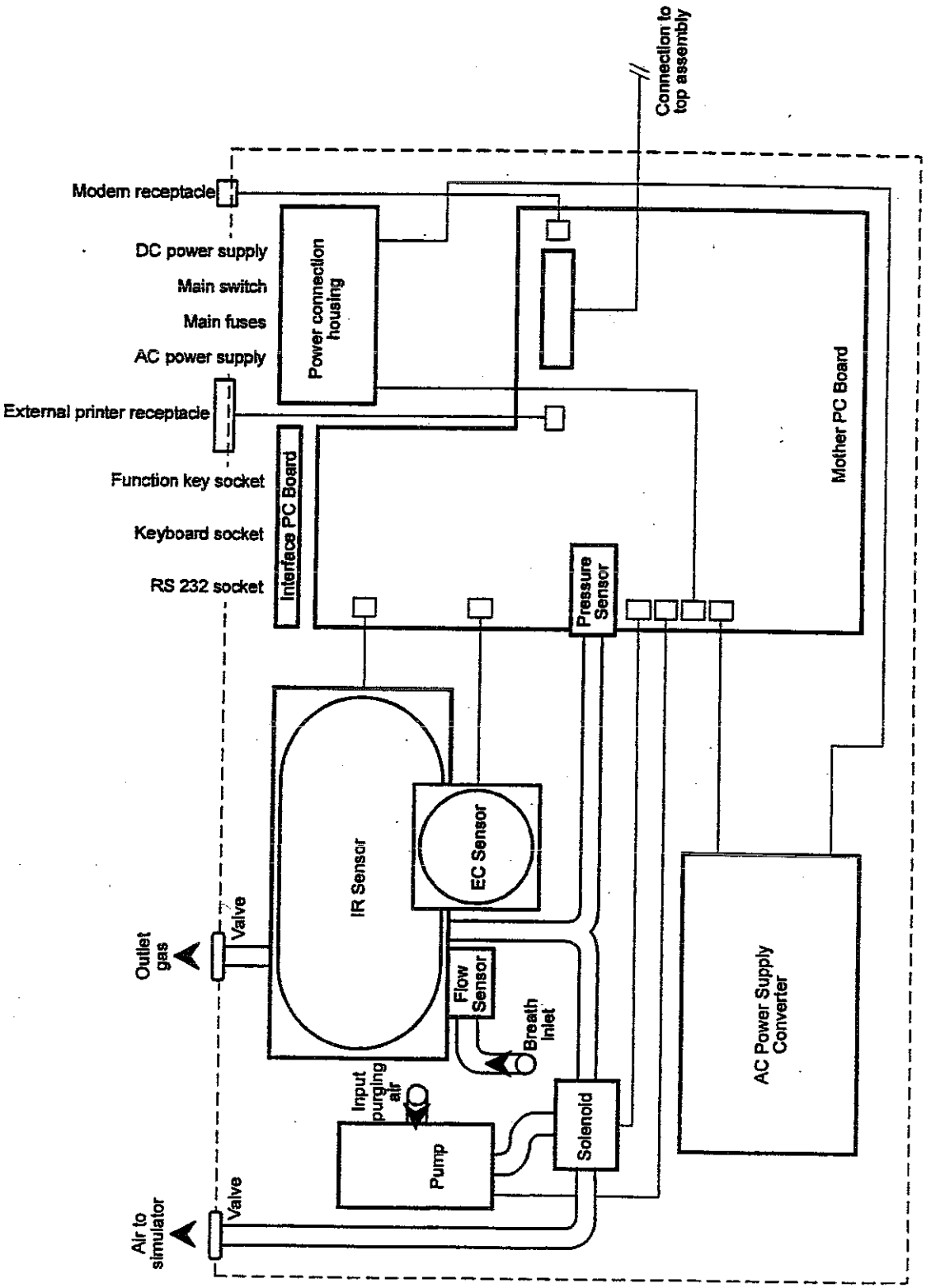


Fig. 3
Response of the electrochemical sensor
to ethanol in comparison to methanol.

11. System Block Diagram



12. Systems and Components

Optics

The central part of the measuring system is the infrared absorption cuvette, where the breath sample is analyzed. The breath sample is transferred into the system via the breath hose. The cuvette is heated to 41°C (± 2°C) to avoid condensation and to guarantee defined conditions for the analysis. The cuvette is a multi-reflection cell which provides a long absorption path for high precision yet, at the same time, has a volume of only 70mL. This small volume makes it possible to trace the concentration-time profile very carefully because fast changes are noticed. At both ends of the cell, gold coated parabolic mirrors contain the infrared source and the detector with the IR-filter. Energy from the infrared source passes through a central orifice in the mirror onto the detector.
The infrared source is a small platinum heating element. Due to its low thermal mass, it can be modulated by supplying it with short current pulses, thus totally avoiding a mechanical chopper. Furthermore, power consumption is only 1.5 Watts. The detector is a pyro detector with very high sensitivity. Its housing also contains the alcohol specific filter. The output signal is fed into a very low noise amplifier, which brings the voltage to a considerable level for further analysis.

Sampling System

The sampling system for the EC sensor is a small piston pump assembly which pulls a fixed sample (1cc) of gas from the IR cuvette into the EC sensor.

Flow Sensor

At the inlet of the cuvette there is a sensor which measures the breath flow during a subject's test. The resistance of this heated thin filament changes when it is cooled down by the incoming air. Due to its very low thermal capacity, response time is very fast and interruptions in the flow of the breath sample can be easily detected.

Pressure Sensor

The pressure sensor constantly monitors ambient air pressure which is necessary if dry gas standards are used to check calibration. It also monitors the internal pump output.

Breath Hose

The breath sample is transferred through the breath hose into the cuvette. The breath hose is heated to 42°C to avoid condensation and the temperature is controlled to ± 2°C. It has excellent insulation to keep power consumption minimal at low temperatures. The breath hose is 46 inches long and flexible.

Micro Processor

All incoming signals from the sensors are passed to the microprocessor via a multiplexer and 12 bit A/D converters for further analysis. The microprocessor continuously checks all supply voltages and important components to ensure proper operation. It also has an RS 232 interface to communicate with a computer allowing all stored data to be uploaded with optional communication software.

Signal Processing

The IR detector converts the pulses from the IR source to a small sinusoidal electrical signal. This signal is first amplified by a low noise amplifier and then sent through a band-pass-filter stage for noise reduction. At the A/D converter, this signal is sampled 128 times per second with 12 bit resolution and then it is transferred to the micro processor.

Simulator Temperature Probe

The Mark IIA simulator allows a supervisor to check the accuracy of the 7110 MK III. The Mark IIA simulator employs a NIST traceable mercury column that controls the temperature of the solution to NHTSA specifications. The Simulator Temperature Probe is a thermistor based sensor that is inserted into the simulator in place of the standard thermometer and connected to the 7110 MK III via a coiled cord. The probe provides real-time monitoring of the simulator temperature through the microprocessor of the 7110 MK III. Calibration Checks can only be performed if the simulator is within NHTSA's specified range of 34° C +/- .2° C.

NOTE: For accurate reading of the Simulator Temperature Probe, the probe value in the 7110 MK III must always be set according to the probe value specified on the Temperature Probe Certificate.

13. Standard Breath Test Sequence

Purging
The internal pump flushes the cuvette and breath hose with ambient air to ensure that an alcohol and absorbing compound free environment exists.

Ambient Air Check
After the purging cycle, an air sample from the cuvette is drawn into the EC sensor for analysis. This procedure ensures that the air in the cuvette is free of any absorbing substance.

Air Blank Check
After the purging cycle the intensity of the infrared energy is analyzed and stored as a reference.

Breath Test
At this stage, the subject's breath is introduced into the cuvette. After the breath flow has stopped, there is a short pause so that the pressure in the cuvette reaches equilibrium with ambient air pressure. Once equilibrium is achieved, the intensity of the infrared energy is analyzed. The reduction of intensity is approximately 4% relative for a concentration of 40 µg/100mL. Immediately after the IR analysis, the EC sensor pulls a 1cc sample out of the cuvette for analysis.

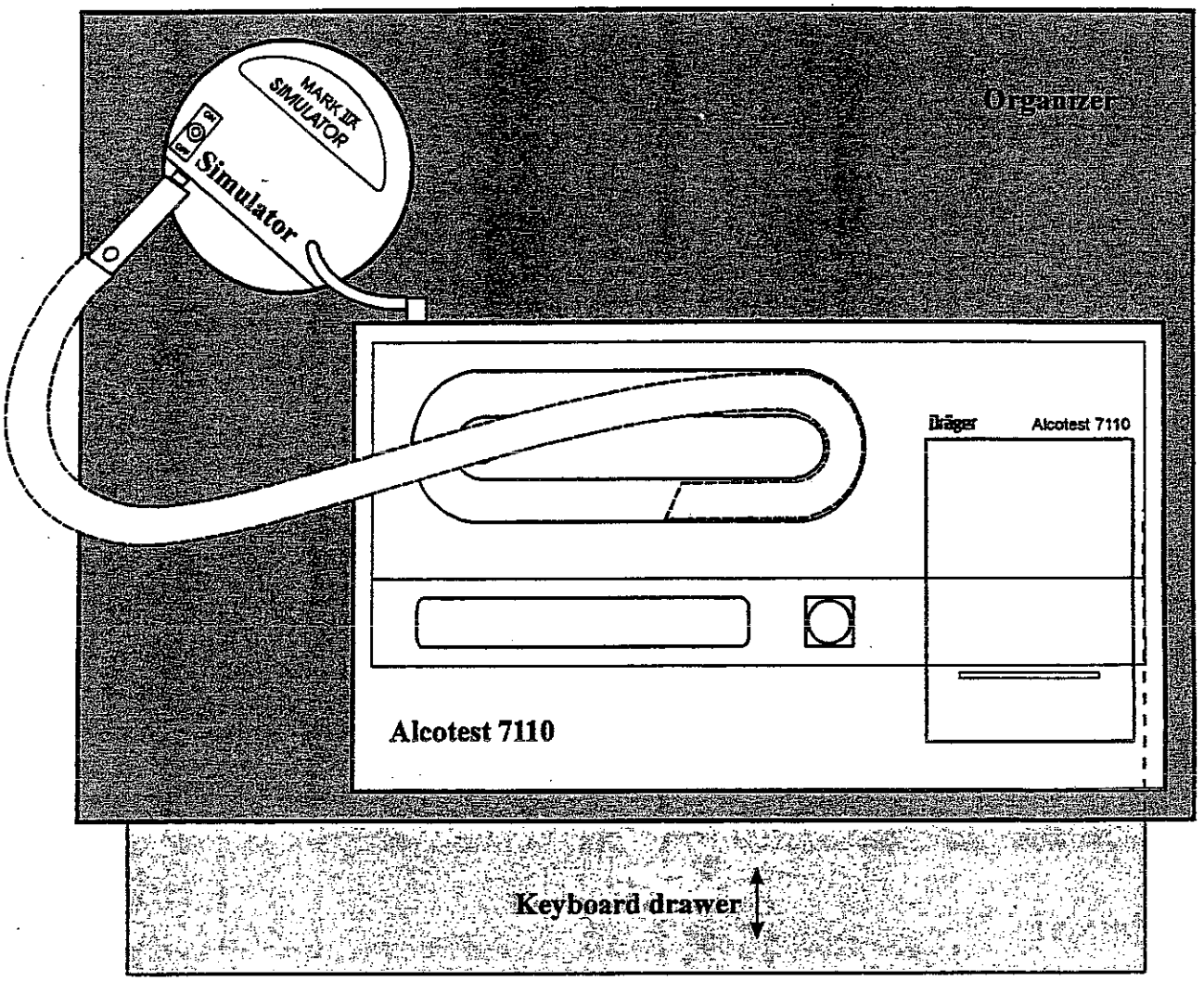
Mouth Alcohol Detection
Mouth alcohol is characterized by a sharp increase of the alcohol concentration at the beginning of the subject's sample followed by a decrease until the end of the sample. While a breath sample is delivered, the breath's alcohol concentration is continuously monitored. If mouth alcohol is detected, a reference message is displayed and the test is aborted. Mouth alcohol will be flagged when a negative slope is detected - when the concentration drops more then 50 µg/L from a peak of less than 1000 µg/L - and if the concentration drops more than 5% from a peak of > 1000 µg/L.

Profile Analysis
Various criteria have to be met in order for the 7110 MK III to accept a breath sample and to ensure that the breath sample analyzed represents a deep lung air sample. The following conditions have to be satisfied before the profile analysis is activated:

- Minimum flow rate: 2.5 L/min.
- Minimum blow duration: 4.5 sec.
- Minimum breath volume: 1.5 L

A valid breath test is characterized by a nearly constant alcohol concentration in time (plateau) at the end of the subject's sample. The plateau is reached if the concentration does not increase by more than 1% per 1/4 second above a concentration of 200 µg/L (0.04%) and 0.001% BAC at concentrations below 200 µg/L.

14. Organizer Assembly



15. Starting Measurement - Warm-up phase

After switching on the 7110, a self-test is performed and the unit will display every sequence on the LCD:

MEMORY TEST • DISPLAY TEST • HORN TEST • A/D CONVERTERS TEST
HEATERS TEST • SOLENOID TEST • PUMP TEST • PRESSURE SENSOR TEST
IR SENSOR TEST • EC SENSOR TEST • PRINTER TEST

AUTOTEST OK

Then the following is displayed:

WARMING UP

NOT READY

LOCATION: ----------

07/12/95 11.35 PM

After the date / time display, the 7110 automatically purges the cuvette and breath hose with ambient air. After the purging cycle the following information will be alternately displayed until the 7110 reaches the "Ready" mode.

WARMING UP

NOT READY

To avoid condensation, the passage ways exposed to the subject's breath are heated to the specified temperature.

When the 7110 is ready for a measurement, the following is displayed:

READY

(audible signal: 2 x BEEP)

16. Data entry before a Breath Test

Entries are made via keyboard as prompted by the instrument's display.
The keyboard supplied with the Alcotest 7110 MK III works just as any personal computer keyboard. The keyboard cable is attached to the rear of the instrument at the keyboard receptacle. There are two keys that have special functions when operating the instrument. The enter key controls data entry. The ESC key allows entry to specified functions of the instrument.

Enter key - This key has two functions.
After answering questions displayed on the Alcotest 7110 MK III, press Enter to display response, then press Enter again to send the correct answer or data to the instrument.

General Note: The test procedure can be manually aborted at any given time by pressing the start button for two (2) seconds. The unit will return to the "READY" mode.

Start of measurement

- Press button.

The request to enter the customer specified data appears on the display, for example:

Enter requested data by keyboard, finish entry with **>ENTER<.**

Note: After each data entry, the 7110 will go into a verification mode.
The display will show the latest data entry. If there are any errors, retype the data and press **>ENTER<.**

If the entry is satisfactory, verify by pressing the **>ENTER<** key and the unit will advance to the next sequence.

After entering the last data field, the measuring system will be purged.

The following is displayed:

PURGING - AMBIENT AIR CHECK - AIR BLANK CHECK - CALCULATING - PURGING - AIR BLANK CHECK

17. NEW JERSEY SPECIFIC DATA ENTRY

- CASE NO: (24 Digits)
- ARREST DATE: MMDDYYYY
- ARREST TIME: HHMM
- ARREST LOCATION: (4 Digits)
- ARREST OFFICER LAST NAME: (24 Digits)
- BADGE NO.: (10 Digits)

- SUBJ LAST NAME: (24 Digits)
- SUBJ FIRST NAME: (24 Digits)
- SUBJ MIDDLE INIT.: (2 Digits)
- SUBJ D. O. B. : MMDDYYYY
- SUBJ GENDER : <M> <F> :

- OPER LAST NAME: (24 Digits)
- OPER BADGE NO.: (10 Digits)

After entering the last data field, the measuring system will be purged.
The following is displayed:

PURGING - AMBIENT AIR CHECK - AIR BLANK CHECK
PLEASE BLOW >

The 7110 MK III is now ready to accept the first subject's breath sample, follow the instructions displayed on the LCD.

18. Subject's Breath Test

The following will be displayed when the 7110 MK III is ready to accept a subject's breath sample:

NOTE:	***Subject should be advised to remove any candy, gum, chewing tobacco, etc. from their mouths before providing a breath sample.***

Remove breath hose from the storage recess. Insert new mouthpiece. Request that the person being tested inhale calmly and then blow continuously and evenly into the mouthpiece for as long as possible.

Asterisks on the display indicate that an adequate breath sample is being delivered:

The subject should continue to blow **without any physical strain.**
Any interruption of blowing or failure to satisfy the minimum requirements such as minimum volume and minimum flow rate will result in "Insufficient Breath Sample" displayed and the test aborted.

The required volume is satisfied if the subject has delivered a sufficient amount of deep lung air. At this point a substantial portion of the display is filled with asterisks. Although the delivery of the breath sample can be stopped when the asterisks reach the end of the display, encourage the subject to blow as long as possible.

If the required volume was not reached, a new breath sample must be provided; the test will automatically be repeated.

If the subject's breath sample met all the specified requirements, the following is displayed:

STOP

and

REMOVE MOUTHPIECE

Remove mouthpiece and replace sampling hose in storage recess.

Depending on how the 7110 is configured, for example to do a second breath test, the instrument automatically repeats the first sequence:

PURGING	- followed by
AIR BLANK CHECK	- followed by
PLEASE BLOW	- followed by
REMOVE MOUTHPIECE	- followed by
PURGING	- followed by
AIR BLANK CHECK	- followed by
PRINTING	

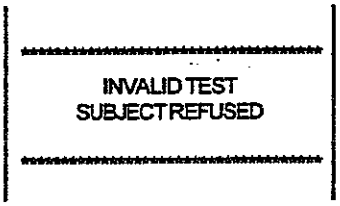
19. Refusal to deliver a Breath Sample

After the 7110 MK III is ready to accept a subject's breath sample and the LCD shows "PLEASE BLOW >", the subject will have three (3) minutes to deliver a breath sample.

If the subject refuses to take the test, the operator is able to press the "R" key on the keyboard anytime during the three (3) minute period and the display will show:

REFUSAL ? < Y OR N >

If the operator selects the "N" key, the 7110 MK III will go back to the "PLEASE BLOW >" mode. If the subject refuses and the operator presses the "Y" key, the test will be terminated and a special remark will be indicated on the printout:



A subject who is uncooperative or incapable of providing a breath sample will have three chances to provide an acceptable breath sample.

After 3 failed attempts, the display will indicate:

REFUSAL ? < Y OR N >

20. Printout of final result

While the final result is displayed on the LCD,
a test record is printed.
An additional copy may be printed upon demand.

The following message is displayed for
approximately 10 seconds:

COPY ? PRESS BUTTON PLEASE

If a copy is required: • Press button.

Remark: While the test record is being printed,
a Quick Reset is not possible.

Example of printout:

```
**********************************
STATE OF NEW JERSEY
NJSP
DRAEGER SAFETY, INC.
ALCOTEST 7110 MK III
SERIAL NO.:      ARLM-0271
DATE :           01/20/1998
START TIME :     22:44 S
END TIME :       22:56 S
**********************************
CASE NO. :       C110981230
ARREST DATE :    01/20/1998
ARREST TIME :    16:06
ARREST LOCATION : 0343
ARREST OFFICER LAST NAME
SMITH
BADGE NO. :      1921
**********************************
SUBJ LAST NAME:
BLOW
SUBJ FIRST NAME :
JOE
SUBJ MIDDLE INITIAL :  M
SUBJ D.O.B. :    07/15/1956
SUBJ AGE:        41
SUBJ GENDER:     MALE
**********************************
OPERATOR LAST NAME :
SMITH
BADGE NO. :      1921
**********************************
DIAGNOSTIC OK
BLANK    0.00    22:54 S
SUBJ-IR  0.12    22:54 S
SUBJ-EC  0.12    22:54 S
BLANK    0.00    22:55 S
SUBJ-IR  0.12    22:55 S
SUBJ-EC  0.12    22:55 S
BLANK    0.00    22:56 S
UNITS:——%BAC——TIME
DIAGNOSTIC OK
**********************************
TST1 BREATH VOL :  2.7 l
TST2 BLOW TIME :   8.2 s
TST1 BREATH VOL :  2.5 l
TST2 BLOW TIME :   7.8 s
**********************************
        RESULT:

      0.12 % BAC
**********************************
SIGNATURE OPER:

_____
**********************************
```

21. Common Errors-Cause-Remedies

Three Minute Time-Out

When the display "PLEASE BLOW >" appears, the subject has three minutes to provide a breath sample. If a sample is not received within the three minute time-out, the instrument will display "READINESS TO BLOW EXPIRED." The instrument will then display "BREATH TEST WILL BE REPEATED", "PURGING", "AIR BLANK CHECK." The instrument will then reset to display "PLEASE BLOW >." If the situation continues, the display will indicate:

READINESS TO BLOW EXPIRED

then

REFUSAL? <Y or N>

Type "Y" if the subject refuses to provide a breath sample. The display will indicate "SUBJECT REFUSED" and print it out.

Type "N" if the subject decides to provide a sample. The instrument will display "BREATH TEST WILL BE REPEATED", "PURGING", then "AIR BLANK CHECK." Then the instrument will automatically reset to display "PLEASE BLOW>"

Refusal Key

If it has been determined that a subject refuses to submit to a valid test while the instrument is in the "PLEASE BLOW >" sequence, the operator may opt to use the refusal key. Press "R" and the instrument will display:

REFUSAL? <Y or N>

Improper or Insufficient Samples

If "MINIMUM VOLUME NOT ACHIEVED", then "AIR BLANK. " The instrument will then reset to display "PLEASE BLOW >", and the subject is to be advised that if instructions are not followed for a proper breath sample, it will be considered a refusal. If this situation continues, the instrument will display:

REFUSAL? <Y or N>

Common Errors - Cause - Remedies (continued)

Interference

An "INTERFERENCE" message is given and printed if the difference between the IR and the EC sensors exceed a preset tolerance. The instrument has detected an interfering substance in the breath of the subject.

Out of Measuring Range

The breath test result is higher than the acceptable measuring range of the instrument. (0.00% - 0.63%). The instrument will display, and printout, "OUT OF MEASURING RANGE."

Mouth Alcohol Detected

Residual mouth alcohol detected. The subject may have belched within the observation period. The instrument will display and print out "MOUTH ALCOHOL DETECTED."

Alcohol Concentration Too High

The subject may have belched while delivering a sample into the instrument. The instrument will operate as it does when mouth alcohol is detected.

Ambient Air Check Failed or Air Blank Check Failed

Absorbing substance in the ambient air detected.

22. Hardware-System-Errors

The Alcotest 7110 MK III is equipped with various error analysis features in the event of a systematic problem. In such a case, the display and the printer will indicate the error condition, for example, ERROR [081] INTERFACE-SYS>.

Error code	Error name:	Potential reason for error:
002	MAIN-SYSTEM, EEPROM memory	Defective memory cell
003	MAIN-SYSTEM, RAM memory	Defective memory cell
004	MAIN-SYSTEM, External RAM memory	Defective memory cell
008	MAIN-SYSTEM, Batteries for memory	Discharged batteries
009	MAIN-SYSTEM, Power supply	12 VDC insufficient. Turn instrument off and on again.
023	IR-SYSTEM, Source oscillator	Frequency too low
031	EC-SYSTEM, EC-signal	Incorrect voltage, or early warning that the fuel cell may need to be replaced
032	EC-SYSTEM, Sampling system	Motor, pump, relay
035	EC-SYSTEM, EC-peak signal	Signal peak not found
041	FLOW-SYSTEM, Flow sensor	Short or interrupted circuit
043	FLOW-SYSTEM, Purge	Insufficient flow for air blank. Check to see that back of unit is not obstructed.
051	PRESSURE-SYSTEM, Pressure sensor	Short or interrupted circuit
071	HEATER-SYSTEM, NTC for cuvette	Short or interrupted circuit
072	HEATER-SYSTEM, NTC for breath hose	Short or interrupted circuit
075	HEATER-SYSTEM, Temperature(s)	Cuvette-, breath hose-heater malfunctioning
081	INTERFACE-SYSTEM, Printer	No printer commands
084	INTERFACE-SYSTEM, Function-key	Unacceptable voltage
101	CALIBRATION, IR-system	Unacceptable adjustment
112	CALIBRATION, Calibration data	Lost data in EEPROM
113	CALIBRATION, Configuration	System parameters incorrect

23. Designated New Jersey Functions

FUNCTIONS	1st level sub-functions / *(explanation)* 2nd level sub-functions / *(explanation)* 3rd level sub-functions / *(explanation)*	Accessibility: Oper.	Key	PC
DATE	*(Displays the date and time).*		X	X
TIME	*(Displays the date and time).*		X	X
SET-CLOCK	PLEASE INSERT: MMDDYYYY HHMM *(Enter date, military time).*		X	X
PRINTOUT	<1># OF PRINTOUTS *(Press number 1 key and enter number of printouts. Applicable to internal printer only.)* <2> TEXT - INP *(Press number 2 key and toggle "PROTOCOL-ITEMS" on and off by pressing the space bar. Feature allows performing a breath test without having to enter all the protocol items.)* <3> INT/EXT *(Toggle between internal and external printer by pressing the space bar).*		X	X
LOCATION	*(Enter, show, or edit name of location).*		X	X
STND-CONFIG	<1> # TESTS *(Enter number of tests between 1 and 20).* <2> INLET / GAS TYPE <1> HOSE <2> CUV.INLET <3> GAS PORT *(n/a)* <1> WET <2> WET+CO2 <3> DRY <4> DRY+CO2 *(Choose the type of calibration media by pressing the appropriate number key).* <3> CONC / TOL STND - GAS *(Enter alcohol concentration).* ENTER STND-CHECK TOLERANCE		X	X

Designated New Jersey Functions (continue)

FUNCTIONS	1st level sub-functions / *(explanation)* 2nd level sub-functions / *(explanation)* 3rd level sub-functions / *(explanation)*	Accessibility Oper.	Key	PC
STND-CHECK	*(Runs standard checks according to factory settings).* ***Note: Only available in "READY-MODE"***		X	X
CALIBRATE	STND - GAS *(Enter standard gas concentration).* ***Note: Only available in "READY-MODE"***		X	
PROBE	<1> SHOW *(shows simulator solution temperature)* <2> ADJUST *(Enter probe-value as recorded on the Probe Calibration Certification.)* *NOTE: PROBE ONLY READS ACCURATELY WITH SPECIFIC PROBE VALUE ENTERED.* <3> AUTO - ADJUST *(function not possible)*		X	X
LOCKOUT	LOCK - OUT TIMER (0...60 MIN) *(Enter minutes of lockout after mouth alcohol detection.)*		X	X
VERSION	*(displays the current EPROM version)*		X	X
COPY	<1> COURT <2> D.A. <3> TROOP <4> STATION <5> ALL *(Reprintout protocol on the external printer by pressing the appropriate number key).*	X	X	

Designated New Jersey Functions (continue)

FUNCTIONS	1st level sub-functions / *(explanation)* 2nd level sub-functions / *(explanation)* 3rd level sub-functions / *(explanation)*	Accessibility Oper.	Key	PC
MODEM	<1> HOST NUMBER *(Enter host modem number).* <2> DIAL *(not possible from host PC)* *(7110 MK III calls host for data upload)* <3> INIT MODEM *(not possible from host PC)* *(tests and initializes modem)*		X	X
MEMORY	<1> CLEAR MEM *(clears all stored data in 7110 MK III memory)* <2> SHOW MEMORY *(displays % of used 7110 MK III memory)* <3> ——— *(function not possible)*			X
LOCAL-PRINT	*(Type message to 7110 MK III internal printer).*			X
CALL	*(7110 MK III sends stored data to host PC)*		X	
COPY	<1> COURT <2> D.A. <3> TROOP <4> STATION <5> ALL *(Reprintout protocol on the external printer by pressing the appropriate number key).*	X	X	X

24. Servicing

Inspection of the instrument is recommended every 12 months and should only be performed by Draeger Safety, Inc. Breathalyzer Division or Draeger Safety certified technicians.

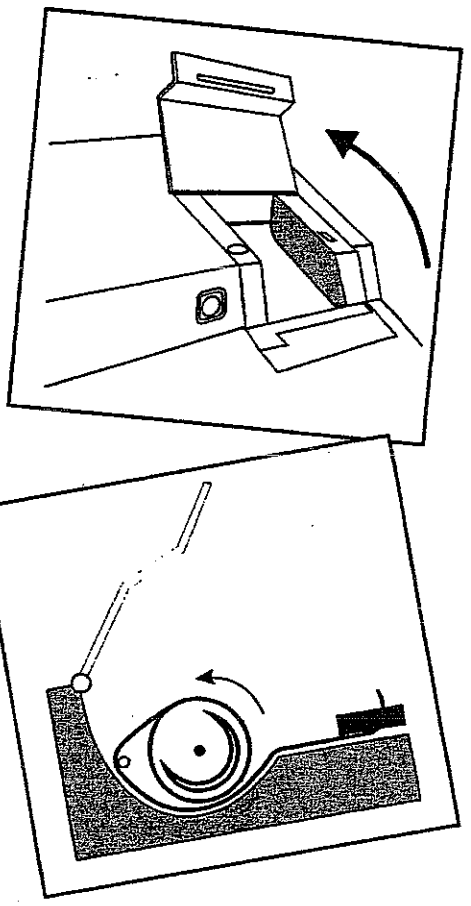
Inserting printer paper

Do not operate the 7110 without a sufficient supply of paper!

Remark: A colored stripe on the edge of the paper roll indicates that the paper is nearly at its end.

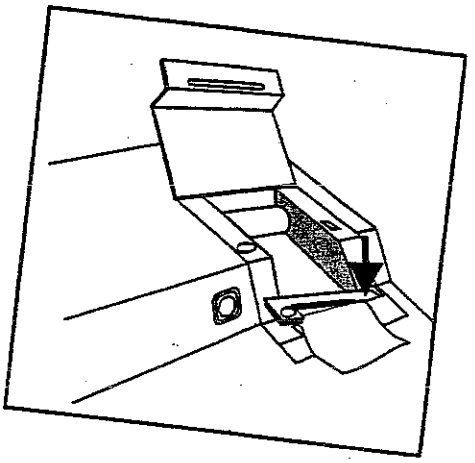
Procedure:

- Open lid of printer.
- Remove remaining paper roll.
- Place new paper roll into compartment.
- Route paper behind the metal bar.
- Insert paper into the slot of the printing mechanism.
- Depress the orange button to feed an appropriate amount of paper through the printer head.
- Route paper through the slot in lid.
- Close lid.



Changing printer ribbon

Procedure:



- Open printer lid.
- Remove old cassette by pressing on right side of ribbon cassette marked "Push."
- Tighten the ribbon of new cassette by turning the knurled thumb wheel in direction of arrow.
- Insert and press new cassette into place.
- Close lid.

Cleaning

- Disconnect power supply to the 7110 MK III.
- Wipe instrument and breath hose with a damp cloth.
- Dry thoroughly.

Remark: Do not use solvents or cleaning agents containing alcohol.
Do not allow liquids to enter the 7110 MK III housing or the breath hose.

Replacing main fuses

- Use screwdriver with appropriate blade.
- Unscrew both fuse covers.
- Replace defective fuses with new ones. Only use the specified miniature fuses!
- Replace both main fuse covers.

25. Wet Bath Simulator Methodology

Henry, an English chemist, studied the behavior of solutions in which a volatile substance (one which readily evaporates to form a gas) was dissolved and in 1803 he described the behavior as a law now known as Henry's Law. Although Henry did not study alcohol solutions in his work, his law applies to aqueous (water) solutions of alcohol containing less than 20 per cent alcohol.

When a volume of alcohol is added to water it dissolves to form a solution. There is a tendency for some of this alcohol to escape from the solution in the form of gaseous alcohol, and this can be detected by the odor of alcohol above the solution.

If an alcohol solution is poured in a bottle so as to partially fill it and the bottle is sealed, the concentration of alcohol vapor in the air (and water vapor) above the solution increases rapidly until it reaches a certain concentration and it then remains at this concentration. At this stage there will be a definite ratio between the concentration of alcohol in the solution and that in the air. The concentration of the alcohol vapor above the solution depends on two factors:

(a) the temperature of the system, and
(b) the concentration of alcohol in the solution.

If the air in the bottle were replaced with air containing a higher alcohol concentration, alcohol would pass from the vapor to the solution until the same ratio between the two concentrations (vapor and solution) again existed, provided the temperature had not been altered. If the temperature of the solution is allowed to rise, the concentration of alcohol in the vapor will be greater than it was previously.

From these observations a simplified version of Henry's Law may be stated:

"When an aqueous solution of a volatile compound comes to equilibrium with air, there is a fixed ratio between the concentration of the compound in air and its concentration in the solution and this ratio is constant for a given temperature."

Distribution ratios are NOT related to a person's weight and/or physique.

Wet Bath Simulator Methodology (continue)

The formation of a fixed ratio (at a given temperature) of the concentration of a volatile substance in solution and in the air above the solution is called partitioning. The ratio of concentrations at equilibrium is called the distribution ratio which is more specifically the weight of alcohol in a given volume of air to the weight of alcohol in the same volume of solution (when the air and the solution are at equilibrium).

Henry's Law also applies to the human body. The partitioning of alcohol between blood (in the lungs) and breath occurs in the same fashion as described for alcohol in aqueous solutions.

An application of Henry's Law to describe the partitioning of alcohol between blood and breath in the human body is shown in the following table.

HENRY'S LAW	HUMAN BODY
When an *aqueous solution*	blood
of a *volatile compound*	alcohol
comes to *equilibrium with air*	in lungs
there is a *fixed ratio* between the concentration of the compound in air and its concentration in solution	Ratio: 2100 : 1 (assumption) Concentration of alcohol in blood varies.
and this ratio is constant for a *given temperature*	Body temperature is constant.
% Alcohol Reading	**Blood alcohol reading is dependent on how much alcohol is present in a person's blood.**

27. Accuracy or Calibration Testing with the Wet Bath Simulator

Using wet bath simulators for accuracy testing has been the accepted method for many years. Breath alcohol simulators are specially designed water-alcohol instruments which provide equilibration of alcohol between water and air at a controlled temperature. The water-alcohol solution is maintained at a temperature of 34°C (approximate temperature of exhaled breath).

The alcohol concentration of the vapor produced by a wet bath simulator is proportional to the alcohol concentration of the alcohol-water solution at a constant temperature (34°C) in accordance with Henry's Law.

It will be assumed that the 7110 MK III is in the "Ready" mode and the wet bath simulator is in proper working order with fresh certified solution, up to operating temperature, and a leak test has been performed.

1. Attach the clear (internal pump to simulator) hose with the male adapter to the white fitting at the back of the instrument. Make sure an audible "click" is heard which indicates a proper connection has be achieved. Attach the other end to the top port (air in) of the simulator.

***Warning: If the pump to simulator hose is placed on the horizontal port (air out to analyzer) the IR cuvette could be flooded with simulator solution which will require service to correct.**

2. Connect the temperature probe key to the 7110 MK III, securing it by tightening the threaded "O" ring.

3. At the keyboard of the 7110 MK III press the "Esc" key to access the "Function" prompt. Type STND-CHECK then press "ENTER" to initiate the standard check sequence.

4. The printer will be activated briefly, followed by the "PURGING" sequence, followed by "CONNECT HOSE TO SIMULAT", "PRESS BUTTON." Connect the Breath Hose to the horizontal (air out to analyzer) port of the simulator and press the Orange start button. The internal pump of the 7110 MK III will then pump air through the simulator into the breath hose.

5. After the pump cycle ends "DISCONNECT HOSE FROM SIMULATOR" will be displayed.

6. If multiple standard checks are done with the same solution, step "4" will be repeated as many times as programmed.

28. SOME COMMON PRODUCTS CONTAINING ETHANOL

Brand Name	*Manufacturer*	*Ethanol %*
Actidil	Burroughs-Wellcome	4.0
Actifed with Codeine	Burroughs-Wellcome	4.3
Alamine C Liquid	Vortech	5.0
Alamine Expectorant	Vortech	7.5
Alamine Liquid	Vortech	5.0
Alurate Elixir	Roche	20.0
Ambenyl Cough Syrup	Forest	5.0
Artane Elixir	Lederle	5.0
Asbron Elixir	Sandoz	15.0
Asbron G Elixir	Dorsey	15.0
Atarax Syrup	Roerig	0.5
Bactrim Oral Suspension	Roche	0.3
Barbidonna Elixir	Wallace	15.0
Benadryl Elixir	Parke-Davis	5.3
Benylin Cough Syrup	Parke-Davis	5.0
Betadine Gargle	Purdue-Frederick	8.0
Betalin S. Elixir	Lilly	10.0
Black Draught Syrup	Chattem	5.0
Brondecon Elixir	Parke-Davis	20.0
Bronkolixir	Winthrop	19.0
Butibel Elixir	Mc Neil	7.0
Butisol Sodium Elixir	Wallace	7.0
Calcidrine Syrup	Abbott	6.0
Ce-Vi-Sol Drops	Mead Johnson	5.0
Celestone Syrup	Schering	1.0
Cepacol	Marion Merrell Dow	14.0
Cerose DM Expectorant	Ives	2.5
Cheracol Syrup	Upjohn	4.75
Cheracol-D Cough Syrup	Upjohn	4.75
Cherry Chloraseptic	Richardson Vicks	12.5
Chlor-Trimeton Syrup	Schering-Plough	7.0
Chloraseptic	Richardson Vicks	12.5
Choledyl Elixir	Parke-Davis	20.0
Codimal DM Syrup	Central	4.0
Cold Sore Lotion	Pfeiffer	85.0
Cologel Liquid	Lilly	5.0
Colrex Expectorant	Reid-Rowell	4.7
Dalidyne Lotion	Dalin	61.0
Day Care Liquid	Richardson-Vicks	10.0
Demazin Syrup	Schering-Plough	7.5
Dentocaine (Adult)	Dentocaine	70.0
Dexedrine Elixir	SKF	10.0
Dilantin-125/Oral Susp.	Parke-Davis	0.6
Dilantin-30 Pediatric	Parke Davis	0.6
Dilaudid Cough Syrup	Knoll	5.0
Dilor Elixir	Savage	18.0
Dimetane DC	Robins	0.95
Dimetane Elixir	Robins	3.0
Dimetapp Elixir	Robins	2.3
Diuril Oral Suspension	MSD	0.5
Dolanex Elixir	Lannett	23.0
Donnagel Suspension	Robins	3.8
Donnagel-PG Suspension	Robins	5.0
Donnatal Elixir	Robins	23.0
Doxinate 5% Solution	Hoechst-Roussel	5.0
Dr. Caldwell's Senna Lax.	Gebauer	4.5
Dr. Hands Teething Lotion	Roberts	10.0
Dramamine Liquid	Searle	5.0
Eldertonic	Mayrand	13.5
Elixophyllin Elixir	Forest	20.0
Elixophyllin-KI Elixir	Forest	10.0
Entex Liquid	Norwich Eaton	5.0
Feosol Elixir	SmithKline Beecham	5.0
Fer-In-Sol Drops	Mead Johnson	0.02
Fer-In Sol Syrup	Mead Johnson	5.0
Fergon Elixir	Winthrop	7.0
Fletcher's Castoria	Mentholatum	3.5
Formula 44-D Cough Mix.	Vicks	10.0
Fumaral Elixir	Vortech	5.0
Gantrisin Pediatric Drops	Roche	0.3
Gantrisin Syrup	Roche	0.9
Geriplex-FS Liquid	Parke-Davis	18.0
Geritol Liquid	SmithKline Beecham	12.0
Gevrabon Liquid	Lederle	18.0
GG-Cen Syrup	Central	10.0
Grifulvin V Oral Susp.	Ortho	0.2
Hexadrol Elixir	Organon	5.0
Histadyl EC Syrup	Lilly	5.0
Homicebrin Liquid	Lilly	5.0
Hycotuss Expectorant	Du-Pont	10.0
Hytinic Elixir	Hyrex	10.0
Iberet Liquid	Abbott	1.0
Iberet-500 Liquid	Abbott	1.0
ILX B12 Elixir	Kenwood	8.0
ILX Elixir	Kenwood	8.0
Incremin w/Iron Syrup	Lederle	0.75
Infantol Pink Liquid	Scherer	2.0
Isoclor Expectorant	Fisons	5.0
Jiffy Toothache Drops	Block	76.0
Kaochlor 10% Liquid	Warren-Teed	5.0
Kaochlor S-F Liquid	Warren-Teed	5.0
Kaon Elixir	Warren-Teed	5.0
Kaon 20% Elixir	Warren-Teed	5.0

Brand Name	Manufacturer	Ethanol %
Listerine	Warner-Lambert	26.9
Lomotil Liquid	Searle	15.0
Lufyllin Elixir	Wallace	20.0
Lufyllin EPG Elixir	Wallace	5.5
Lufyllin GG Elixir	Wallace	17.0
Mallergan VC Expectorant	Mallard	7.0
Malotuss Syrup	Hauck	3.5
Marax DF Syrup	Roerig	5.0
Maxibolin Elixir	Organon	10.0
Mellaril Concentrate	Sandoz	4.2
Mellaril Concentrate	Sandoz	3.0
Mestinon Bromide Syrup	ICN	5.0
Mouthwash & Gargle	McKesson	14.0
Navane Concentrate	Roerig	7.0
Nembutal Elixir	Abbott	18.0
Nembutal Sodium Solution	Abbott	10.0
Nicotinex Elixir	Fleming	14.0
Niferex Elixir	Central	10.0
Noratussin Syrup	Vortech	3.5
Norisodrine w/Calcium	Abbott	6.0
Novahistine DH Liquid	Marion Merrell Dow	5.0
Novahistine DMX Liquid	Marion Merrell Dow	10.0
Novahistine Elixir	Marion Merrell Dow	5.0
Novahistine Expectorant	Marion Merrell Dow	7.5
Nu-Iron Elixir	Mayrand	0.5
Numzit	Purepac	12.0
Nyquill	Richardson-Vicks	25.0
Odara	Lorvic	48.0
Organidin Elixir	Wallace	21.75
Orthoxicol Cough Syrup	Roberts	8.0
Paradione	Abbott	65.0
Parepectolin Suspension	Rorer	0.7
Pediacof Cough Syrup	Winthrop	5.0
Pedicran w/Iron Liquid	First Texas	1.0
Peri-Colace Syrup	Mead Johnson	10.0
Permitil Concentrate	Schering	1.0
Phenergan Syrup	Wyeth	7.0
Phenergan Syrup Fortis	Wyeth	7.0
Phenergan Syrup Plain	Wyeth-Ayerst	7.0
Phenergan VC Plain	Wyeth-Ayerst	7.0
Phenergan VC w/Codeine	Wyeth-Ayerst	7.0
Phenergan w/Codeine	Wyeth-Ayerst	7.0
Pinex Concentrate	Pinex	16.0
Pinex Regular Syrup	Pinex	3.0
Polaramine Expectorant	Schering	6.0
Poly-Histine Expectorant	Bock	4.0
Prolixin Elixir	Princeton	14.0
Prunicodeine Liquid	Lilly	25.0
Quelidrine Syrup	Abbott	2.0
Secran Liquid	Scherer	7.0
Secran/Fe Elixir	First Texas	1.0
Senokot Syrup	Purdue-Frederick	7.0
Septra Oral Suspension	Burroughs-Wellcome	0.26
Serentil Concentrate	Boehringer-Ingelheim	0.6
St. Joseph Cough Syrup	Plough	0.4
St. Joseph Fever Reducer	Plough	9.5
St. Joseph Fever Reducer	Plough	7.0
Sudafed Cough Syrup	Burroughs-Wellcome	2.4
Sudafed Syrup	Burroughs-Wellcome	2.4
Temaril Syrup	SKF	5.7
Terpin Hydrate Elixir	Various Mfgrs.	40.0
Theo-Oranidin Elixir	Wallace	15.0
Tolu-Sed DM	Scherer	10.0
Tolu-Sed Syrup	Scherer	10.0
Triaminic Expectorant	Sandoz	5.0
Triaminic Expectorant DH	Sandoz	5.0
Triaminic Expectorant	Sandoz	5.0
Trilafon Concentrate	Schering	0.1
Trind Syrup	Mead Johnson	5.0
Trind-DM Syrup	Mead Johnson	5.0
Tusquelin Syrup	Circle	5.0
Tussar-2 Cough Liquid	Rhone-Poulenc Rorer	6.0
Tussar-SF Cough Syrup	Rhone-Poulenc Rorer	12.0
Tylenol Cough Night-Time	McNeil	10.0
Tylenol w/Codeine Elixir	McNeil	7.0
Valdrene Expectorant	Vale	5.0
Vi-Daylin ADC Drops	Ross	Trace
Vi-Daylin Drops	Ross	Trace
Vi-Daylin F Drops	Ross	0.1
Vi-Daylin Liquid	Ross	Trace
Vi-Daylin Plus Iron Drops	Ross	0.5
Vi-Daylin/F ADC Drops	Ross	0.3
X-Prep Liquid	Gray	7.0
Zentron Liquid	Lilly	2.0
Robitussin A-C Liquid	Robins	3.5
Robitussin Syrup	Robins	3.5
Robitussin-CF Liquid	Robins	4.75
Robitussin-PE Syrup	Robins	1.4
Scope	Proctor & Gamble	18.5
Kay Ciel Elixir	Forest	4.0
Klorvess / 10%	Sandoz	0.75
Lanophyllin Elixir	Lannett	20.0
Lanoplex Elixir	Lannett	11.0
Lanoxin Pediatric Elixir	Burroughs-Wellcome	10.0
Lasix Oral Solution	Hoechst-Roussel	11.5
Levsin Elixir	Schwarz Pharma	20.0

TRAINING ROSTER

(Please print or type)

DATE OF CLASS ______________ TRAINER (Full Name) ______________________________

TRAINER's DEPARTMENT NAME AND ADDRESS ______________________________

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Print Name ______________________ Print Name ______________________
Signature ______________________ Signature ______________________
Agency ______________________ Agency ______________________
Address ______________________ Address ______________________
______________________ ______________________
Agency Tel. ( )______________ Agency Tel. ( )______________
Agency Fax( )______________ Agency Fax ( )______________
Home Tel. ( )______________ Home Tel. ( )______________

Print Name ______________________ Print Name ______________________
Signature ______________________ Signature ______________________
Agency ______________________ Agency ______________________
Address ______________________ Address ______________________
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Agency Tel. ( )______________ Agency Tel. ( )______________
Agency Fax( )______________ Agency Fax ( )______________
Home Tel. ( )______________ Home Tel. ( )______________

Print Name ______________________ Print Name ______________________
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