

Draeger Alcotest 9510



Washington State Patrol
Impaired Driving Section

DataMaster/DataMaster CDM



Draeger Alcotest 9510

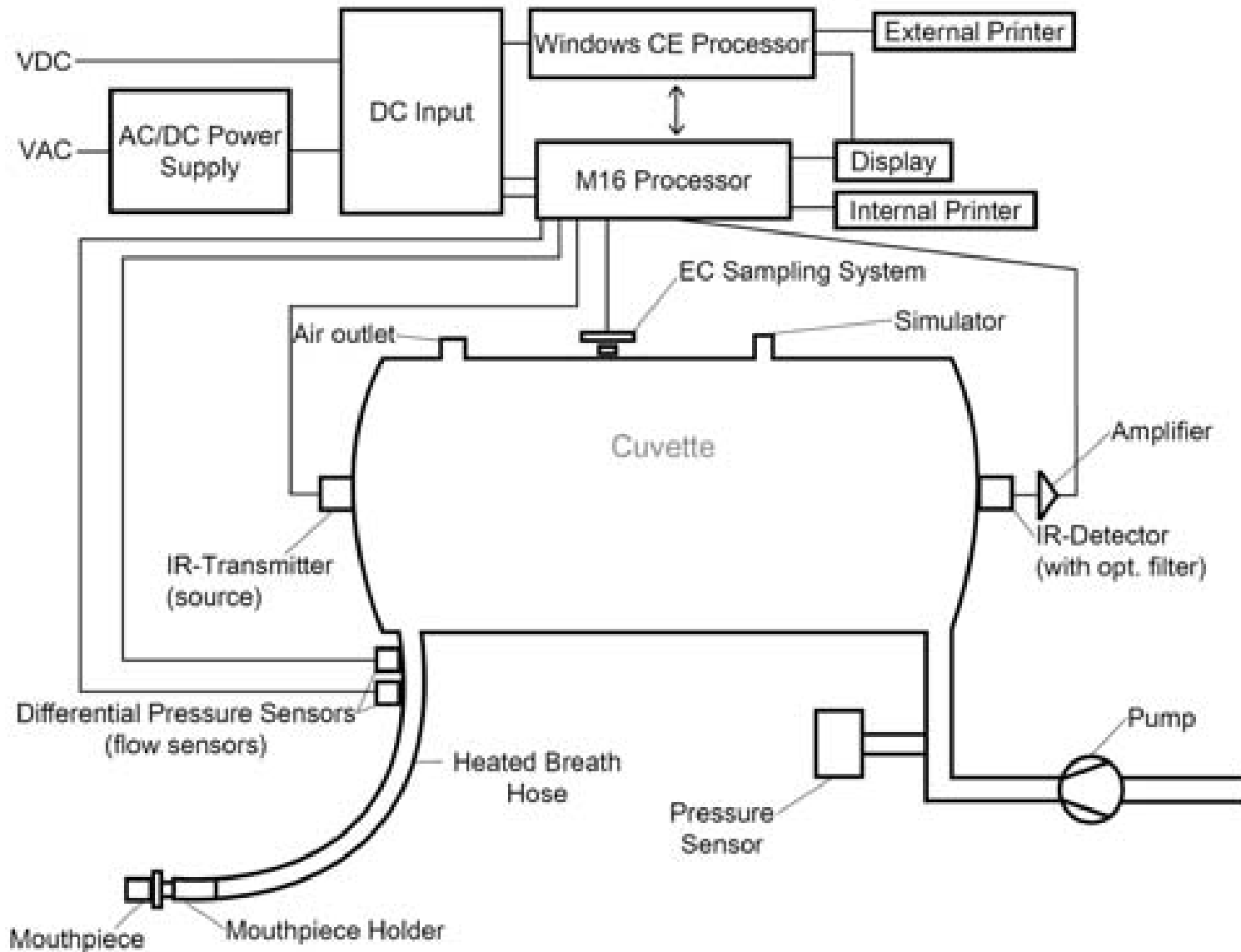


Comparing Instruments

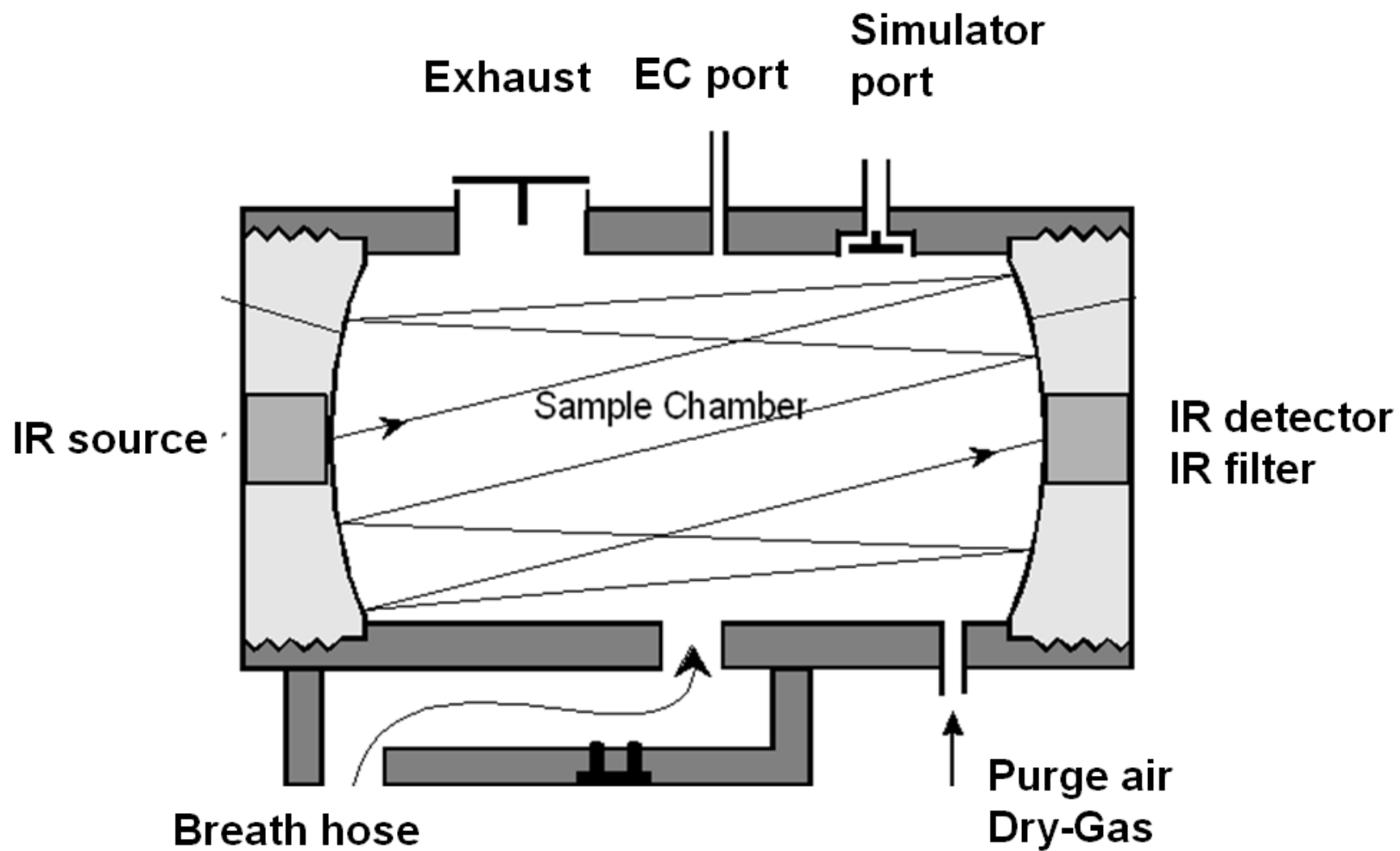
	<u>DataMaster/DataMaster CDM</u>	<u>Draeger Alcotest 9510</u>
Ethanol Detection Technology	Infrared (IR)	Infrared (IR) and Electrochemical Cell (EC)
Software Updates	Manually replace EPROM chip	Remotely or via USB Drive
External Standard	Ethanol Wet Bath	Ethanol Dry Gas
Internal Standard	Quartz Plate	IR Energy Attenuated
Interfering Substances Detection	Chopper Wheel, Filter System	Dual Detection Technology and Change in IR spectrum
Radio Frequency Interference (RFI)	RFI Detection Feature (antenna)	Sample Chamber Shielded from RFI

Software

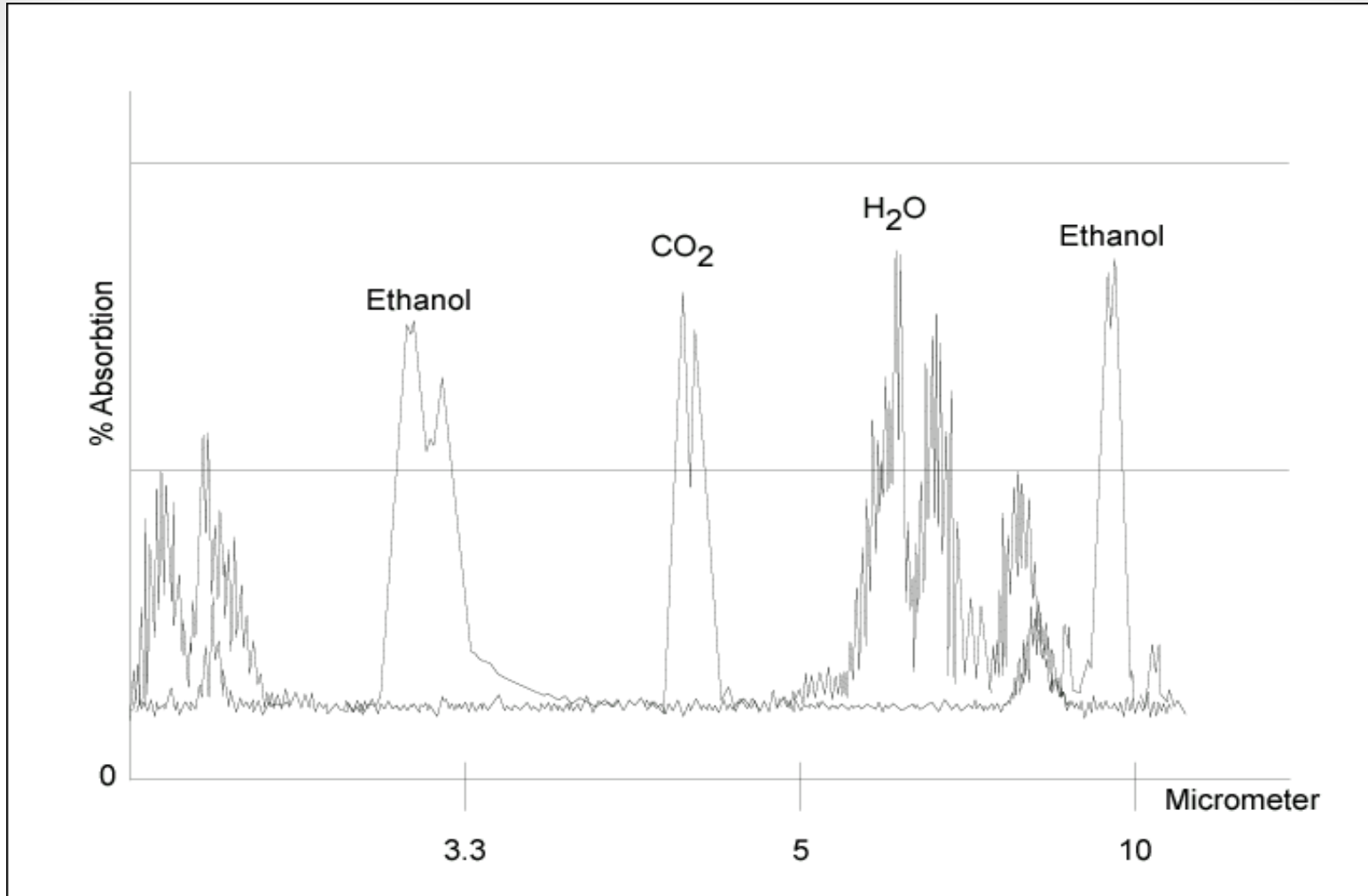
Name	Purpose
Bootloader	Instrument start-up commands
Operating System -Microsoft Windows CE (WinCE)	Typical computer functions, touchscreen, peripherals, internet communications, etc.
Configuration File -Requested specifications specific to WA	Naming conventions, testing sequence to conform to RCW/WAC requirements, QAP and calibration procedures, operator and technician interface, status codes, etc.
Measurement System Software -Independent processor based	Analytical microprocessor, sensor inputs, algorithms and computations which produce the results and measurement sequence.



Internal Components



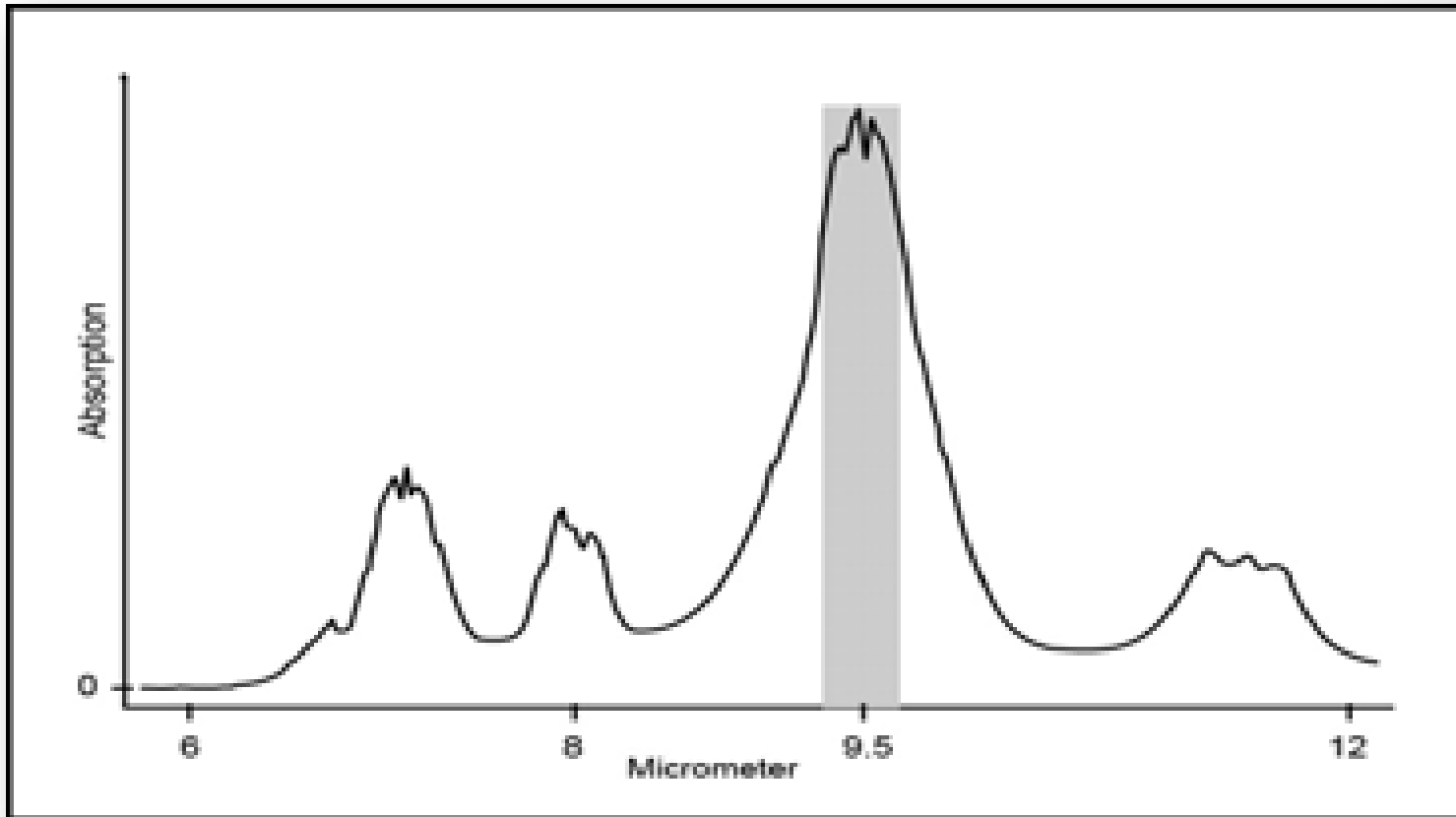
Draeger Sample Chamber



IR - spectrum of a human breath sample containing 200 ppm ethanol (approximately 0.08% BrAC)

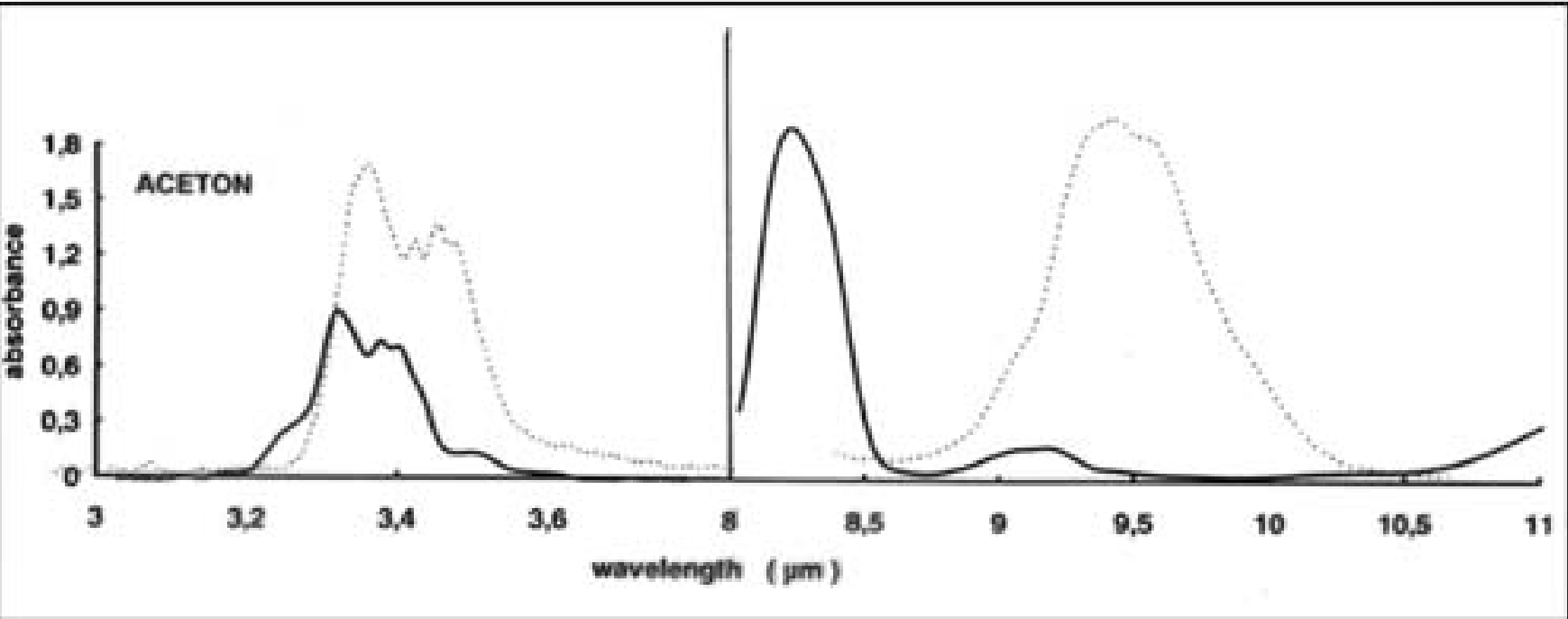
Ethanol peak at 3.4 μm (micrometers) corresponds to the stretching of the C-H bond.

Ethanol peak at 9.5 μm corresponds to the vibration of the C-O bond.



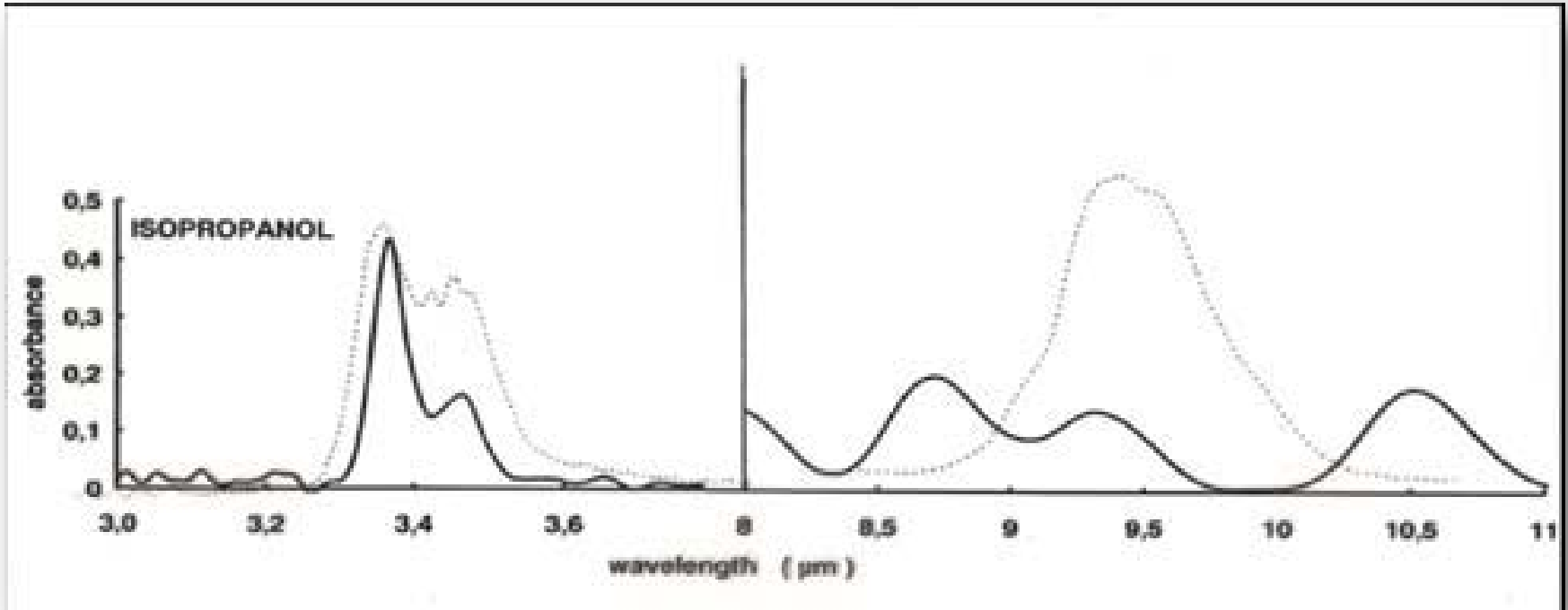
Draeger Alcotest 9510 Infrared Operating Range

By shifting the operating range from 3.4 μm to the 9.5 μm range, tests results are virtually free from the influence of interfering substances.



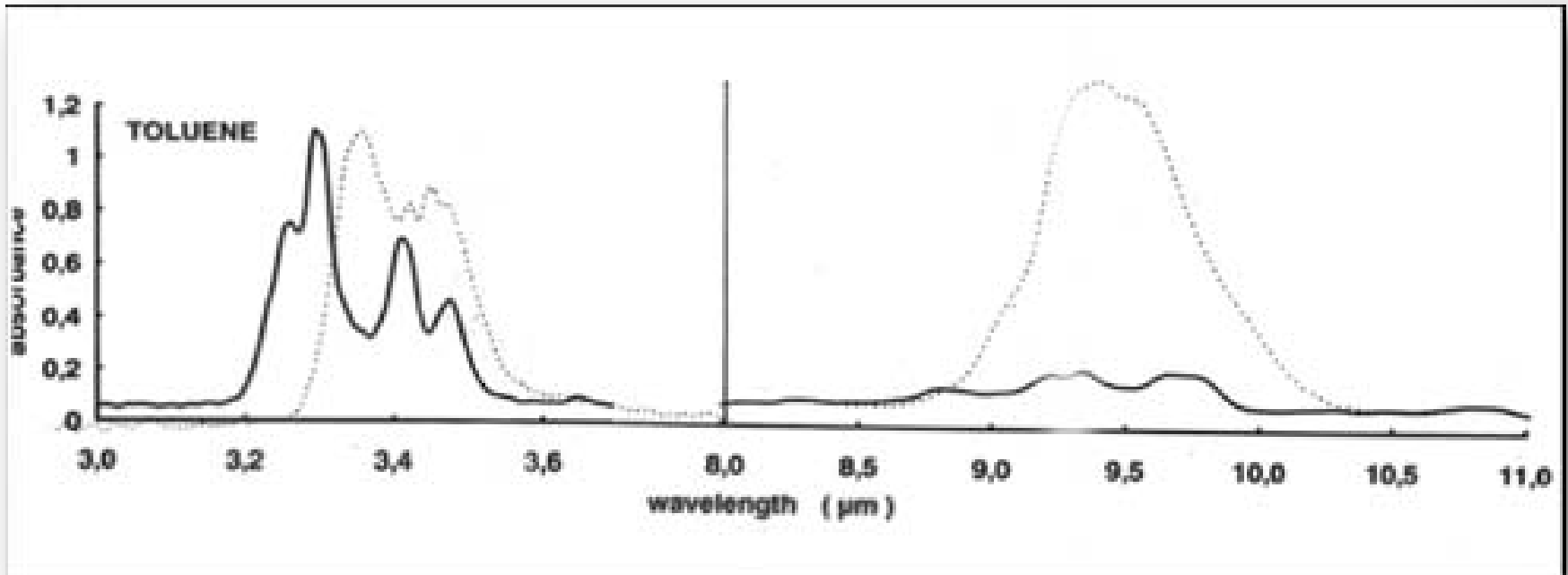
IR Spectrum for Exhaled Breath with Acetone/Ethanol

Solid line indicates acetone while the dotted line indicates ethanol.



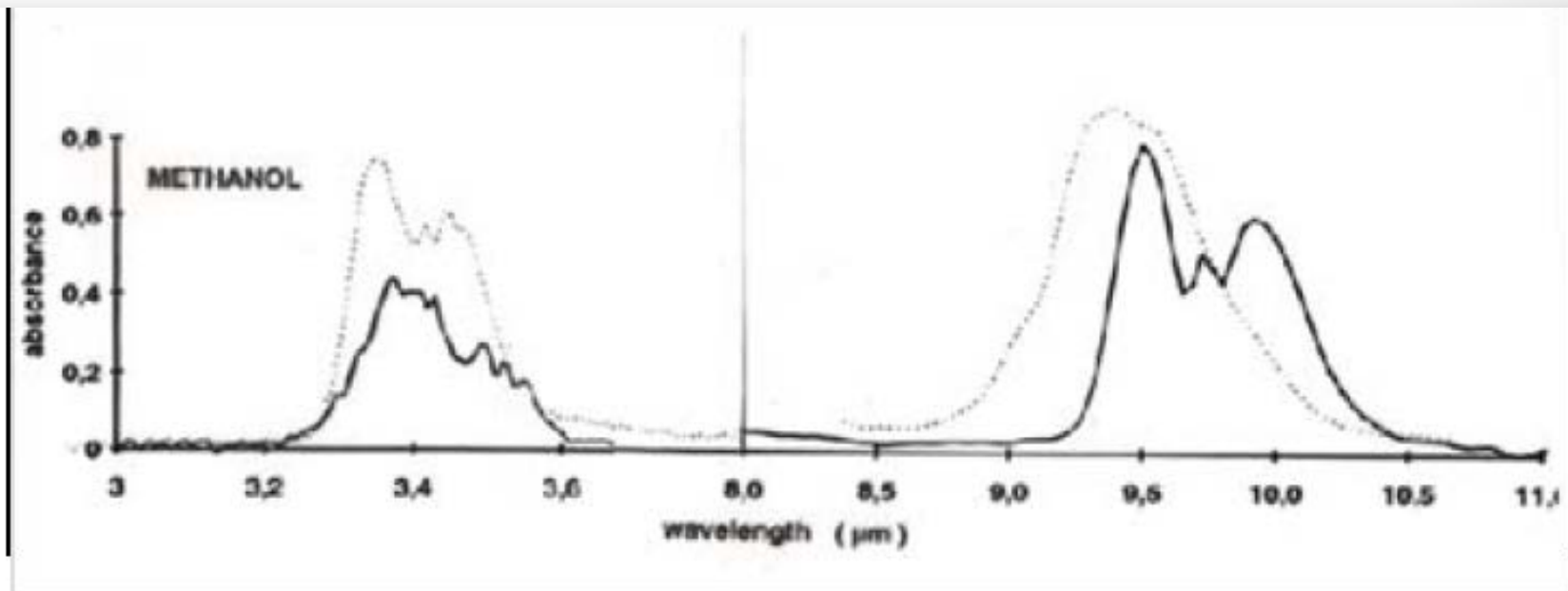
IR Spectrum for Exhaled Breath with Isopropanol/Ethanol

Solid line indicates isopropanol while the dotted line indicates ethanol.



IR Spectrum for Exhaled Breath with Toluene/Ethanol

Solid line indicates toluene while the dotted line indicates ethanol.



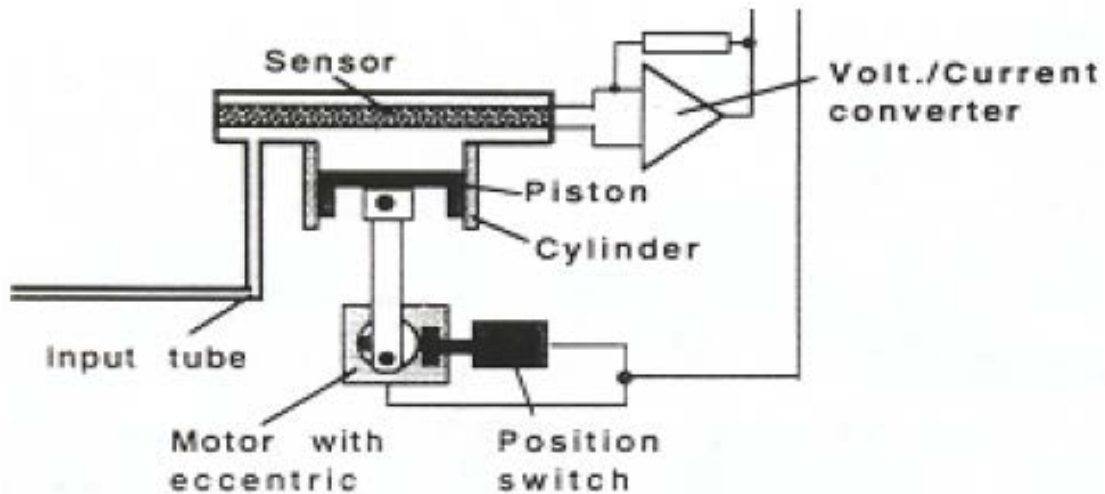
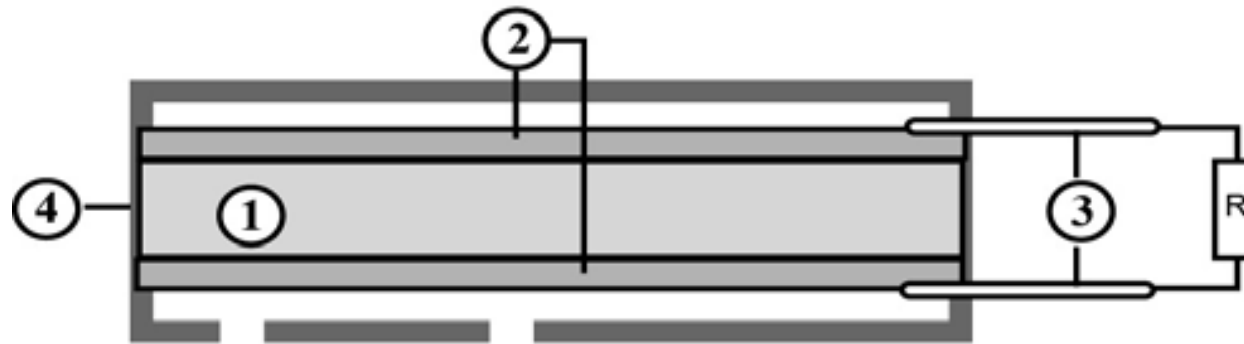
IR Spectrum for Exhaled Breath with Methanol/Ethanol

Solid line indicates methanol while the dotted line indicates ethanol.

Electrochemical Sensor

- Abbreviated on Breath Test Documents as EC.
- More commonly known as Fuel Cell.
- Similar in design to PBT detection technology.
- Located on top of the sample chamber, the fuel cell measures a small amount of the same exhaled breath sample immediately following the IR measurement.
- If alcohol is present, a chemical reaction is triggered and the resulting current is used to determine the amount of alcohol in the sample.
- The Fuel Cell is alcohol specific.

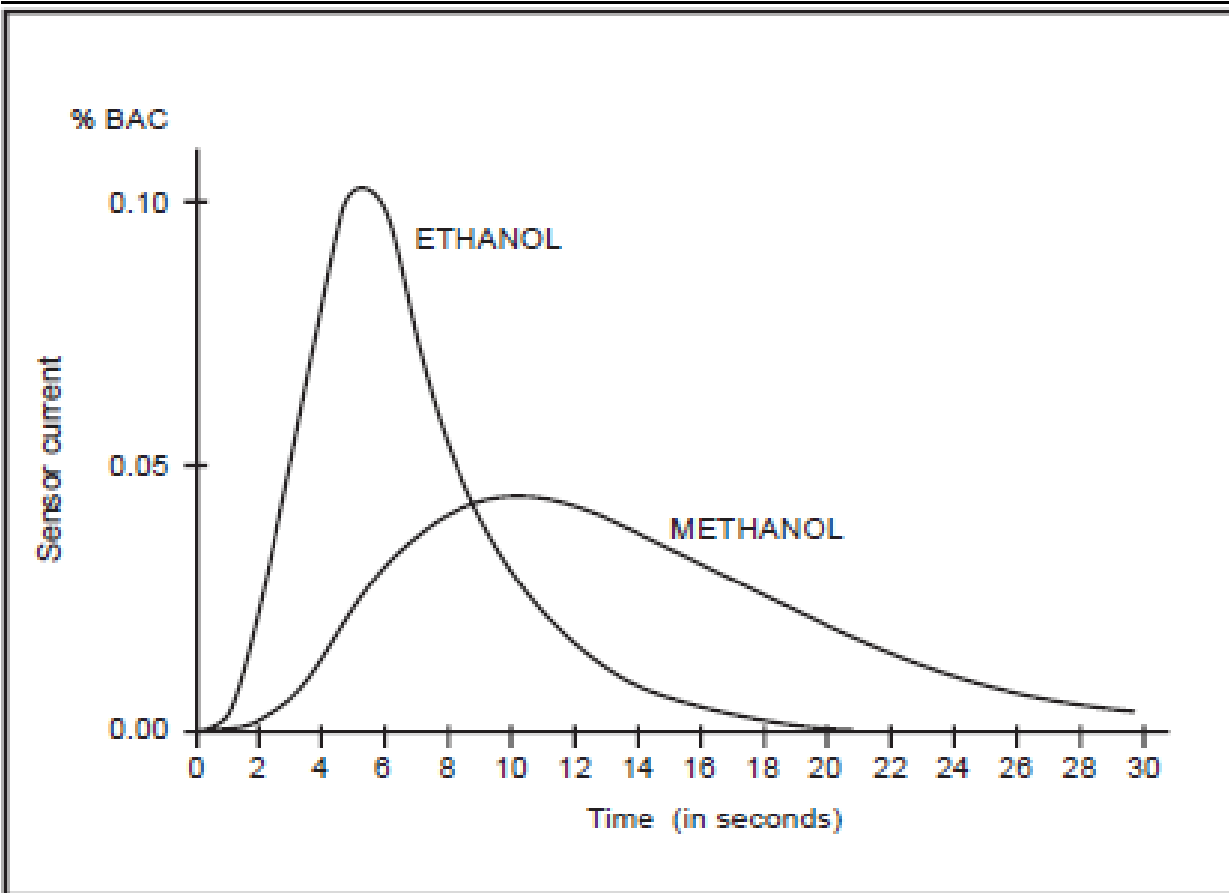
- ① CATALYTIC IMBEDDED MEMBRANE
- ② PLATINUM PLATES
- ③ ELECTRODE CONNECTIONS
- ④ PLASTIC HOUSING



Electrochemical Sensor (Fuel Cell)

Interfering Substances

	IR Detector	EC Detector	“Interference” Triggered By
Methanol	Yes	Yes	EC Curve Pattern
Isopropanol	Yes	Yes	IR vs. EC Delta
Acetaldehyde	Yes	Yes	IR vs. EC Delta
Acetone	Yes	No	IR vs. EC Delta
Hydro Carbons	Yes	No	IR vs. EC Delta



Ethanol/Methanol EC Curve Pattern

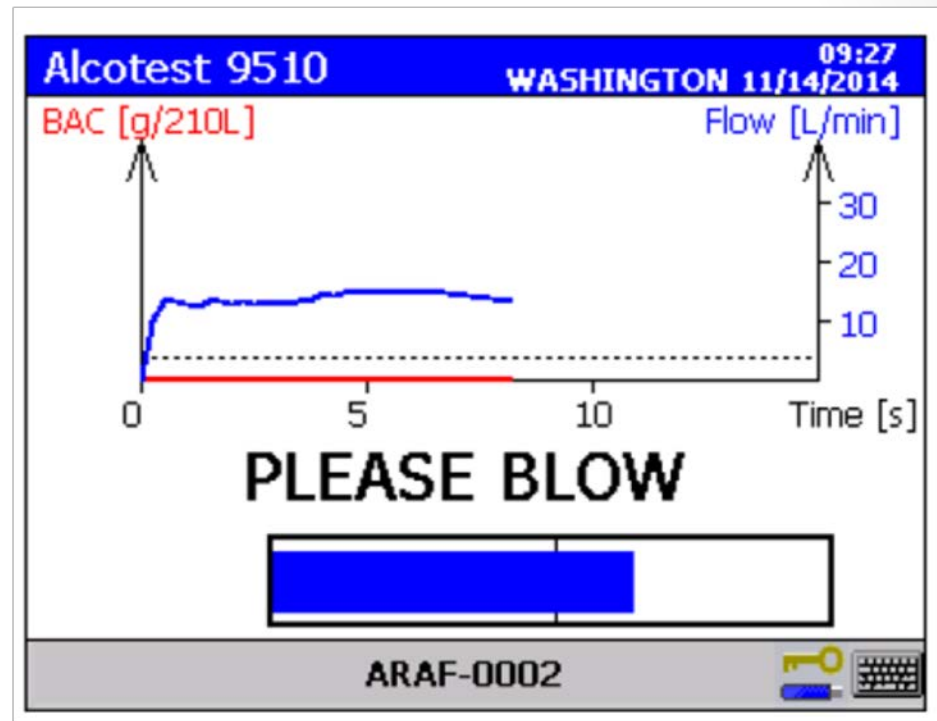
The 9510 compares the kinetic reaction profile of the EC to the recorded profile observed when then instrument performs an external standard check (ethanol only).

Breath Sample Criteria

- Starting flow rate is 8.0L/min.
- Minimum flow rate of 4.0L/min.
- Minimum blow duration of 5.0 sec.
- Minimum breath volume of 1.5L.
- Slope (plateau) detection
 - The alcohol concentration must always be increasing or plateauing. A plateau is recognized as increasing $\leq 4\%$ in 1 second.
- All four test results (IR and EC from each of the two breath samples) must be within $\pm 10\%$ of the mean of all four test results.

On Screen Features

- Touch screen with external keyboard
- Streamlined data entry process
- Real-time breath flow and ethanol curve along with sampling parameters.



Breath Test Document

Operator
and subject
data

WASHINGTON STATE PATROL
EVIDENTIARY SUBJECT TEST
ALCOTEST 9510 SERIAL NUMBER ARAH-0094
SOFTWARE VERSION 8322798 0.7
CONFIGURATION VERSION 8322796 2.3
DATE OF LAST QAP: 09/09/2014

Instrument
specific
information

Analysis Date: 10/02/2014
Observation Period Began: 08:10
Citation/Case Number: 1930
Operator Name: STERKEL/ MEL/ D
Subject Name: GEYHDYD/ KDF/ R
Subject Date of Birth: 09/08/1976
External Standard Lot: LOT1_6789012345678901234

Two results
per sample

Breath Analysis	Result g/210L	Time hh:mm	Volume liters	Blowtime seconds
Blank Test	0.000	08:40		
Internal Standard	VERIFIED	08:41		
Subject Sample 1			2.3	6.6
IR Result	0.000	08:42		
EC Result	0.000	08:42		
Blank Test	0.000	08:43		
External Standard IR	0.080	08:43		
External Standard EC	0.077	08:43		
Blank Test	0.000	08:44		
Subject Sample 2			1.8	5.8
IR Result	0.000	08:45		
EC Result	0.000	08:45		
Blank Test	0.000	08:46		

Breath volume
and blow time
displayed

Certification
and Officer
Signature

During this test, I followed all protocols set in place by the Washington State Toxicologist for the purposes of this test. At the time of this test I was certified to operate the Alcotest 9510 and possessed a valid permit issued by the State Toxicologist. I observed the subject during the entire observation period and during that time they did not eat, drink, smoke, vomit, or place any foreign substances in their mouth.

I certify (or declare) under penalty of perjury under the laws of the state of Washington that the statements on this document and information contained herein are true, correct, and accurate. (RCW 9A.72.085.)

Officer Signature  Date 10/2/14
Location Signed  W.A.

Internal Standard

- The analytical process in the internal standard check is virtually identical to that of an actual breath alcohol analysis.
- A very precise and consistent amount of radiated IR energy from the IR Source passing through the absorption chamber is attenuated.
- This resembles the effect that alcohol vapor has in the absorption chamber thus, the instrument computes the drop in IR energy to a corresponding alcohol concentration reading.
- If successful, it will still display 'Internal Standard-Verified'.
- The quartz plate, which is used by the DataMaster as the internal standard, has been eliminated.

External Standard

- Two ethanol dry gas cylinders mounted on the rear of the instrument.
- Secured with a technician key.
- Used to verify the accuracy of the instrument.
- Replaces the 'Wet Bath' simulator which was present on the DataMaster.



External Standard Certification

- Dry gas prepared and certified by DryGaz
- Manufactured in lots
- Each lot will contain a Certificate of Analysis (COA)
- Each COA will be reviewed and posted on WebDMS.

DRYGAZ™
by CALGAZ

CERTIFICATE OF ANALYSIS
EBS - ETHANOL BREATH STANDARD

DRABGER SAFETY DIAGNOSTICS, INC
ATTN: ACCOUNTS PAYABLE
101 TECHNOLOGY DRIVE

INVOICE#: 56176567
PO#: 45174604
CUST. ITEM #: 4412016
DATE: Jul. 24, 2014

METHOD OF ANALYSIS: IR Breath Alcohol Analyzer
ANALYTICAL ACCURACY: +/-0.002 BrAC or +/-2% whichever is greater.
CALGAZ LOTS: 1697859
ETHANOL IN NITROGEN

PRODUCT EXPIRATION: Jun. 18, 2017

COMPONENT	PPM	(BrAC)
ETHANOL	208.4	(0.080)
NITROGEN	BAL.	
AVERAGE ANALYTICAL VALUE		
ETHANOL	211.1	(0.081)

REFERENCE STANDARD	CYLINDER	CONCENTRATION PPM
N.M.I. TRACEABLE STANDARDS*	5603479	208.4

* CERTIFICATION TRACEABLE TO National Metrology Institute of the Netherlands (V.S.L.)
PPM ETHANOL STANDARDS

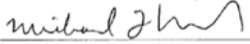
TRACEABILITY
Preparation:
Gas mixtures manufactured with balances calibrated by an ISO 17025 accredited company using NIST traceable weights and meets or exceeds the requirements of NIST Handbook 44.
Calibration test CG/01/09/14/DW01, CG/01/09/14/DW02, CG/01/09/14/DW03, or CG/01/09/14/DW04 dated, 9th January 2014 applies.

Analytical:
Analytical Instruments Calibrated Using NMI Traceable Standards.
Certification Numbers: 3222253-01, 3222399, 3222311, 3222450-01, 3222450-02, 3221852-04

No affecting environmental conditions during analysis.

*NMI is recognized by NIST through the Mutual Recognition Agreement (CIRM MBA).
CALGAZ calibration devices were found to meet all applicable requirements of the National Highway Traffic Safety Administration Model Specifications for calibrating units for breath alcohol testers.

MANUFACTURED DATE: Jun. 18, 2014
CALGAZ CYLINDER SIZE: 6DM

APPROVED BY : 

We certify that all the cylinders for the Lot numbers identified herein are manufactured and tested within the requirements of CFR 49 part 178.65 and that physical and chemical test reports are on file and copies will be furnished upon request.

CALGAZ, Div. of Air Liquide Advanced Technologies U.S. LLC
821 Chesapeake Drive, Cambridge, MD 21613-0149

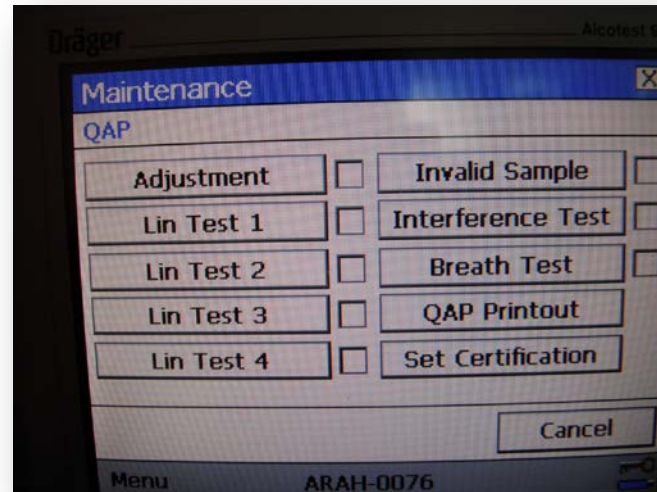
Reference Barometer

- Dry gas cylinders are potentially affected by ambient pressure.
- Internal pressure sensor automatically adjusts the external standard reading.
- Technician calibrates the internal pressure sensor during the QAP process.



New Instrument Features

- Optical Card Scanner
 - Verifies operator's certification
 - Scans WA driver's licenses
 - Manual entry also available
- Quality Assurance Procedure (QAP)
 - Process built into instrument software
 - Easier to track and review
 - Less opportunity for human error



Thank You

Washington State Patrol-Impaired Driving Section
Breath Test Program
811 East Roanoke Street
Seattle, WA 98102-3915
(206) 720-3018



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