

# Draeger Alcotest 9510 for Legal Professionals

Washington State Patrol  
Impaired Driving Section



# How do you spell it?

- The Draeger Alcotest 9510 originates from a German company with its U.S. operations headquartered in Irving, Texas.
- In German, the name is spelled “Dräger” but with an umlaut above the ä (in German, umlaut means “change sound”).
- In English, we change the spelling to “Draeger”.
- Draeger Safety Diagnostics, Inc. (the U.S. branch) along with the NHTSA Conforming Products List both use the “Draeger” spelling when referring to the Alcotest 9510.
- WAC 448-16-020 lists the approved instrument as the “Drager Alcotest 9510”.
- The State Toxicologist included the umlauts in her submittal for revision to the WAC but it looks like the code reviser did not include them (or was unable to).

# Why new instruments?

- DUI cost recovery funds were being used each year to procure 25 new DataMaster CDM instruments.
- In 2007 National Patent Analytical Systems/Intoximeter, manufacturer of the DataMaster and DataMaster CDM, announced they would no longer have these instruments in production.
- The WSP made the decision to look at all available manufacturer options for replacement.
- State Procurement Office in consultation with the WSP put out requests for bids.
- The Draeger Alcotest 9510 instrument was chosen for validation testing in 2009.

# Validation Testing

- Two phases: Spring of 2013 and Fall of 2013
- Consisted of accuracy, precision, robustness and ruggedness testing along with various other purpose specific evaluations.
- Validation testing was reviewed and the Draeger Alcotest 9510 was approved for evidentiary use by the WA State Toxicologist in March 2014.
- WA State specific software approved in October 2014.
- Breath Test Program Operations Manual update approved in July 2014.
- Training, Technical and Quality Manual updates approved in November 2014 after accreditation.

# Laboratory Accreditation

- American Society of Crime Laboratory Directors/Laboratory Accreditation Board (ASCLD/LAB) evaluated the WSP Breath Test Program for months over the Summer and Fall of 2014 with a week long on-site visit in October 2014.
- Granted re-accreditation status on November 14, 2014 (Originally accredited on November 16, 2009).
- Included scope extension for Draeger Alcotest 9510 policies, procedures, and calibration work.
- WSP Breath Test Program accredited under the following international standards:
  - ISO/ICE 17025:2005
  - ASCLD/LAB-International Supplemental Requirements for Breath Alcohol Calibration Laboratories:2007
  - Infrared Spectrometry and Infrared Spectrometry/Fuel Cell

# Technician Training

- All breath test technicians attended an extensive Draeger Technician Course in September 2014 taught by Draeger engineers.
- All technicians must show competency on the calibration process by performing a QAP which is then reviewed by the Breath Test Program Technical Lead and Impaired Driving Section Commander.
- Technicians are providing certified and valid operators with a 2-3 hour 'Draeger Transition Training' course prior to use in the field.

# Discovery Materials Site

**Washington State Patrol**  
**Forensic Laboratory Services**

Search

**Section Menu**  
Expand All | Collapse All

- Crime & Safety
- Forensic Lab Services
  - Bureau Overview
  - Crime Lab Division
  - Impaired Driving Section
  - Toxicology Lab Division
  - Forensic Services Library
  - Web DMS - Breath Test
- Investigative Services

## Breath Test Program - Discovery Materials Site

Welcome to the Web Based Discovery Materials Site (WebDMS). This site provides instant access to records of breath test results, instrument maintenance, policies, procedures and manuals of the Washington State Patrol Breath Test Section.

- [DUI Arrest Forms](#)
- [BTP Public Records](#)
- [Draeger Documents](#)
- [DRE Forms & Manuals](#)

**Search Options** - To begin your search, please select one of the following options:

- [Breath Test Instrument Records](#)
- [QAP Simulator Certifications](#)
- [Solution Batch Certifications](#)
- [Dry Gas Cylinder Search \*\*New!\*\*](#)

**Reference Sheets** - For breath test instrument codes:

- [Draeger Status and Error Codes \*\*New!\*\*](#)
- [Washington State County Codes \*\*New!\*\*](#)

**NOTE:** Older records not found on this site must be obtained from the local responsible Technician. This Web site does not contain copies of permit cards for individual operators, which must be obtained from the individual law enforcement agency with which the operator is employed.

**Notices and Updates**

- Starting January 6, 2015 the WSP Impaired Driving Section will provide access to the evidential breath test records for the Draeger Alcotest 9510 instruments through WebDMS, which can be located by clicking on this [link](#).

## Breath Test Program - Draeger Alcotest 9510

This public records index on this page provides a list of the Draeger Instrument's available supporting documentation. Please select a link under the right-column menu to jump to a specific document category. Some of the supporting documentation not specific to the Draeger instrument can also be found on the [Public Records Index page](#).

## Barometer Calibration Records

### Druck DPI-740

74003877

- [10-27-2014.pdf](#)

### Mensor CPG-2400

410004ST-651309      410004SU-651310      410004SV-651311

- [01-27-2015.pdf](#)
- [01-27-2015.pdf](#)
- [01-27-2015.pdf](#)

410004SW-651312      410004SX-651313      410004SY-651314

- [10-27-2015.pdf](#)
- [01-27-2015.pdf](#)
- [01-27-2015.pdf](#)

410004SZ-651315

- [01-27-2015.pdf](#)

## CALGAZ External Standard Accreditation

- [CALGAZ Accreditation Certificate 01202015.pdf](#)
- [CALGAZ Accreditation Certificate 11212012.pdf](#)

Dry Gas Certificates of Analysis (COAs) can be found [here](#).

## Manufacturer's Technical Manual

- [Draeger Alcotest 9510 Technical Manual Copyright License.pdf](#)
- [Draeger Alcotest 9510 Technical Manual WA State Version 3.1.pdf](#)

# DUI Arrest Report Updates

INDEPENDENTLY, TO DETERMINE ALCOHOL CONCENTRATION.

1. YOU ARE NOW ADVISED THAT YOU HAVE THE RIGHT TO REFUSE THIS BREATH TEST; AND THAT IF YOU REFUSE:
  - (A) YOUR DRIVER'S LICENSE, PERMIT, OR PRIVILEGE TO DRIVE WILL BE REVOKED OR DENIED BY THE DEPARTMENT OF LICENSING FOR AT LEAST ONE YEAR; AND
  - (B) YOUR REFUSAL TO SUBMIT TO THIS TEST MAY BE USED IN A CRIMINAL TRIAL.
2. YOU ARE FURTHER ADVISED THAT IF YOU SUBMIT TO THIS BREATH TEST, AND THE TEST IS ADMINISTERED, YOUR DRIVER'S LICENSE, PERMIT, OR PRIVILEGE TO DRIVE WILL BE SUSPENDED, REVOKED, OR DENIED BY THE DEPARTMENT OF LICENSING FOR AT LEAST NINETY DAYS IF YOU ARE:
  - (A) AGE TWENTY-ONE OR OVER AND THE TEST INDICATES THE ALCOHOL CONCENTRATION OF YOUR BREATH IS 0.08 OR MORE, OR THE TEST INDICATES THE THC CONCENTRATION OF YOUR BLOOD IS 5.00 OR MORE, OR YOU ARE IN VIOLATION OF RCW 46.61.502, DRIVING UNDER THE INFLUENCE, OR RCW 46.61.504, PHYSICAL CONTROL OF A VEHICLE UNDER THE INFLUENCE; OR
  - (B) UNDER AGE TWENTY-ONE AND THE TEST INDICATES THE ALCOHOL CONCENTRATION OF YOUR BREATH IS 0.02 OR MORE, OR THE TEST INDICATES THE THC CONCENTRATION OF YOUR BLOOD IS ABOVE 0.00, OR YOU ARE IN VIOLATION OF RCW 46.61.502, DRIVING UNDER THE INFLUENCE, OR RCW 46.61.504, PHYSICAL CONTROL OF A VEHICLE UNDER THE INFLUENCE.

THE BREATH TEST INSTRUMENT WILL NOT TEST FOR THC CONCENTRATION IN A BREATH SAMPLE.
3. IF YOUR DRIVER'S LICENSE, PERMIT, OR PRIVILEGE TO DRIVE IS SUSPENDED, REVOKED, OR DENIED, YOU MAY BE ELIGIBLE TO IMMEDIATELY APPLY FOR AN IGNITION INTERLOCK DRIVER'S LICENSE.
4. YOU HAVE THE RIGHT TO ADDITIONAL TESTS ADMINISTERED BY ANY QUALIFIED PERSON OF YOUR OWN CHOOSING.

**FOR THOSE NOT DRIVING A COMMERCIAL MOTOR VEHICLE AT THE TIME OF ARREST:** IF YOUR DRIVER'S LICENSE IS SUSPENDED OR REVOKED, YOUR COMMERCIAL DRIVER'S LICENSE, IF ANY, WILL BE DISQUALIFIED.

**FOR THOSE DRIVING A COMMERCIAL MOTOR VEHICLE AT THE TIME OF ARREST:** IF YOU EITHER (A) REFUSE THIS TEST OR (B) SUBMIT TO THIS TEST AND THE TEST INDICATES AN ALCOHOL CONCENTRATION OF 0.04 OR MORE, OR ANY MEASURABLE AMOUNT OF THC CONCENTRATION, YOU WILL BE

<input type="checkbox"/> At the time of this test(s), I was certified to operate the BAC DATAMASTER and the BAC DATAMASTER CDM and possessed a valid permit issued by the State Toxicologist.			
<input type="checkbox"/> At the time of this test(s), I was certified to operate the DRAEGER ALCOTEST 9510 and possessed a valid permit issued by the State Toxicologist.			
DO YOU HAVE ANY FOREIGN SUBSTANCE IN YOUR MOUTH? <input type="checkbox"/> YES <input type="checkbox"/> NO	MOUTH CHECKED? TIME? <input type="checkbox"/> YES <input type="checkbox"/> NO	2 <sup>ND</sup> MOUTH CHECK? (If Necessary) TIME? <input type="checkbox"/> YES <input type="checkbox"/> NO	ANY FOREIGN SUBSTANCES FOUND? EXPLAIN: REMOVED <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> YES <input type="checkbox"/> NO
<input type="checkbox"/> I observed the subject from the time of the mouth check through the completion of the breath test.			
<input type="checkbox"/> The subject did not vomit, eat, drink, smoke, or place any foreign substance in his/her mouth during the observation time.			
<input type="checkbox"/> At the time of this test, I possessed a valid permit issued by the State Toxicologist and was certified to operate the PBT. The test was performed in accordance with the State Toxicologist's protocols. (Chapter 448-15 WAC)		PBT READING	PBT TIME
<input type="checkbox"/> BOOKED RELEASED TO:			

# Comparing Instruments

**DataMaster/DataMaster CDM**



**Draeger Alcotest 9510**

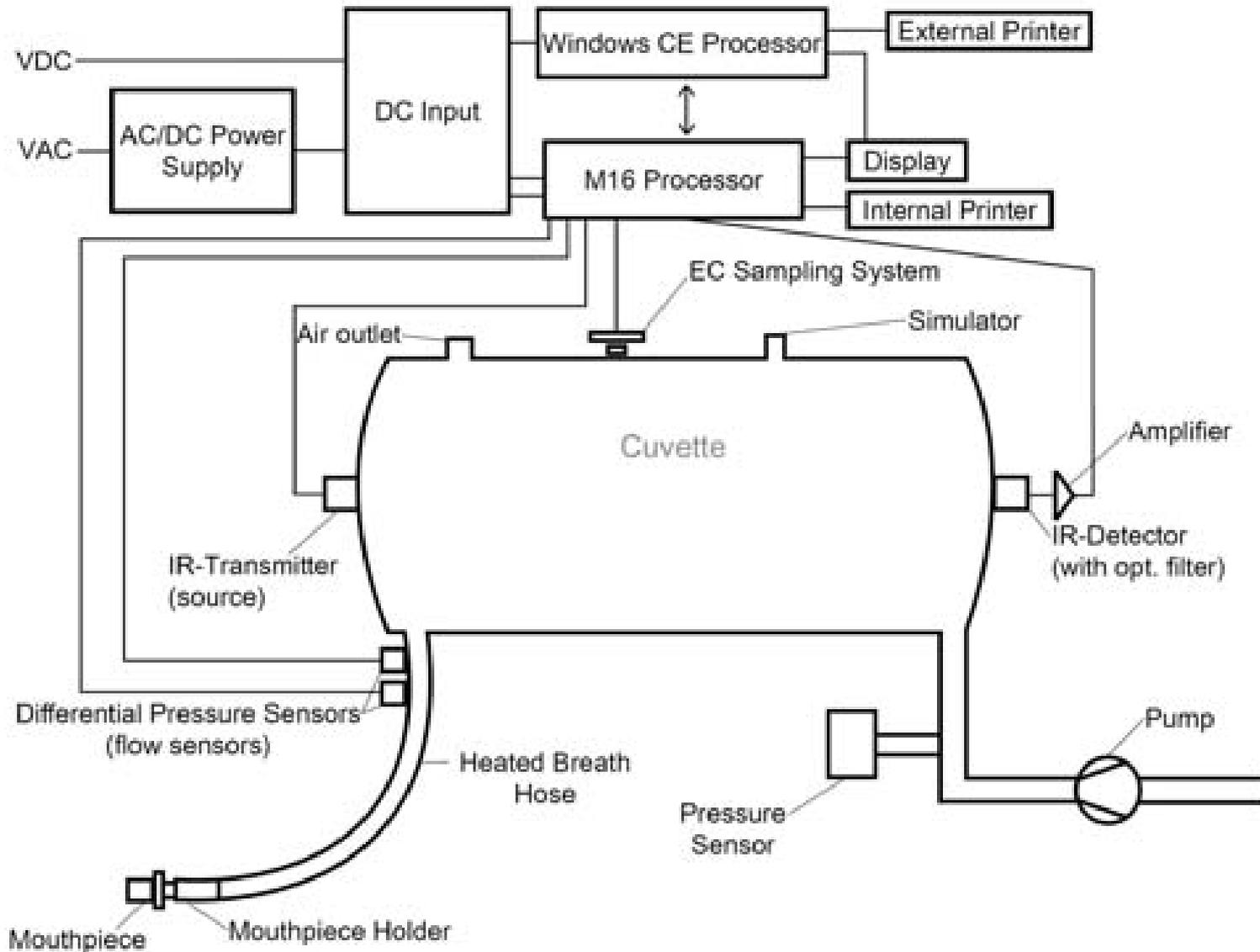


# Comparing Instruments

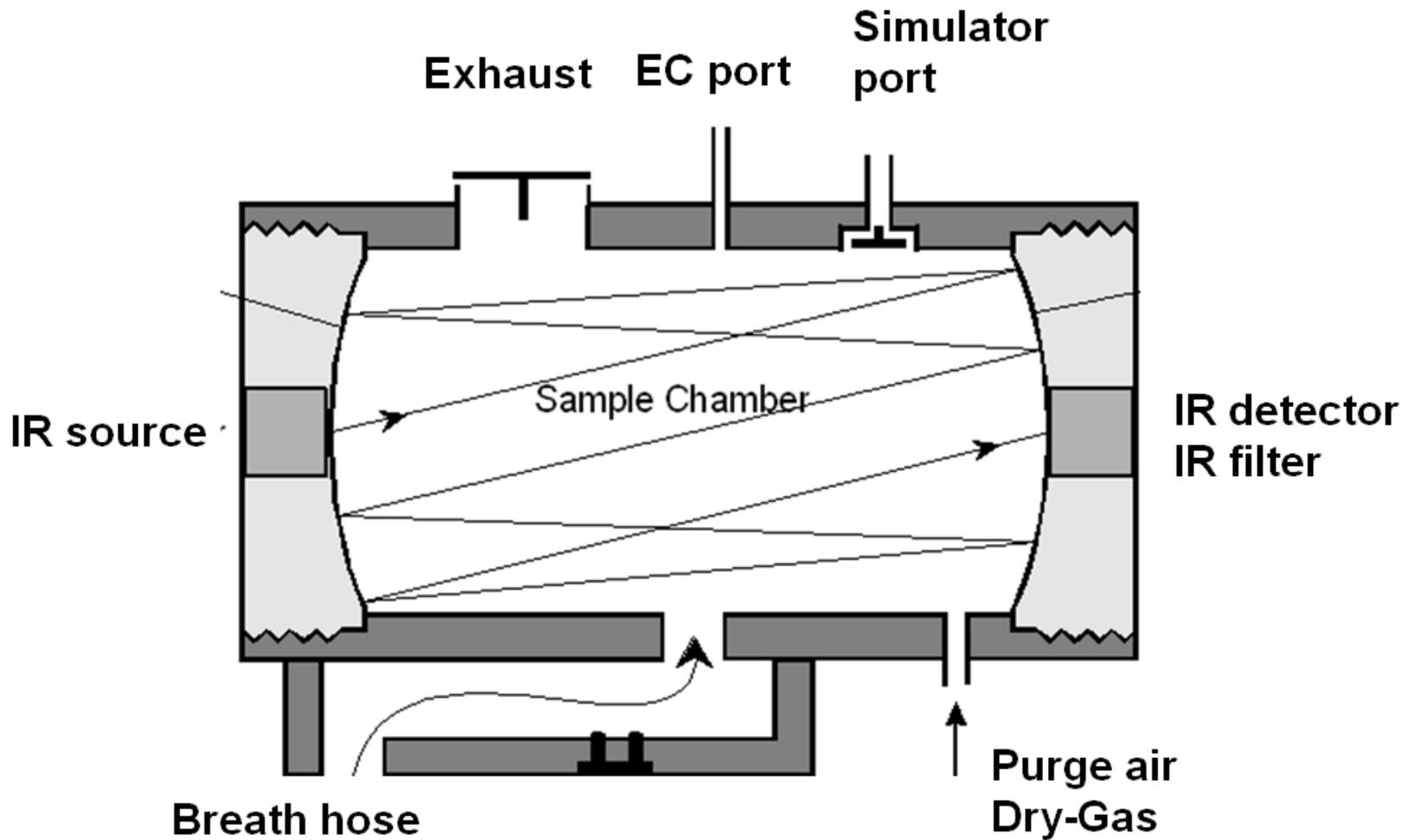
	<u>DataMaster/DataMaster CDM</u>	<u>Draeger Alcotest 9510</u>
<b>Ethanol Detection Technology</b>	Infrared (IR)	Infrared (IR) and Electrochemical Cell (EC)
<b>Software Updates</b>	Manually replace EPROM chip	Remotely or via USB Drive
<b>External Standard</b>	Ethanol Wet Bath	Ethanol Dry Gas
<b>Internal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

# Software

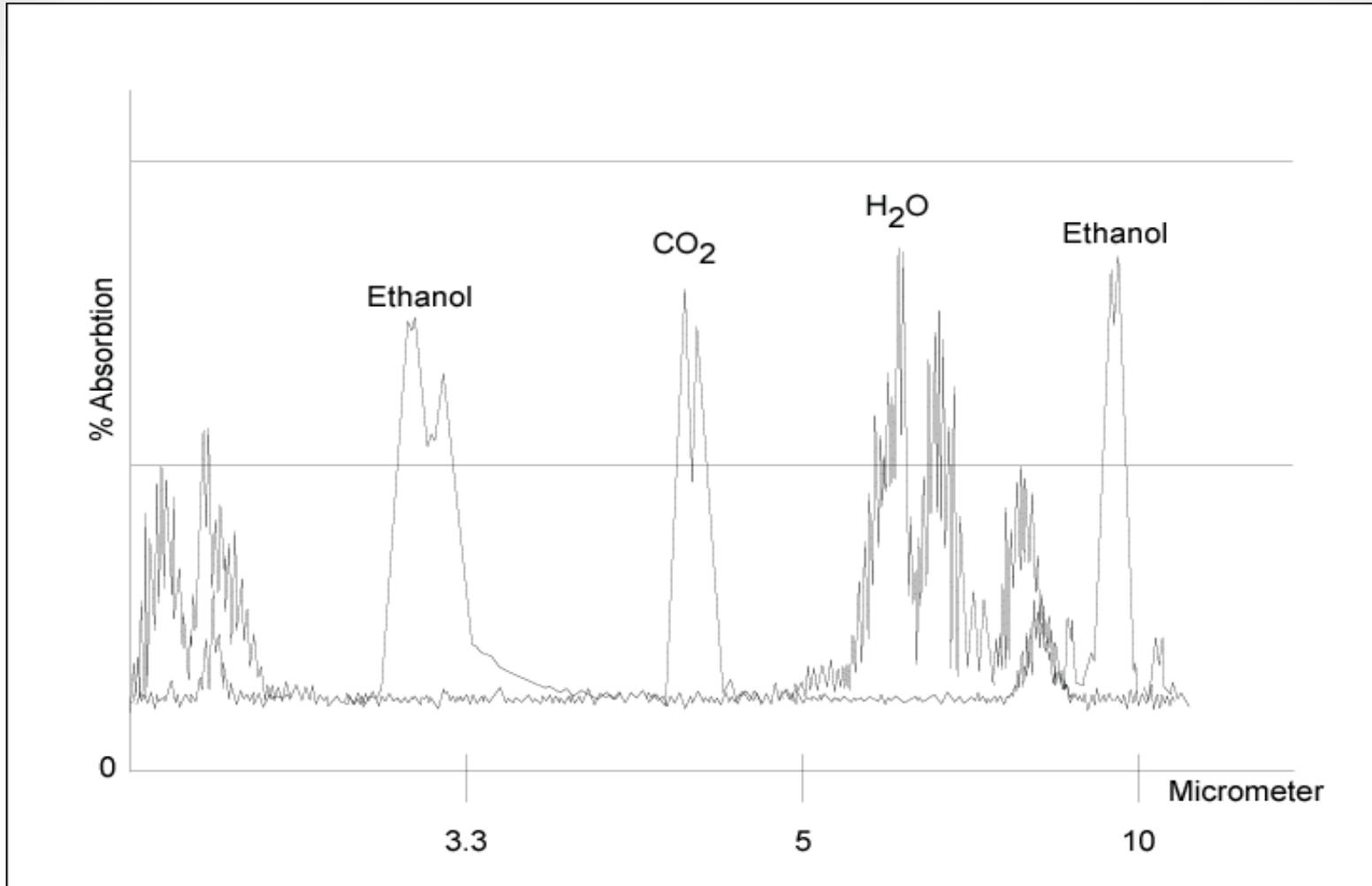
Name	Purpose
Bootloader	Instrument start-up commands
Operating System -Microsoft Windows CE (WinCE)	Typical computer functions, touchscreen, peripherals, internet communications, etc.
Configuration File -Requested specifications specific to WA	Naming conventions, testing sequence to conform to RCW/WAC 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



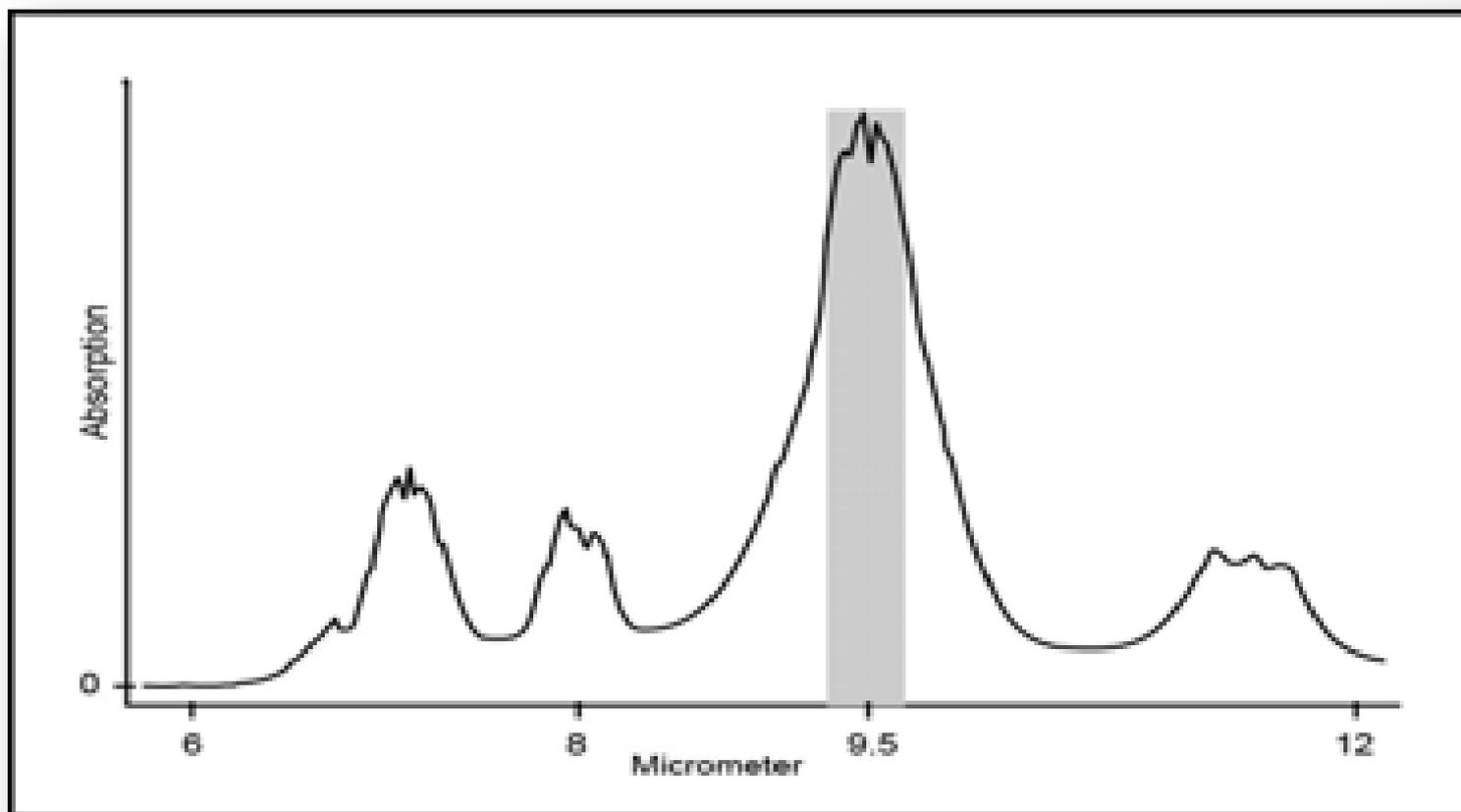
**Draeger Sample Chamber**



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

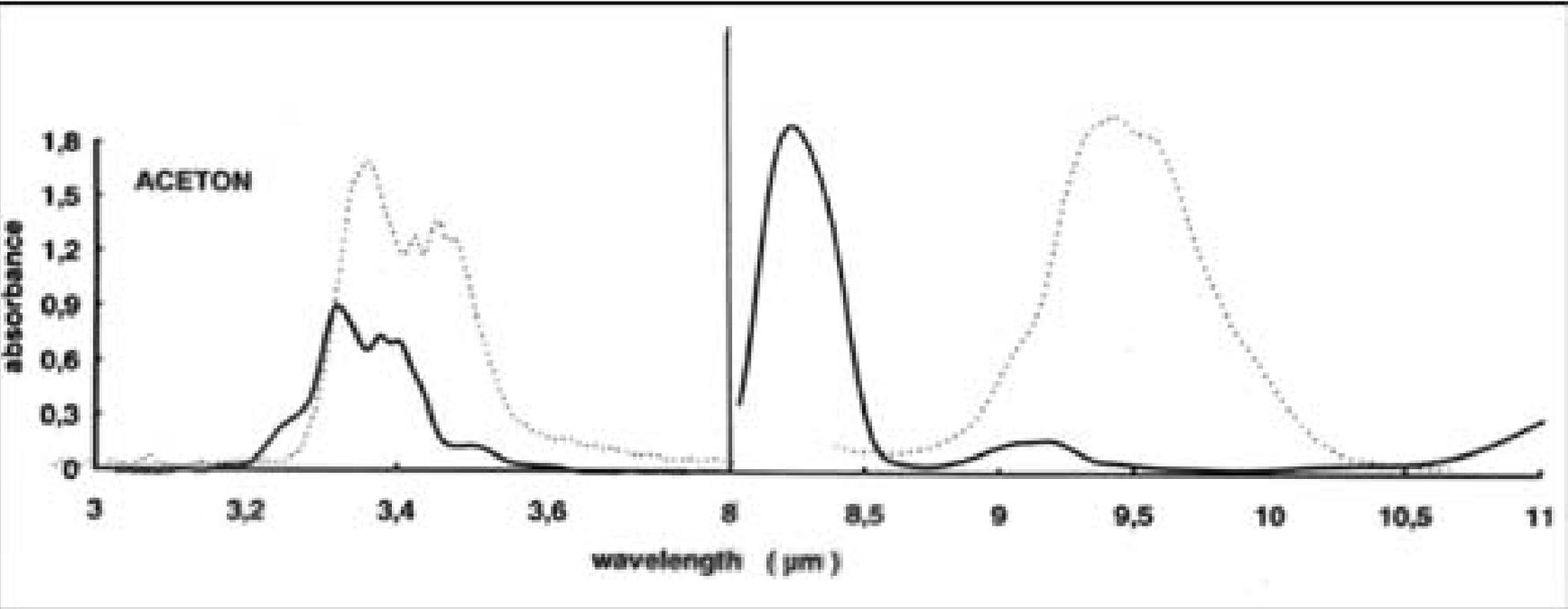
*Ethanol peak at 3.4  $\mu\text{m}$  (micrometers) corresponds to the stretching of the C-H bond.*

*Ethanol peak at 9.5  $\mu\text{m}$  corresponds to the vibration of the C-O bond.*



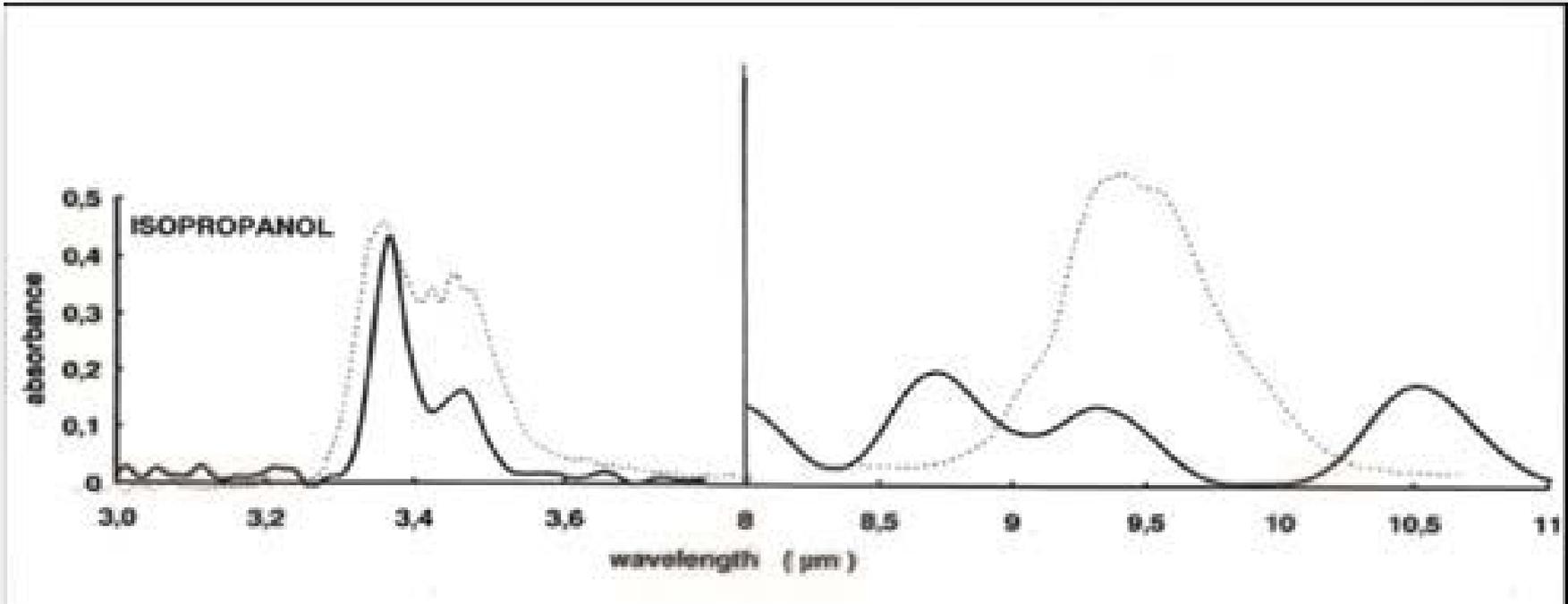
## Draeger Alcotest 9510 Infrared Operating Range

*By shifting the operating range from 3.4  $\mu\text{m}$  to the 9.5  $\mu\text{m}$  range, tests results are virtually free from the influence of interfering substances.*



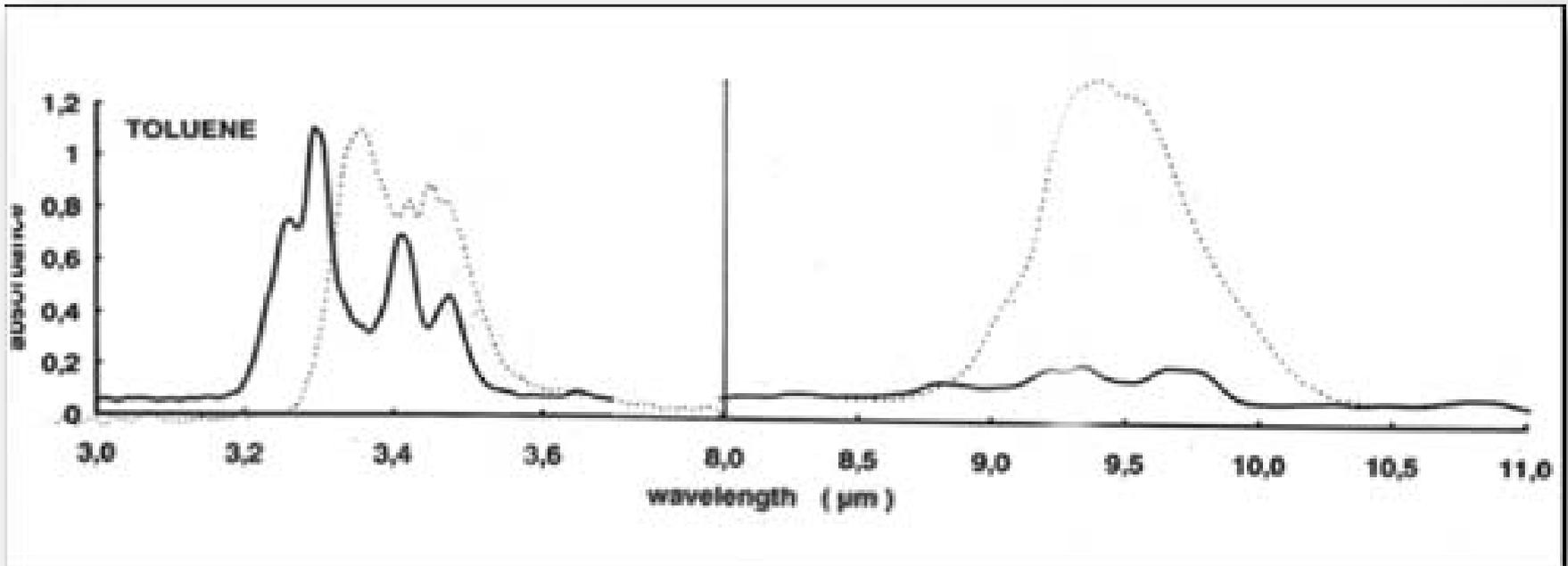
# IR Spectrum for Exhaled Breath with Acetone/Ethanol

Solid line indicates acetone while the dotted line indicates ethanol.



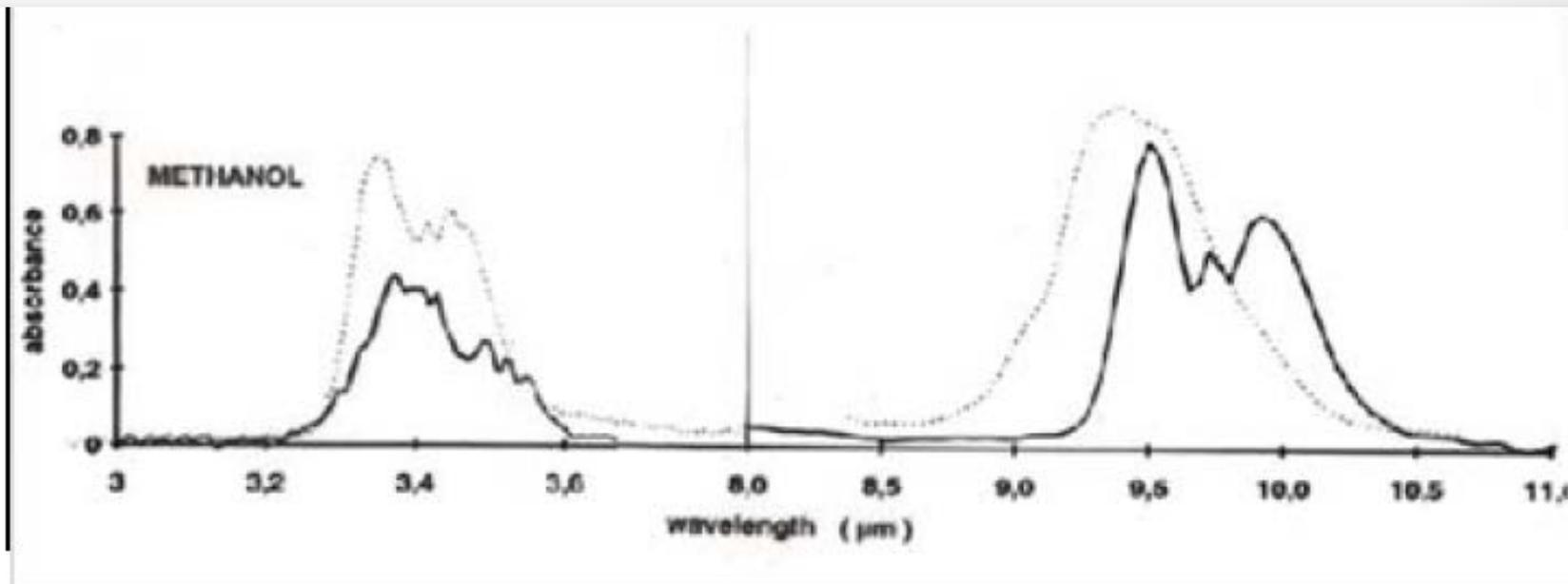
## IR Spectrum for Exhaled Breath with Isopropanol/Ethanol

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.



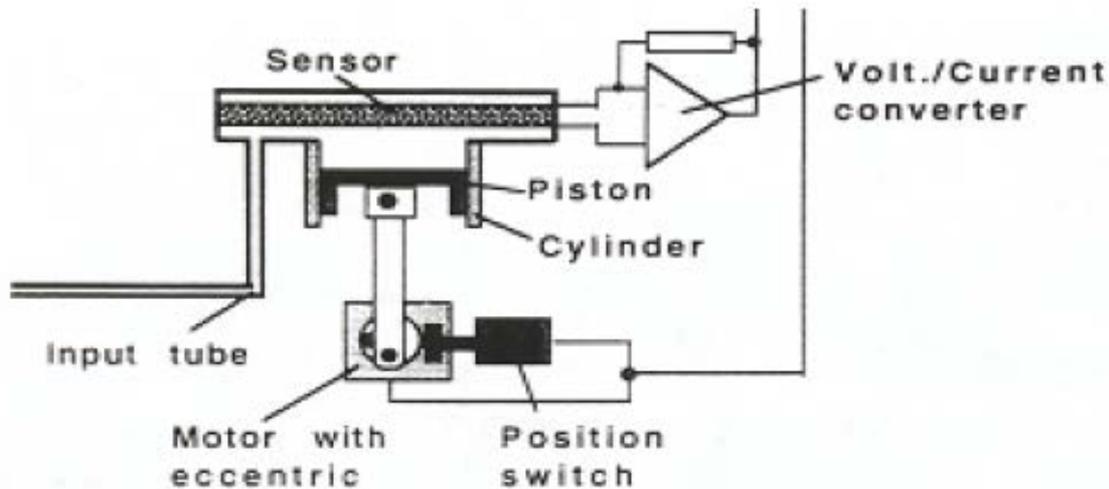
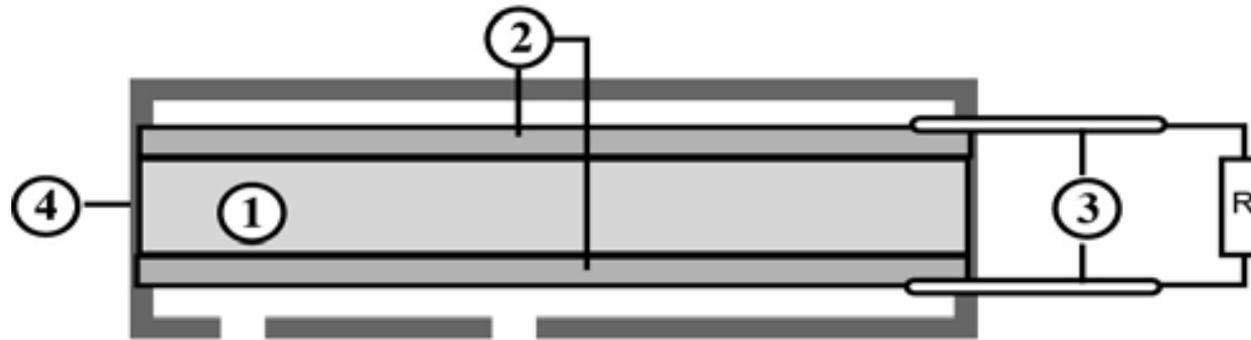
## IR Spectrum for Exhaled Breath with Methanol/Ethanol

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.

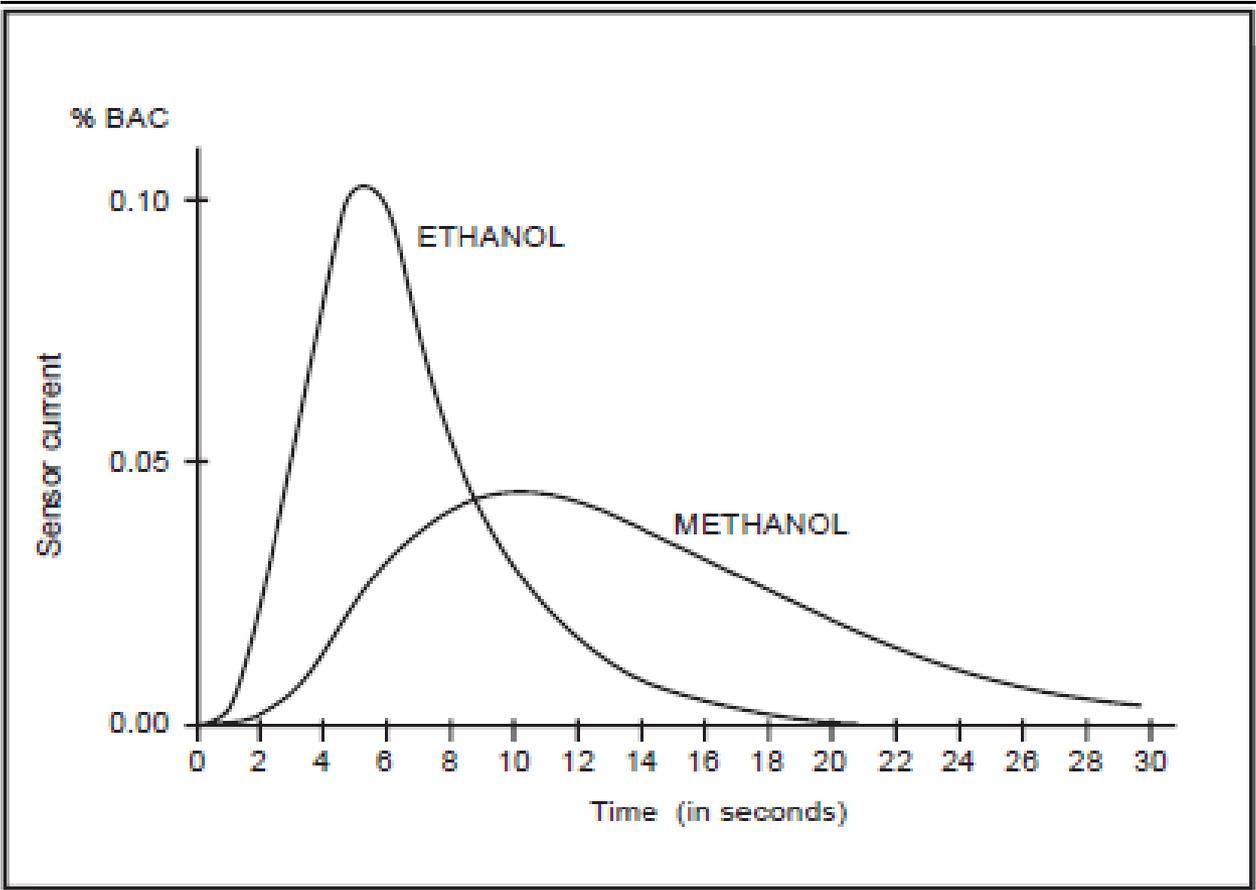
- ① CATALYTIC IMBEDDED MEMBRANE
- ② PLATINUM PLATES
- ③ ELECTRODE CONNECTIONS
- ④ PLASTIC HOUSING



## 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

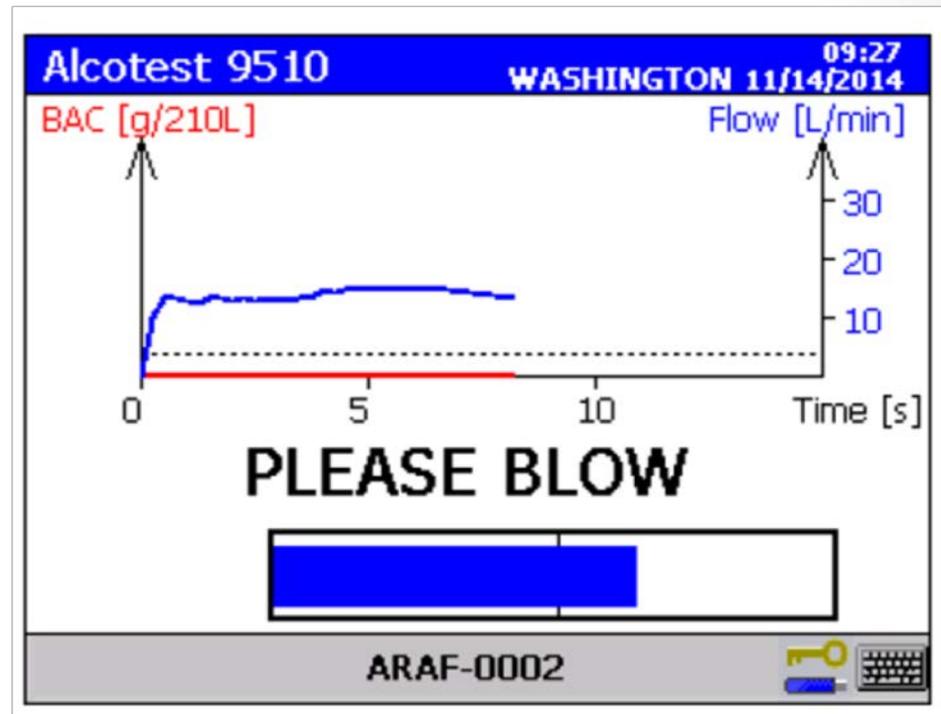
The 9510 compares the kinetic reaction profile of the EC to the recorded profile observed when then instrument performs an external standard check (ethanol only).

# 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

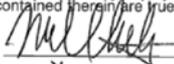
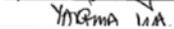
Breath Analysis	Result g/210L	Time hh:mm	Volume liters	Blowtime seconds
Blank Test	0.000	08:40		
Internal Standard	VERIFIED	08:41		
Subject Sample 1			2.3	6.6
IR Result	0.000	08:42		
EC Result	0.000	08:42		
Blank Test	0.000	08:43		
External Standard IR	0.080	08:43		
External Standard EC	0.077	08:43	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

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

INVOICES: 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 recognised 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

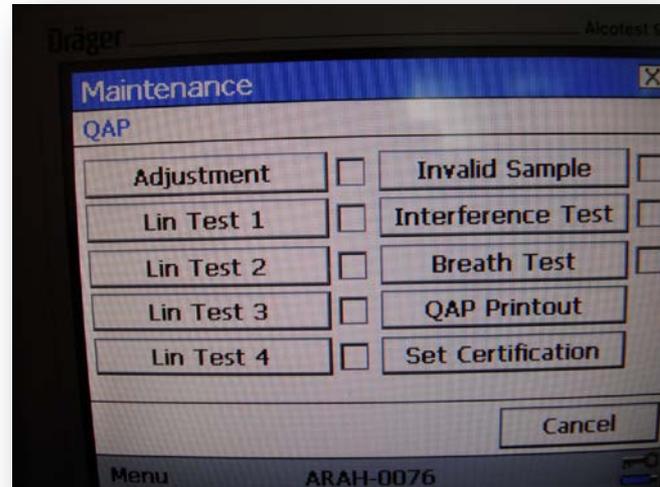
# Reference Barometer

- 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



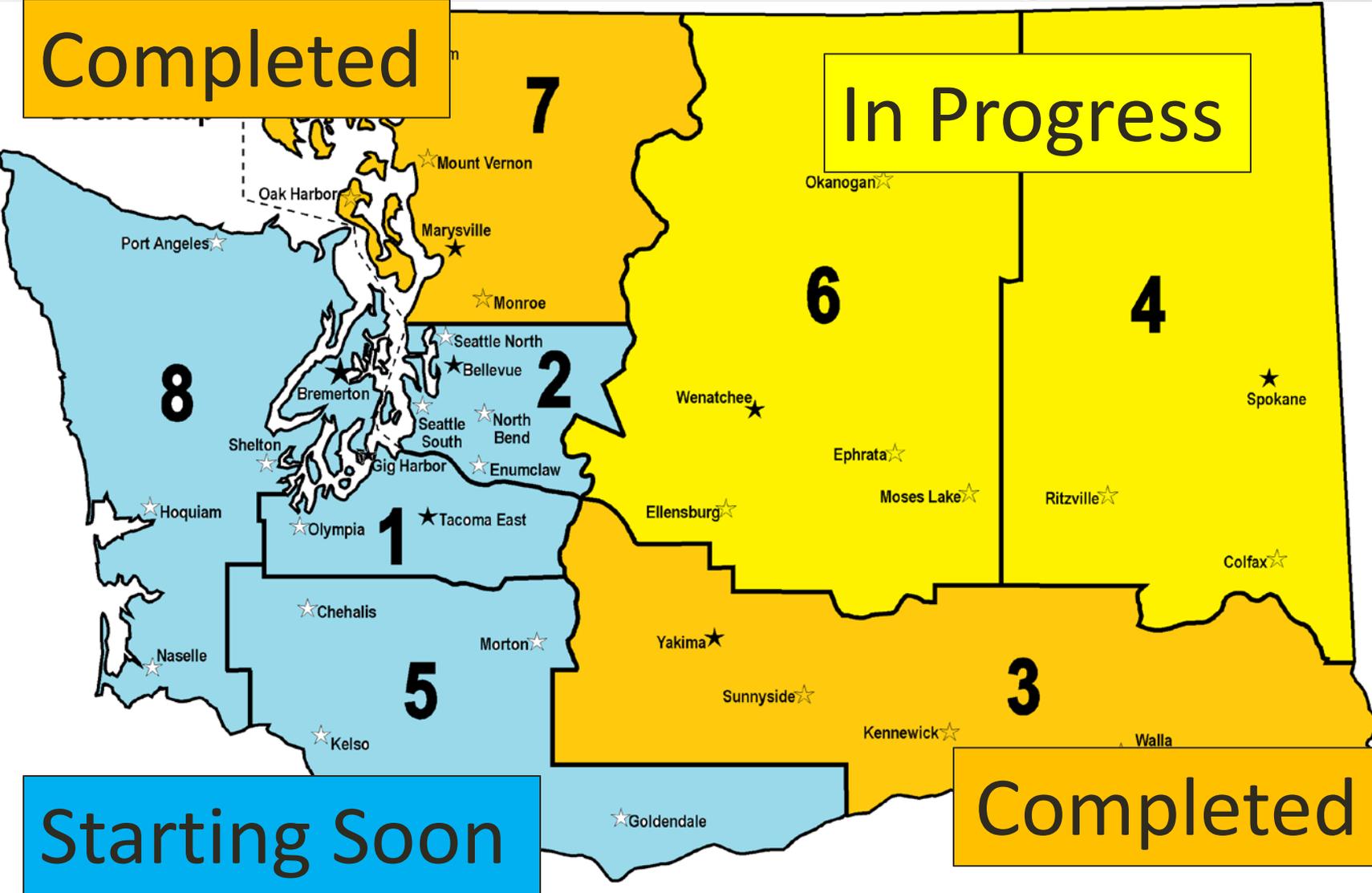
# Implementation Progress

Completed

In Progress

Starting Soon

Completed



# 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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