The Instrumentation

The purpose of this section is to ensure that Intoxilyzer 8000 users have the necessary depth of understanding to complete evidential breath testing. This section will include information about the instrument methods of analysis, proper procedures, menu options, and safeguards.

The Intoxilyzer 8000 instrumentation is approved for evidentiary use in the State of Oklahoma. It is designed for mobile and stationary breath alcohol analysis and is equipped with electronic communications capability.

Method of Analysis

Infrared light absorption (spectroscopy).

Infrared spectroscopy is a simple and reliable technique widely used in both organic and inorganic chemistry, in research and industry. It is used in quality control, dynamic measurement, and monitoring applications such as the long-term unattended measurement of CO2 concentrations in greenhouses and growth chambers by infrared (IR) gas analyzers.

It is also used in forensic analysis in both criminal and civil cases, for example in identifying polymer degradation. It is also used in determining the blood alcohol content of a suspected drunk driver.

Infrared (IR) Spectroscopy works due to the Beer-Lambert law. All molecules have a unique structure and will absorb energy/light in a unique way, for example, ethanol is absorbed at a specific infrared wavelength. The substance will have a linear relation between absorbance and the concentration of the absorbing molecule.

The subject will provide a breath sample which is blown into the sample chamber. The IR Source will produce infrared light in specific wavelengths which the alcohol molecule will absorb. The more Infrared (IR) light absorbed, the greater the concentration of alcohol in the sample analyzed.

The Intoxilyzer uses many Infrared Light Absorption Components to include:

Sample Chamber – Where a breath sample is analyzed. Its temperature is thermostatically controlled at 47C to prevent condensation.

Light Source (IR Source) – A spiral filament which pulses infrared light into the sample chamber. It is directly connected to one end of the sample chamber.



Filters – Filter infrared light at specific wavelengths to identify alcohol. The 3.4 uM filter identifies

alcohol and interferents in the sample. The 9.36 uM filter identifies alcohol in the sample. The two filters are directly connected to the sample chamber opposite the light source.

Detectors – Two pyroelectric detectors, each directly connected to a filter, which detect and determine the amount of light not absorbed by alcohol in the sample. It converts the heat energy into an electrical response.

Microprocessor – Calculates the amount of alcohol in a sample in g/210L based on the electrical responses received from the detectors.

Additional Operational Components

The Intoxilyzer 8000 has other operational components that an Operator must be familiar with. Operators should familiarize themselves with the following concepts.

Power Source

The power supply converts AC current from the wall outlet into the DC current required by the computer circuits of the system. The power is derived from the 110-volt AC (wall outlet) then converted to the voltage needed by the Intoxilyzers systems. If the input current or voltage is outside of the preset limit, a diagnostic failure will be displayed, and the test will be aborted.

Power Switch – Black rectangular rocker switch used to turn the instrument on and off. This switch is on the back of the instrument just above the power cord. The Intoxilyzer 8000 has a second black round rocker switch used to apply energy to the battery circuits. Both rocker switches must be turned on or off. The device should not be turned off unless a reboot or shutdown is required.



Battery Power ON/OFF switch



Start Test Button – Green button used to initialize the instrument, to initiate a breath test sequence, and to bring the instrument from STANDBY MODE to READY MODE.

Bar Code Reader - Scans barcode information from the back of Driver's License and BOT Intoxilyzer access cards. The bar code reader shows up as a red light when the Access Card and Driver's License bar codes are read.



Keyboard – The keyboard is used to input information. The keyboard is a fold-down compact model and is attached to the instrument. For convenience, the keyboard can be detached from the instrument.

Breath Tube – Delivers a breath sample into the instrument. It is temperature controlled at 45C to prevent condensation; therefore, check to make sure it is warm to the touch prior to use. The breath tube is used in conjunction with a "mouthpiece". The mouthpiece is placed into the open end of the breath tube. The mouthpiece serves a primary role of protecting the instrument but also plays a role in universal precautions. Failure to use a mouthpiece will not invalidate an otherwise valid breath test analysis. The mouthpiece is not used to analyze breath alcohol. The subject will blow through the mouthpiece into the breath tube. Two examples of mouthpieces commonly supplied by the Board are pictured below.



Mouthpiece



Display

The Display is the primary means of communications with the Operator. The display prompts the operator for the required inputs.

Display

The Display is a two-line (twenty characters per line) fluorescent display which communicates information to the user.

Tones

The Intoxilyzer 8000 will also communicate with the Operator using "BEEPS" or "TONES". There are three distinct Tones you will hear. A single Beep after the completion of each operation. The Operator will hear a continuous tone while a subject blows into the instrument with sufficient pressure and volume. The third tone is a Low/High tone or a "warbling" tone that denotes an exception, incorrect operational procedure, or unfulfilled test requirement.

Printers

The Intoxilyzer is designed to allow an external printer to be installed using a USB printer port. The USB port is located on the back of the instrument. The instrument is then attached to a printer and all results will be printed on an Officer's Impaired Driving Affidavit. If the external printer stops working,

then the instrument will print to the internal printer. Then Check cables and power source and press F1. If still not printing turn external printer and Intoxilyzer off, turn both back on and press F1.

The internal printer is thermal printer which can be used to print breath test results if no external printer is connected or detected. The instrument automatically detects the absence of an external printer and

defaults to the internal printer. The printout is on internal printer and will only print safeguard messages or Subject's test results, Not Valid Impaired Driving Affidavits. Affidavits will be covered in another section.



The internal printer paper must be installed correctly. Thermal printing is a digital printing process which produces a printed image by selectively heating coated thermal paper, when the paper passes over the thermal print head. The coating turns black in the areas where it is heated, producing the image of the letter typed. If the paper is installed incorrectly the coating is not heated and



no image will be displayed. Install the paper as shown with the paper coming up from the bettom or the roll. The green lever locks the roller into place, depress the green lever and feed the paper underneath the roller then lock the green lever back into place. The paper must go through the slot in the internal printer cover. Close the cover and lock back into place.



Communications

The Intoxilyzer 8000 has built in communications to allow the transfer of data between the instrument and the Board of Tests for Alcohol and Drug Influence (BOT) main frame. All data from the Officer's Affidavits and Refusal Affidavits completed on the instrument are transmitted to the Board of Tests for Alcohol and Drug Influence (BOT) mainframe. The BOT is also capable of transmitting form updates, operator databases and other items to the individual Intoxilyzer. The communication is accomplished using a MODEM or an Ethernet connection. Both communication ports are on the back of the instrument.



Operational Modes

The Intoxilyzer 8000 has four modes of operation. STANDBY, READY, NOT READY and DISABLED. Normally an LE will find the instrument in the STANDBY MODE. If the green start test button is not pushed within approximately thirty (30) minutes while the instrument is in READY MODE, the instrument will go to STANDBY MODE. The instrument suspends all analytical functions but maintains operational temperatures (like a "sleep mode"). To bring the instrument back to READY MODE, follow the prompt and push the green start test button.

When READY MODE is displayed, the instrument is ready for use. All the diagnostics have been completed and passed and all internal heated elements are at their proper temperatures. The instrument must be in the READY mode to start the testing sequence.

If the instrument is "off", or a person must turn the instrument "off" then, back to "on" to reset, the display will show "NOT READY MODE". The instrument is not ready for use because it is warming to operational temperatures. The instrument may take approximately twenty (20) minutes to warm-up. During this warm-up time, the instrument will display the date and time also displays "READY IN" and provides a countdown timer to the READY MODE. The instrument cannot be used by the operator to





perform a breath test sequence until the warm-up period is complete. After the warm-up is complete the instrument will perform a self-diagnostic. When the self-diagnostics are completed, the instrument will display READY MODE and the testing sequence may begin.

The DISABLED MODE disables the instrument if maintenance is necessary. When in the DISABLED MODE the instrument will display, "DISABLED MODE", the date and time. The Intoxilyzer 8000 is set up to automatically disable when the device senses the dry gas canister is below 25 PSI, when the Dry Gas Canister or Control Check Reference is expired and when the instrument detects the calibration check is out of tolerance. The device may also be placed into DISABLED MODE by the Board of Tests.

If an instrument is Disabled upon arrival with arrestee or Disables during a testing sequence, the only two options are to conduct a test on another device or read the Oklahoma Implied Consent Test Request for States Blood Test.

If the instrument is showing a DISABLED MODE indication, please call or message the Board of Tests, <u>http://www.oklahoma.gov/bot</u> or call (405) 425- 2460.

Diagnostics Check

When power is turned on, POST (Power-On Self-Test) is the diagnostic testing sequence that a computer's <u>basic input/output system</u> (or "starting program") runs to determine if the computer keyboard, <u>random access memory</u>, MODEM, and other hardware are working correctly.

If the necessary hardware is detected and found to be operating properly, the computer begins to <u>boot</u> to the "READY MODE". If the hardware is not detected or is found not to be operating properly, the BIOS issues a message which will display the instrument as in the "NOT READY MODE".

The instrument automatically performs all the following tests when a diagnostic check is conducted:

Internal Printer Test – Verifies that the internal printer has paper and is operational **Real Time Clock Test** - Validates the time and date.

Digital Signal Processor Test – Verifies that the digital signal processor is functioning correctly.

Analytical Stability Test – Verifies the stability and operation of analytical components.

Electronically Erasable Programmable Read Only Memory Checksum Test (EEPROM) – Verifies validity of the checksum and EEPROM data.

Voltage/Current Test – Verifies voltage and current values.

RAM Test – Verifies Random Access Memory availability.

Modem Test – Verifies internal modem operation.

Temperature Regulation Test – Verifies prescribed temperature controls for the sample chamber and breath tube.

DIAGNOSTIC OK indicates that all tests are successfully completed, and the instrument's analytical components and operational standards are in compliance. The instrument then enters "READY MODE". **DIAGNOSTIC FAIL** indicates that a diagnostic test result does not pass the internal diagnostics test. The instrument will remain in "NOT READY MODE".

Control Test and Dry Gas Standard

Control tests verify the calibration of the instrument by analyzing a dry gas standard. A dry gas standard is a standard consisting of a mixture of alcohol (ethanol) and gas which produces a known alcohol (ethanol) vapor at a specific BAC equivalent. This ensures that the results obtained are within the acceptable range for the samples analyzed. The use of a control test shows that the instrument is providing an accurate and reliable result at the time of the breath test by verifying the calibration of the instrument.

The control tests are automatically conducted during the breath test sequence.



THE DRY GAS STANDARD

Dry Gas Standard Analysis

The Dry Gas Standard is used to conduct control tests after the analysis of the breath samples. The gas concentration used is 0.08 g/210L. The acceptable range for the gas analyses is 0.08 (+/- 0.01) g/210L. If any analysis result is not within the acceptable range, the instrument will disable, and the message CALIBRATION CHECK OUT OF TOLERANCE will be displayed.

Dry Gas Standard Messages

When the gas pressure remaining in the cylinder is less than 75 psi, the following message will be displayed:



The "#" indicates the pressure remaining in the cylinder.

Press the green Start Test Button.

If the pressure in the gas cylinder is 25 psi or less or a cylinder is not connected, the following message will be displayed:

Disabled Low Tank Pressure

A breath test cannot be conducted until the gas cylinder is replaced.

Replacing/Removing the Dry Gas Standard Cylinder

The dry gas standard cylinder must be replaced when the cylinder is below minimum pressure, and when the cylinder expiration date has been reached.

The replacement/removing of the Dry Gas Standard canister WILL only be completed by authorized Board of Tests Technicians.

USER MENUS

A multi-level user menu allows features and functions to be changed or initiated. This guide will address the first level menu only. The user can move through the menu by placing the cursor under the desired letter and pressing ENTER. You may also enter the first letter of the function and press enter. If no information is recorded within two minutes after completing a function, the instrument will return to READY MODE. Diagnostic and setup functions can be accomplished through the keyboard Options Menu using what is commonly known as the "Escape, Escape Sequence."

Breath Test Operator Menu

Press ESC, ESC. Enter the password when prompted. If the wrong password is entered the instrument will beep and display" Verification **Fail"**. The instrument will return to the "READY MODE". On input of the proper password the Display will show: 1] A C D E P R Q

A = Continuous Air Blank C = Calibration Check D = Diagnostic E = Prelim Data Entry M = Messages P = Print Test R = Reprint Q = Quit Menu

A – Continuous Air Blank

When this option is selected, the air pump will be activated. The pump will continue until the START TEST button is pushed

C – Calibration Check

Check the simulator for proper connection before beginning this procedure. The instrument will begin a

sequence of testing with the external simulator solution. The sequence will alternate between an air blank and a calibration check. The sequence always ends with an air blank.

D – Diagnostic

This option enables the user to run a self-diagnosis routine on the Intoxilyzer. A printout will be provided when finished.

E – Prelim Data Entry

This option allows the user to view information and make changes. Either type in the new data or press ENTER to review the existing data. In either case, press ENTER when the proper data is on the display to store it in memory. Date: MM/DD/YYYY Time: HH:MM: SS Enter Location: Sets your location Please wait saving... (will display on the instrument)

M – Messages

This option will allow user to print any pending broadcast messages sent from COBRA or a central communications package compatible with I8000 to the local printer connected to the I8000. The operator will be informed if any special messages are present during the Ready Mode. The display will toggle through date, time, battery status and Messages pending if present.

P – Print Test

This provides a more complete diagnostic test for the printer. For instruments with an internal printer: this test will print rows of characters to determine if there are any problems with the paper alignment of the printer mechanism. For Instruments with an external printer: a similar printout should be printed. This should determine if the printer is properly connected.

R – Reprint

This option will reprint results of the last test performed. The same function may be performed from outside the menu by pressing F1.

Q – Quit Menu

To exit from this menu, press Q then enter.

Safeguard Messages

Once the green button is pushed and the Affidavit and Testing sequences have started. There are many messages that may be displayed during the testing sequence. Examples of the messages are provided below. None of these messages are for "failures" of the instrument. The messages are indicators that the safeguards to the instrument have been initiated. The adopted safeguards protect the scientific integrity of the breath samples and subsequent analysis. The following examples provide visual overview and explanation.

If you receive a safeguard message and it is printed, immediately press F1 to reprint the safeguard message. Sign both, give one copy to your arrestee and the other should be sent into Service Oklahoma along with the Officer's Impaired Driving Affidavit.

No matter the safeguard message you have 3 options depending on the message. Start over on the same device, move to another device, or re-read the Oklahoma Implied Consent Test Request and offer Blood for the States Test. If it becomes a refusal during the test, complete a Refusal Affidavit with the Instrument or fill out a handwritten Refusal Affidavit.

```
BOT CLASSROOM 15
Intoxilyzer - Alcohol Analyzer
Model 8000
                     SN 80-002715
11/10/2022
                              15:28
Citation No =
Sub Name =
         CDL,
         TEST,
         ,
Sub DOB = 01/01/1981
Sub Sex = M
Driv Lic = B083454861/OK
Officer = CRAVENS, DAVID, W
Officer Badge = 000000235
Officer Agency = OHP TROOP A
```

| Test | g/210L | Time |
|---------------|--------------|-------|
| Air Blank | 0.00 | 15:30 |
| Subject Test | 0.07 | 15:30 |
| Breath Volume | 1.359 LITERS | |
| Air Blank | 0.00 | 15:31 |
| Wait | ABT* | 15:32 |
| Air Blank | 0.00 | 15:33 |

*Sequence Aborted

Operator's Signature

SEQUENCE ABORTED – The green "Start Test" button was pressed during an operational Function. The instrument will display SEQUENCE ABORTED. If the "Start Test" button is pressed during the nine (9) step sequence a printout will be created. The instrument will return to READY MODE.

BOT STUDY 2 Intoxilyzer - Alcohol Analyzer Model 8000 SN 80-006153 11/08/2022 23:43 Citation No = Sub Name = MOCK, , Sub DOB = 12/20/1995Sub Sex = FDriv Lic = MOCK/OK Officer = MOCK Officer Badge = 435Officer Agency = BOARD OF TESTS



TEST REFUSED – The operator pressed the "R" key on the keyboard when the instrument displayed, PLEASE BLOW UNTIL TONE STOPS /R. The instrument will display SUBJECT TEST REFUSED. The test will abort, return to READY MODE and a printout will be generated. Restart the test on the instrument and complete a refusal Affidavit. Keep and sign all printouts. The operator may elect to complete a handwritten refusal.

```
BOT STUDY 2

Intoxilyzer - Alcohol Analyzer

Model 8000 SN 80-006153

11/08/2022 14:09

Citation No =

Sub Name =

,

,

Sub DOB = 09/02/2000

Sub Sex = M

Driv Lic = MOCKDL/OK

Officer =

Officer Badge =

Officer Agency =
```



AMBIENT FAIL – The instrument air blank was contaminated and did not clear the sample chamber during the air blank prior to a breath sample analysis or a control sample analysis. The instrument will display AMBIENT FAIL. Keep and sign the printout, give a copy to the subject with any other Affidavit copies.

BOT STUDY 2 Intoxilyzer - Alcohol Analyzer Model 8000 SN 80-006153 11/08/2022 15:00 Citation No = Sub Name = , , Sub DOB = 10/10/2000 Sub Sex = M Driv Lic = MOCK/OK Officer = SMITH, JOSHUA, C Officer Badge = 435 Officer Agency = BOT

| Test | g/210L | Time |
|---------------|--------------|-------|
| Air Blank | 0.00 | 15:02 |
| Subject Test | 0.19 | 15:02 |
| Breath Volume | 1.476 LITERS | |
| Air Blank | PUR* | 15:03 |
| Air Blank | 0.00 | 15:04 |
| *Purge Fail | | |

Operator ghature

PURGE FAIL – The instrument did not clear the sample chamber during the air blank after a sample was analyzed. The instrument will display PURGE FAIL. This can occur more frequently if the mouthpiece is not removed from the hose after collecting samples. Keep and sign the printout, give a copy to the subject with any other Affidavit copies.

BOT STUDY 2 Intoxilyzer - Alcohol Analyzer Model 8000 SN 80-006153 11/08/2022 14:47 Citation No = Sub Name = MOCK, SUBJECT, TEST, Sub DOB = 11/03/1999Sub Sex = MDriv Lic = MOCK/OK Officer = SMITH, JOSH, C Officer Badge = 435Officer Agency = BOT

| Test | g/210L | Time |
|-------------------|--------------|-------|
| Air Blank | 0.00 | 14:48 |
| Subject Test | INT* | 14:49 |
| Breath Volume | 1.406 LITERS | |
| Air Blank | 0.00 | 14:49 |
| *Interferent Dete | ect | |
| | R | |

Signature

Operator's

(

INTERFERENT DETECT – The calculated result obtained from the detection of light from each filter did not agree, which could mean that an interfering substance was detected in the breath sample or control sample. The instrument will display INTERFERENT DETECT and abort the test. The subject may need medical evaluation. Keep and sign the printout, give a copy to the subject with any other Affidavit copies.

```
BOT STUDY 2
Intoxilyzer - Alcohol Analyzer
Model 8000
                               SN 80-006153
11/08/2022
                                      13:54
Citation No =
Sub Name =
          MOCK,
          SUBJECT,
          т,
Sub DOB = 02/27/1973
Sub Sex = M
Driv Lic = MOCKDL/OK
Officer =
Officer Badge =
Officer Agency =
```



DEFICIENT SAMPLE - The subject did not provide an adequate sample, must have at least 1.1 Liters of air volume. The test sequence will abort. The subject can be retested, and further coaching is advised. Keep and sign the printout, give a copy to the subject with any other Affidavit copies.

```
BOT STUDY 2

Intoxilyzer - Alcohol Analyzer

Model 8000 SN 80-006153

11/10/2022 02:41

Citation No =

Sub Name =

,

,

Sub DOB = 10/10/2000

Sub Sex = F

Driv Lic = MOCKDL/OK

Officer =

Officer Badge =

Officer Agency =
```



NO SAMPLE GIVEN - The subject did not attempt to provide a breath sample. The operator has three (3) minutes to receive a sufficient sample. The instrument will display NO SAMPLE GIVEN, abort the test, and return to the READY MODE. Keep and sign the printout, give a copy to the subject with any other Affidavit copies. Determine if the subject is refusing the state's test and either retest or complete a refusal affidavit.

```
BOT STUDY 2
Intoxilyzer - Alcohol Analyzer
Model 8000 SN 80-006153
11/10/2022 02:21
Citation No =
Sub Name =
,
,
Sub DOB = 10/10/2000
Sub Sex = M
Driv Lic = /
Officer =
Officer Badge =
Officer Agency =
```

| | Test | g/210L | Time |
|-----------|---|--------------------------------------|-------------------------|
| \langle | Air Blank Subject Test Breath Volume Air Blank *Sample Rejected | 0.00 XXX* 0.992 LITERS 0.00 | 02:27 02:27 02:28 |
| | Operator | s Signature | |

SAMPLE REJECTED – The breath sample did not meet the slope requirements of a minimum acceptable breath sample. This may be caused by residual mouth alcohol. The subject may be retested, but a new deprivation period must be observed. Keep and sign the printout, give a copy to the subject with any other Affidavit copies.

```
BOT STUDY 2
Intoxilyzer - Alcohol Analyzer
Model 8000 SN 80-006153
11/10/2022 02:29
Citation No =
Sub Name =
,
,
Sub DOB = 10/10/2000
Sub Sex = M
Driv Lic = MM/OK
Officer =
Officer Badge =
Officer Agency =
```



IMPROPER SAMPLE – The breath sample was introduced at the wrong time. The instrument will display IMPROPER SAMPLE. The test will abort. A printout will be generated with "IPS*" in the results. Keep and sign the printout, give a copy to the subject with any other Affidavit copies.

| BOT STUDY 2 Intoxilyzer - Alcohol Ana | lvzer | |
|--|-------|----------------|
| Model 8000 | SN | 80-006153 |
| 11/08/2022 | | 14 : 13 |
| Citation No = | | |
| Sub Name = | | |
| , | | |
| , | | |
| , | | |
| Sub DOB = $10/10/2000$ | | |
| Sub Sex = F | | |
| Driv Lic = MOCKDL/OK | | |
| Officer = SMITH, JOSHUA, (| С | |
| Officer Badge = 435 | | |
| Officer Agency = BOT | | |

| Test | g/210L | Time |
|------------------|--------------|-------|
| Air Blank | 0.00 | 14:16 |
| Subject Test | 0.05* | 14:16 |
| Breath Volume | 1.824 LITERS | |
| Air Blank | 0.00 | 14:17 |
| Wait | | 14:19 |
| Air Blank | 0.00 | 14:19 |
| Subject Test | 0.00* | 14:19 |
| Breath Volume | 1.667 LITERS | |
| Air Blank | 0.00 | 14:20 |
| *No .030 agreeme | nt | |
| | 2 | |
| Operator | s Signature | |

NO .030 AGREEMENT – The given breath samples were outside the 0.03 g/210L tolerance. The test will abort. Keep and sign the printout, give a copy to the subject with any other Affidavit copies. The instrument will return to READY MODE. To retest the subject, start the test again, no new deprivation period is required. Keep and sign the printout, give a copy to the subject with any other Affidavit copies. BOT STUDY 2 Intoxilyzer - Alcohol Analyzer Model 8000 SN 80-006153 11/08/2022 14:31 Citation No = Sub Name = , , Sub DOB = 11/22/1955Sub Sex = MDriv Lic = /OKOfficer = SMITH, JOSHUA, C Officer Badge = 435Officer Agency = BOT

| Test | g/210L | Time |
|--|---|----------------|
| Air Blank | 0.00 | 14:36 |
| Subject Test | 0.00 | 14:36 |
| Breath Volume | 1.742 LITERS | |
| Air Blank | 0.00 | 14 : 37 |
| Wait | | 14 : 38 |
| Air Blank | 0.00 | 14:39 |
| Subject Test | 0.00 | 14:40 |
| Breath Volume | 1.472 LITERS | |
| Air Blank | 0.00 | 14:40 |
| Cal Check | 0.00* | 14:41 |
| Air Blank | 0.00 | 14:41 |
| ************************************** | | |
| a management of the state of th | the second second state and second | |

CONTROL OUTSIDE TOLERANCE – The dry gas standard control test value was out of acceptable range. The instrument will display CALIBRATION CHECK OUT OF TOLERANCE. The instrument will enter DISABLED mode and be unavailable. The operator may retest on another instrument or request a blood test. Keep and sign the printout, give a copy to the subject with any other Affidavit copies.





RFI DETECT – The instrument detected radio frequency interference of a sufficient strength and frequency to interfere with the breath test or control test. The instrument will display RFI DETECT, the test will be aborted and return to READY MODE. A printout with "RFI*" will be printed. Subject can be retested. The operator will need to remove or disable all RFI devices, i.e... radios, cell phones, anything that can and will emit a radio frequency, (RFI) signal. Keep and sign the printout, give a copy to the subject with any other Affidavit copies.