



# **User Manual**

**OSA4™ VERSION 7.2 – Windows 7**

**Original Instructions**

**Guide to the OSA4™ Analyzer**

**CE certified**

**ASTM D7417-10**

## PREFACE

This user manual is the first part of the complete guide to the OSA4™ Analyzer. This manual is intended to guide operators of the Analyzer through the normal procedures associated with processing oil samples.

This manual is intended for mechanics, technicians, or anyone else who wants to learn the proper way to analyze oil samples using the OSA4™ Analyzer. The introductory sections of this manual orient the user with the equipment and supplies that are used. The Standardization section covers the procedures that give the user confidence that the Analyzer is performing to specifications. The largest section of this manual is the How To... section. The reader is taken through a step-by-step process of how to analyze an oil sample. The Printing and Flushing sections complete the start-to-finish organization of this manual.

This manual includes features that are designed to aid the reader in quickly referencing helpful information. The outlining is extensive so that the reader can easily find the topic of interest. Useful tips are emphasized in boxes entitled “Key to Successful Oil Analysis.” The electronic version of this document includes hyperlinks and bookmarks to further speed the reader’s access to information.

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On-Site Analysis, Inc.  
7108 Fairway Drive  
Suite 130  
Palm Beach Gardens, FL 33418  
561-775-5756

On-Site Analysis, Inc. declares that their OSA4™ Oil Analyzer with the following models:

MotorCheck™, TruckCheck™, MilitaryCheck 3M™, MetalLab™, and MicroLab™ are classified within the following directives:

EU Low Voltage Directive 2006/95/EC  
EU Electromagnetic Compatibility Directive 2004/108/EC  
EN 60950-1:2006 - EN55022 (2006) +A1:2007 - EN 55024 (1998) + A2:2003

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## I. INTRODUCTION

### OVERVIEW

This is the User Manual for the OSA4 Analyzer. The OSA4™ oil Analyzer is a tool for evaluating the condition of engines, transmissions, gearboxes and hydraulics. The Analyzer tests for wear debris and other contaminants in the oil. The Analyzer also tests the physical properties of the oil itself. By comparing test results to normal conditions, the OSA4™ Analyzer can recommend if any maintenance or repair actions are necessary.

The OSA4™ Analyzer is a tandem spectrometer that integrates an Optical Emissions Spectrometer (OES) and an Infrared Module. The OES excites a portion of the used oil sample and measures the concentration of sub-microscopic metals in solution. These metals are present due to component wear, normal and abnormal, inside the component. The Infrared Module scans a portion of the used oil sample to measure the physical properties of the oil and look for contaminants.

An onboard computer controls both spectrometers and tabulates the results gathered from each. Information about the oil and the vehicle provided by the operator, along with the test results, are evaluated by the Analyzer's proprietary software. The software generates a report that includes the test results and a diagnostic statement. The diagnostic statement is a summary of the test results and an evaluation of the condition of the engine or transmission being tested. The diagnostic statement may also recommend maintenance for specific engine or transmission components.

This manual is about operating the OSA4 Analyzer. The introduction will acquaint you with the features of the Analyzer and bring your attention to safety concerns. The Getting Started section will instruct you on the simple tasks associated with operating the Analyzer and how to use the other items supplied with it. Standardizing the Analyzer is an important first step in getting comfortable with its operation. In the following sections you will be given details on how to properly analyze a sample of oil and produce useful reports.

## SAFETY INFORMATION

To reduce the risk of injury, do not open the instrument enclosure or remove access panels. There are no user serviceable parts inside. Refer servicing to qualified service personnel.

### WARNING LABELS

Special labels are placed where hazards exist.



This symbol warns that dangerous voltages are near that present a risk of electrical shock or personal injury.



This symbol warns that hazards are near which are described in instructions accompanying the equipment.

### SPECIFIC WARNINGS

#### Do Not Defeat the Spark Door Interlocks

Defeating Spark Door Interlocks may expose the user to UV Radiation that can cause permanent eye damage.

Defeating the Spark Door Interlocks may expose the user to voltages that are lethal.

#### Operate in a Well Ventilated Area

The Analyzer produces ozone when high voltage is arcing across the electrodes.

#### Do Not Introduce Flammable Fluids into the Analyzer

Never attempt to introduce fuels such as gasoline, kerosene, and diesel fuel into the Analyzer. Fuels may ignite and explode causing injury.

Only introduce used oil samples from diesel engines, gasoline engines, gearboxes, hydraulics and transmissions.

#### Key to Successful Oil Analysis:



**Never attempt to introduce anti-freeze, water, brake fluid, or fuel into the Analyzer. These fluids will cause irreparable damage.**

## **ANALYZER FEATURES**

The basic features of the OSA4™ Analyzer are listed here. Becoming familiar with these features is necessary as you will need to interact with them routinely during the normal operation of the Analyzer.

The photo at the end of this section illustrates the location of each of the following features of the OSA4™ Oil Analyzer.

### **Spark Stand**

This door should be closed at all times unless performing routine maintenance.

### **Sipper Straw**

The Oil Straw draws sample oil into the Analyzer where it is pumped through the flow system for analysis. This is a consumable item and has to be replaced for every sample.

### **Waste Bottle**

Oil that has been analyzed and flushing solution that has been purged through the flow system drains into this container.

### **Flush Bottle**

The Flush Bottle contains a flushing solution (CheckFlush) used to clean out the flow system and is used during the low standardization process. This bottle needs to be checked on a daily basis.

### **ON / OFF Switch – Reset Switch**

The power switch is an illuminated rocker switch located on a recessed bulkhead along the right side of the Analyzer.

### **Flush / Flush Bracket**

This bracket is included with units that have an optional Dual Temperature Viscometer. It allows for a larger flush bottle to be attached to the side of the OSA4.

### **Waste Port**

This port can be set up by an OSA engineer to allow for larger waste containers. A special tube is inserted in the interior of waste door and this port becomes active. The port is equipped with a female 3/8-18 NPT.

### **Keyboard**

Keyboard is used for entering information and operating the Analyzer.

### **Touch Screen Display**

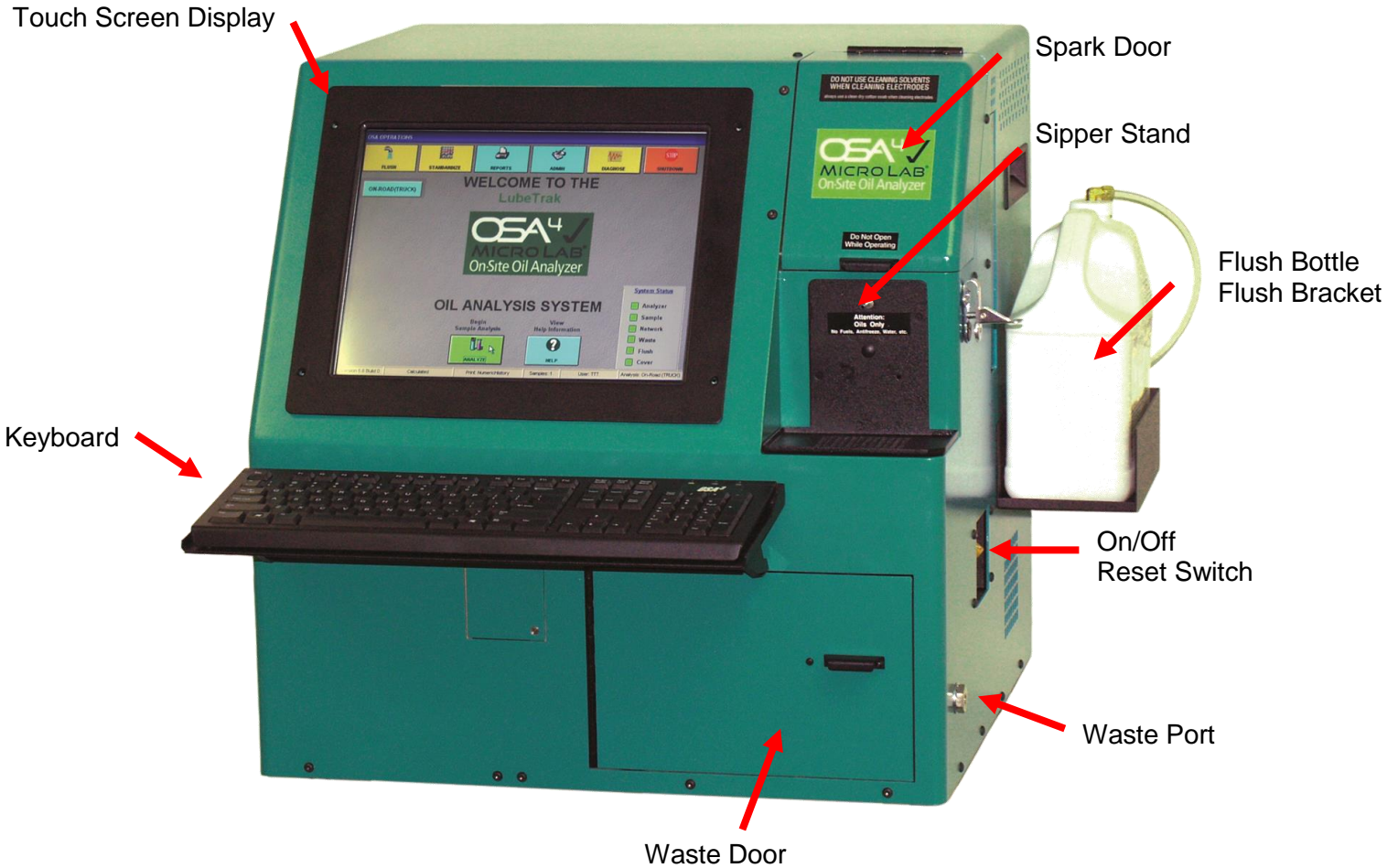
The flat panel LCD touchscreen displays operator keyed information and Analyzer status.

### **Printer (not shown)**

Analysis reports are printed from a printer located near the Analyzer. Typically, the printer sits on the shelf of a cart supporting the Analyzer.

**Modem/Network (not shown)**

A computer modem connection to the Analyzer facilitates problem diagnosis and maintenance from remote customer service centers. A dedicated telephone line or a network IP address connected to the Analyzer via the modem/network connection on the back panel is a requirement at Analyzer placement sites.



**\*\*\*\*\*Please note that your Analyzer may be a different color based on the model ordered\*\*\*\*\***

## II. GETTING STARTED

### ROUTINE TASKS

#### Emptying the Waste Bottle


The waste bottle collects the used sample oil and flushing solution that has been circulated through the flow system. There is a sensor to alert you to empty the waste bottle. The waste bottle is accessed behind the Flush / Waste Door. Check the waste bottle occasionally to be sure that the sensor is working properly.

#### Replacing the Flush Bottle

The Flush Bottle contains the fluid that cleans the instrument between samples and is used during low standardization. There is a sensor to alert you to a low level of flushing solution. The flush bottle is accessed behind the Flush / Waste Door. Check the flush bottle regularly and replace it when it gets low. If your unit is equipped with an optional DTV - the flush is located on the right side in the DTV Flush Bracket.

**Key to Successful Oil Analysis:**

---



**Keep an adequate level of flushing solution in the flush bottle. An inadequate level of flush will cause cross-contamination between oil samples.**

#### SAMPLE INTRODUCTION:

Shake sample gently, then attach straw to analyzer sample intake, and insert into sample bottle, as shown below.



## Maintaining the Electrodes

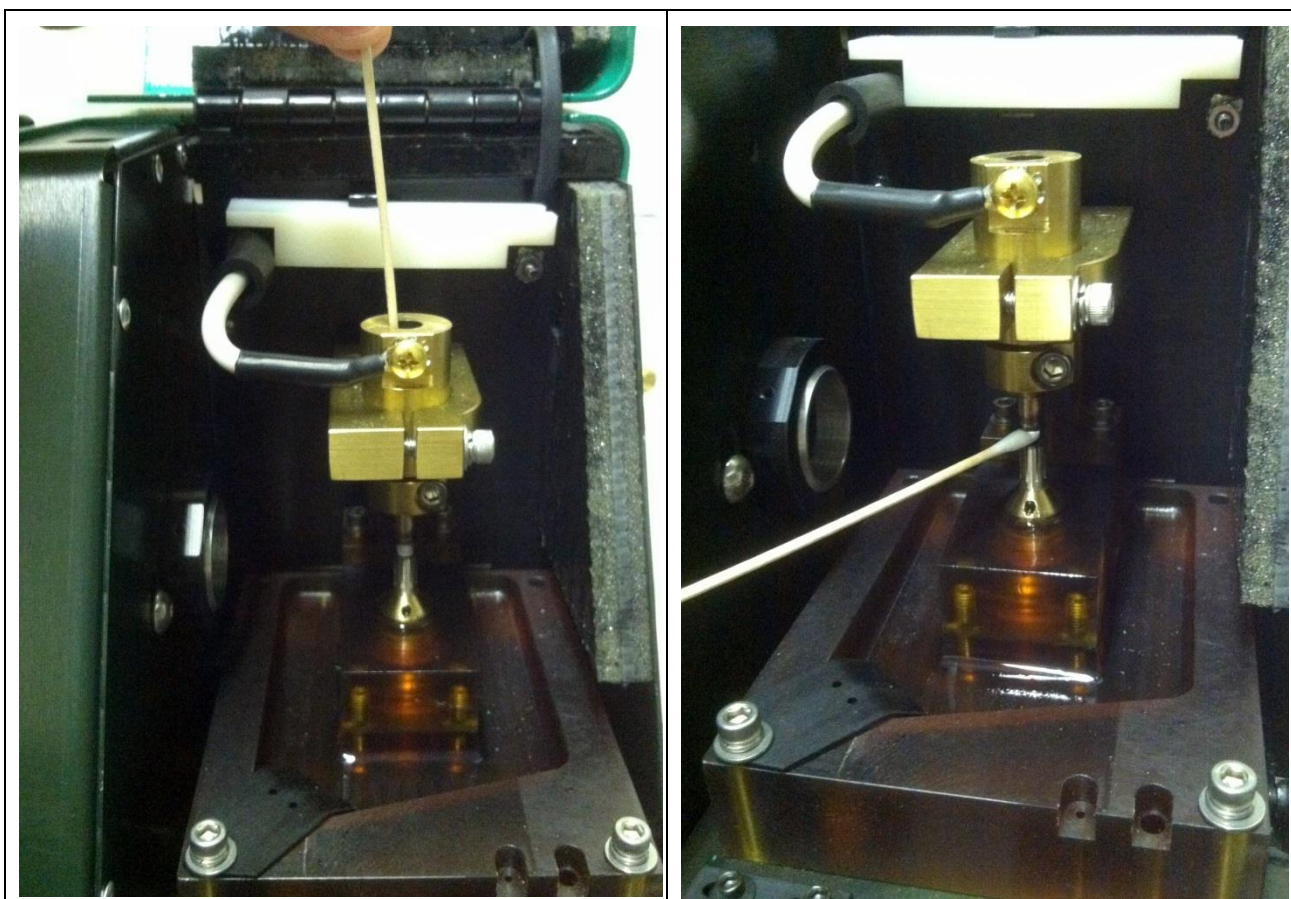
The software will prompt you when required adjustments are needed. If it is necessary to adjust the electrode gap then you must also standardize the Analyzer. Refer to the Standardization section of this manual for details.

The electrodes are on a stand inside the Spark Door. The upper and lower electrodes are positioned vertically – one above the other.

The gap is the distance between the upper and lower electrodes. The gap should be no more than 5/32 of an inch. The flat end of the gap tool (supplied with instrument) can be used as a “Go/No-Go” gauge for measuring the electrode gap. A 5/32 allen wrench is used to loosen the screw that holds the upper electrode and is included with the Analyzer’s supplies.

The electrodes are located on a stand inside the Spark Door.

### **CLEANING THE ELECTRODES - Refer to figure below**



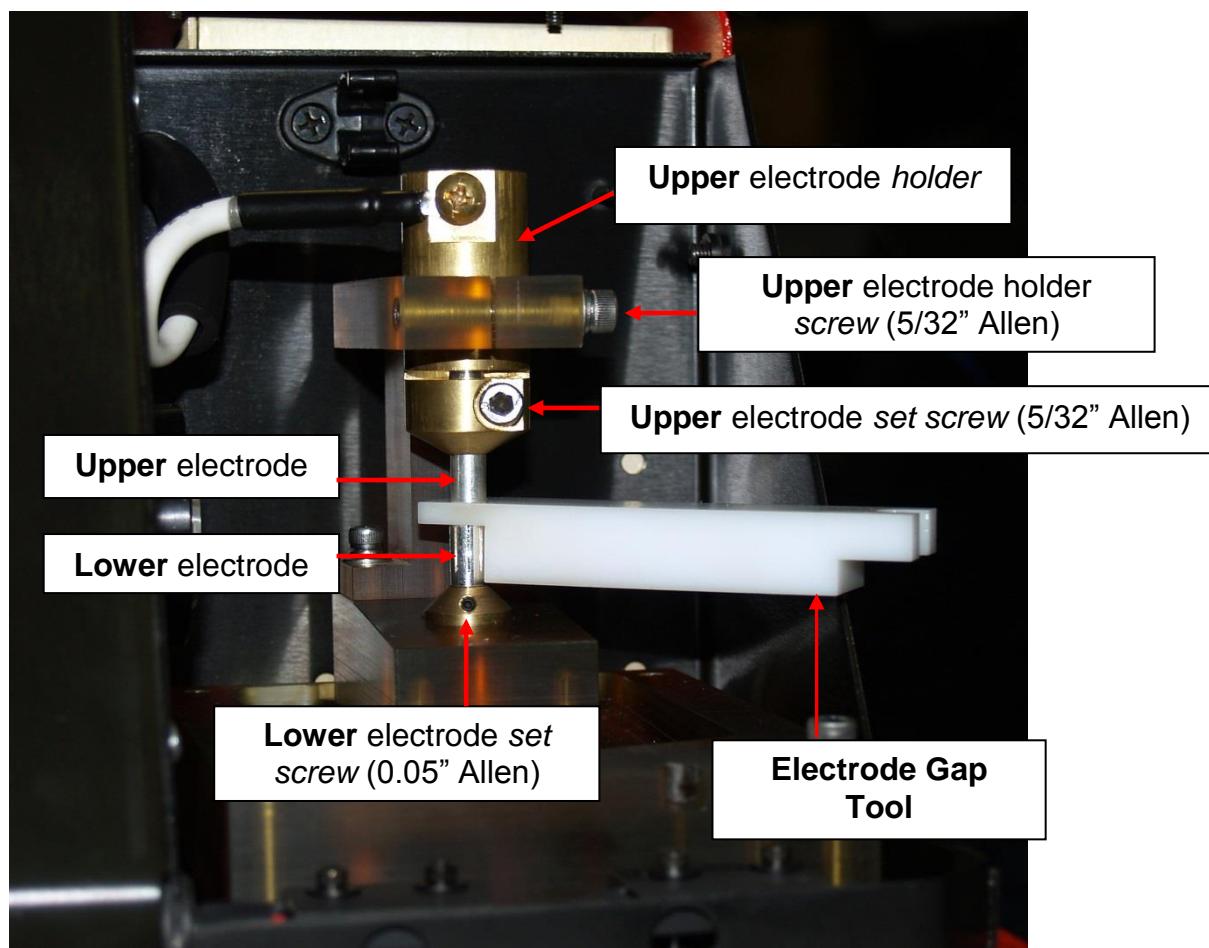
**Use a cotton swab to clean the upper electrodes. First, clean the inside of the upper electrode by inserting the swab down through the center of the electrode and turning clockwise. Then, insert the swab between the electrodes and wipe the flat surfaces of both electrodes.**

## **CHECKING AND ADJUSTING THE ELECTRODE GAP (“GAPPING”)**

### **Electrode gap**

The electrode **gap** is the distance between the upper and lower electrodes. One side of the white electrode gap tool (shown below) is used as a “Go/No-Go” gauge for measuring the electrode gap (5/32”).

As samples are run, the gap between electrodes will increase.



**Figure E-1**

If the electrodes are not properly gapped (Go/No-Go gauge is loose, or gap is too tight to insert gauge), then follow the procedure below to reset the electrode gap.

### **Resetting Electrode Gap (“Gapping”)**

Insert the flat end of the gap tool between the electrodes as shown in Figure E-1.

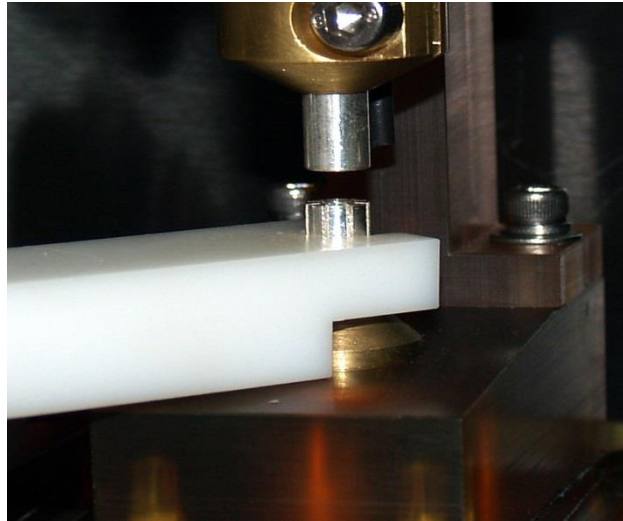
Loosen the upper electrode holder screw (5/32” Allen). Let the upper electrode holder slide down till it is flush with the top of the white electrode gap tool. Retighten the upper electrode holder screw.

**NOTE: Anytime the gap is changed, the unit must be Standardized.**

## **CHECKING THE HEIGHT OF THE LOWER ELECTRODE**

**Note:** The lower electrode will slowly decrease in size with use. It is recommended to regularly check the height of the lower electrode.

Place the grooved (U-shaped) end of the white electrode gap tool (shown in **Figure E-2** below) around the bottom electrode. If the electrode falls **below** the height of the 'U' shaped tool, then it is time to change the electrode. .

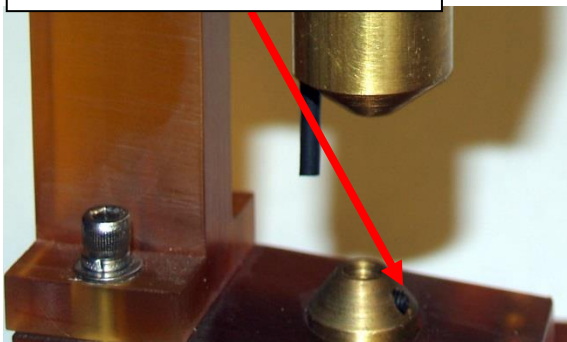


**Figure E-2**

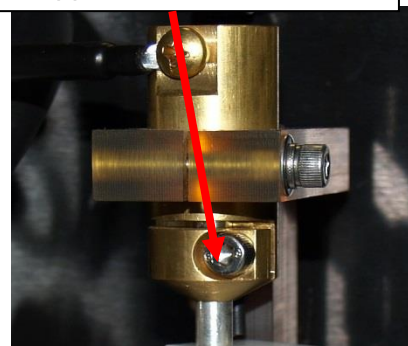
## **CHANGING ELECTRODES**

**To change electrodes –** Remove the Upper Electrode screw shown in the picture below right. Loosen the upper electrode holder screw, and slide the upper electrode straight up out of its holder. After raising the upper electrode out of its holder, remove the lower electrode. The lower electrode has a .05 Allen screw holding it in place. Loosen the Allen screw, and remove the lower electrode by turning counter-clockwise. Anytime you change the bottom electrode, change the upper electrode as well. The upper electrode can be removed from its holder by loosening the screw in the upper holder. The upper electrode is reversible, so pull it out and if it is in good shape place it back in reversed and tighten screw - Otherwise, replace with a new Upper electrode.

Lower electrode Allen screw



Upper electrode screw



Replace bottom electrode by turning in new one clockwise. Insert upper electrode holder down through slot, and adjust the upper electrode so that about 3/8" of the electrode (or the approx. thickness of the gap tool's U-shaped section protrudes from the bottom of the holder (refer to picture, top of this page) then replace the upper electrode screw and tighten it to secure the upper electrode. Re-gap between the electrodes, making sure to tighten the upper electrode holder screw (refer to page 9).

Anytime an upper or lower electrode are replaced- the unit must be Standardized.

**CAUTION**

DO NOT OVER TIGHTEN SOCKET HEAD CAP SCREWS LOCATED ON ELECTRODE HOLDER  
socket head cap screw should be finger tight plus ¼ turn with wrench only  
over tightening of screw may cause stress/cracking to holder

### **CLEANING THE COLLIMATOR**

The collimator acts as the “eyes” of the spectrometer (OES) used to detect and measure wear metals in oil samples. As such, the collimator lens needs to be cleaned periodically to maintain the OSA’s ability to measure these wear metals.

The collimator lens looks like the lens of a camera and is located to the left of the electrodes.

Daily - wipe the collimator lens **gently** with a clean, lint-free cloth (the Kim-Wipes supplied with the analyzer are to be used for this purpose).

**CAUTION**

Be careful not to apply excess pressure to the lens, as moving the lens will affect the alignment of the collimator, possibly resulting in inaccurate results.

### **Servicing the Printer**

Re-supplying paper is usually all you need to do for the printer. Check the paper tray and add paper as necessary, following the instructions included with the printer. When the printer needs service, it will indicate with the Light Emitting Diode (LED).

Most printing problems are easily remedied. Make sure the printer has paper and is powered on. Turning the printer off and back on can clear up other problems.

Occasionally the toner cartridge and/or printer drum will need to be replaced. Patches of light printing on the report page are indications that the toner cartridge needs to be replaced. If the LED indicator light for a Paper Jam is blinking and you can’t find a paper jam, that’s an indication that the drum needs to be replaced. Please contact your customer service center for replacement toner cartridges or printer drums.

## NECESSARY SUPPLIES

### Test Standard (29087-00)

The High Standard solution is a blue colored base-oil that contains precisely controlled amounts of each of the metals needed for Standardization.

### CheckFlush Solution (29088-01)

The flush solution is a non-toxic, environmentally friendly oil cleaning fluid. The flush solution is used to purge the flow system, and run low standard.

### Sample Bottles (29002-01 – 2 oz.) (29002-05 – 5 oz.)

Sample bottles are typically 2 to 5 ounces in capacity. The Basic Analyzer usually uses less than two ounces of oil for a complete analysis. The sample bottles are pre-cleaned and should not be re-used to avoid contamination. Units equipped with a DTV (Viscometer) will use five ounces of sample.

### Report Paper (29011-00)

Report paper is pre-printed having a logo on the front and an explanation of oil analysis results on the back. The explanations are helpful when interpreting oil analysis results.

### Input Sheets (29021-00)

Input sheets are half-sheet sized pre-printed forms that are helpful to fill-out when taking oil samples from vehicles. When several samples are being processed it is important that the input sheets can be identified to differentiate sample bottles.

### Cleaning Supplies

- *Cleaning Swabs (29033-00)*  
Only certain sized cotton swabs will fit properly through the upper electrode. Care should be taken so that the swab does not get stuck in the upper electrode.
- *Clean Shop Rags or New Paper Towels*  
Clean Shop rags or new paper towels are used to wipe off the top electrodes and clean up any oil spills.

### Sipper Straws (29822-00) Box of 350

Sipper Straws are a single use sample intake straw that are swapped out with each individual sample. The straw is removed from the box by holding the bend area and placed directly over the metal intake.

## THE MAIN MENU

The main menu of the User Interface is the first screen that is displayed when the Analyzer is powered-up. From the main menu, all of the Analyzers functions can be accessed. The main menu is shown below. Page numbers for description of the main menu features are provided. Some of the items described here are elsewhere in the User Manual [U.M.]

**WHEN THE ANALYZER IS BOOTED FROM THE DESKTOP – THE USER ID AND PASSWORD ARE “1” AND “1”.**

**THIS LOG-IN MESSAGE BOX WILL APPEAR BRIEFLY AS THE UNIT WARMS UP**



### III. STANDARDIZATION

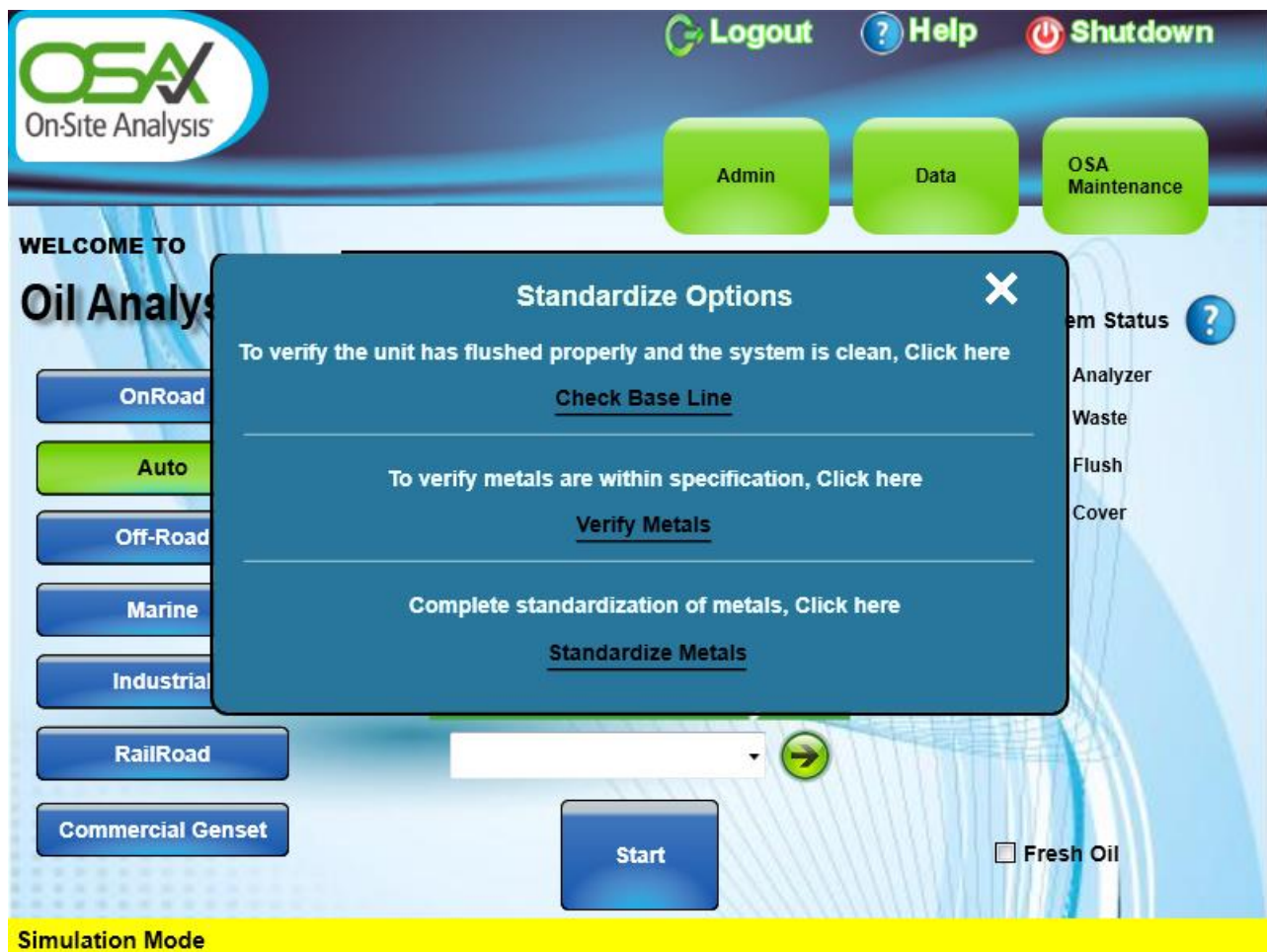
#### EXPLANATION

Occasionally, it is necessary to standardize the OSA4™ Analyzer in order to compensate for minor changes affecting the Analyzer's calibration.

You do not have to standardize the Analyzer unless 1) you have adjusted the Electrode Gap, 2) the Test Standard routine prompts you to, or 3) the message box tells you to at the beginning of a sample run.

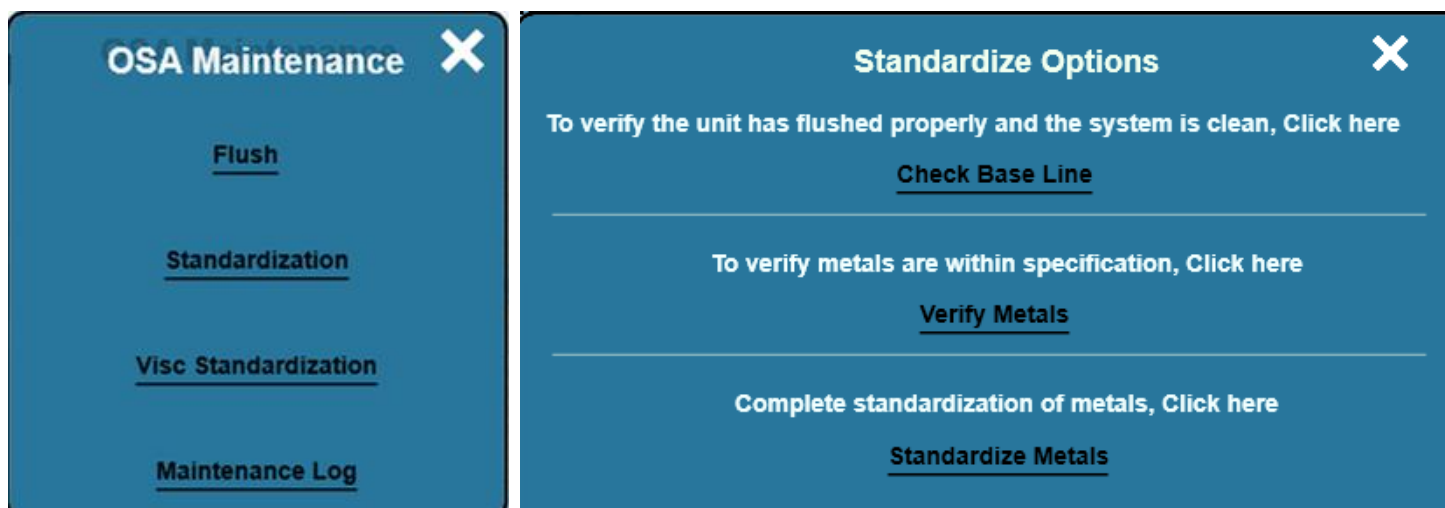
You should run the Verify Metals routine when prompted by the software, or whenever you question the Analyzer's performance.

Prior to running the Verify Metals routine, a Check Baseline Test should be performed.



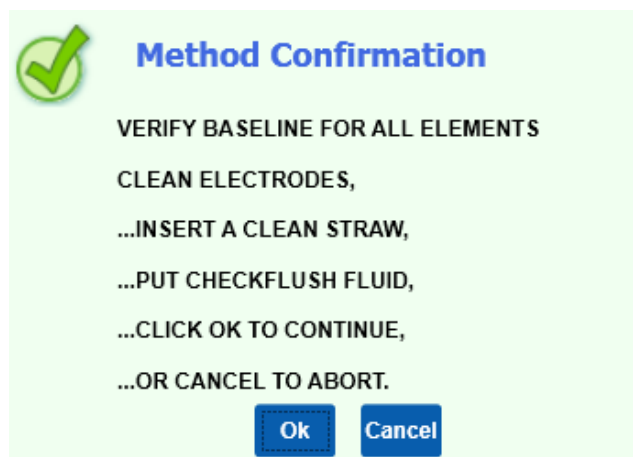
## CHECK BASELINE TEST

The Baseline Test is used to determine if there is contamination in the flow system or on the electrodes of the Analyzer. It should be performed at the beginning of each day, or any time you wish to confirm that the Auto Flush cycle has sufficiently cleaned the internal lines and electrodes after running a highly contaminated sample. To run this test, simply select the OSA Maintenance button from the Main Menu located at the top right of the screen. Select the 'Standardization' option, and the 'Standardize Options' Screen will appear as shown below. Select 'Check Base Line' from the list of options.



When the Baseline Test begins, you will be given instructions to clean the electrodes. Refer to [Cleaning the Electrodes](#) in the [How to Analyze an Oil Sample](#) section of this manual for a description of the proper technique. Follow the directions on the screen to perform the Baseline Test.

After cleaning the electrodes, press the OK key and the Analyzer will run the test. Press CANCEL if you want to return to the main menu.



At the end of the test, a message box will display informing you if there is contamination, or that the System is clean, OK to proceed. If there is contamination, then the Analyzer will give you instructions to flush, clean the electrodes, and try the test again.

**Key to Successful Oil Analysis:**

---

**Clean the electrodes thoroughly prior to starting the Baseline test. A dirty electrode will cause the test to fail.**

## VERIFY METALS

The Verify Metals function allows you to check the Analyzer's standardization. To run this test, choose Verify Metals from the Standardize Options screen and press ENTER. When the test begins, you will be given instructions like those shown on the screen below. Refer to [Cleaning the Electrodes](#) in the [How to Analyze an Oil Sample](#) section of this manual for a description of the proper technique.

**Standardize Options** ✕

To verify the unit has flushed properly and the system is clean, Click here

Check Base Line

---

To verify metals are within specification, Click here

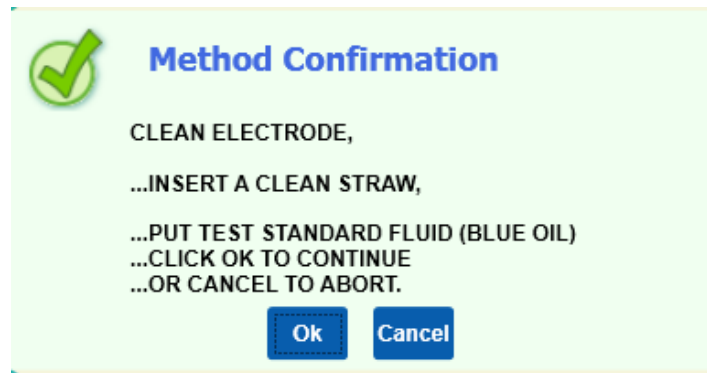
Verify Metals

---

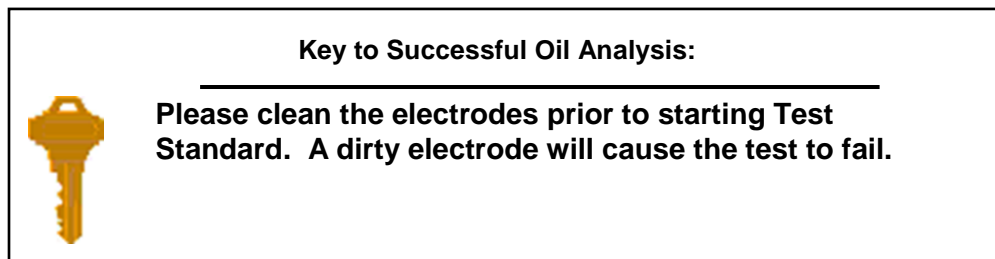
Complete standardization of metals, Click here

Standardize Metals

Press the OK key and the Analyzer will run the test, or press CANCEL to return to the main menu.

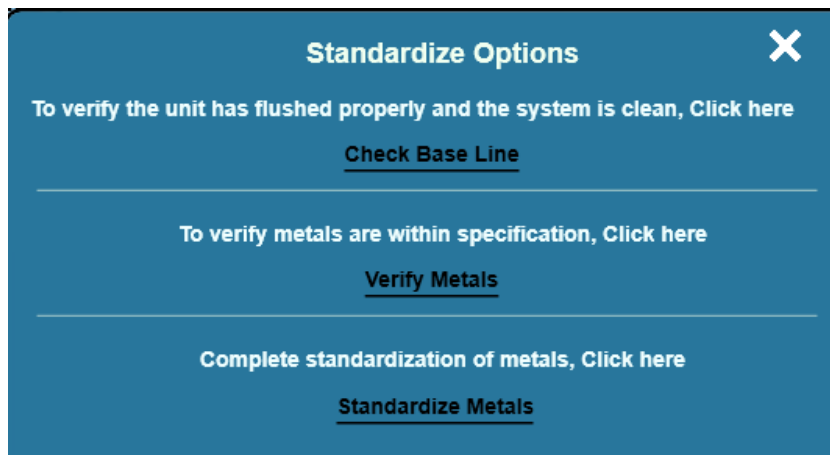


At the end of the test a message box will display informing you if the test of the Analyzer is within specifications. If the Test Standard is not within specifications, then a message box will provide you with instructions to try the test again or to proceed to Standardization.

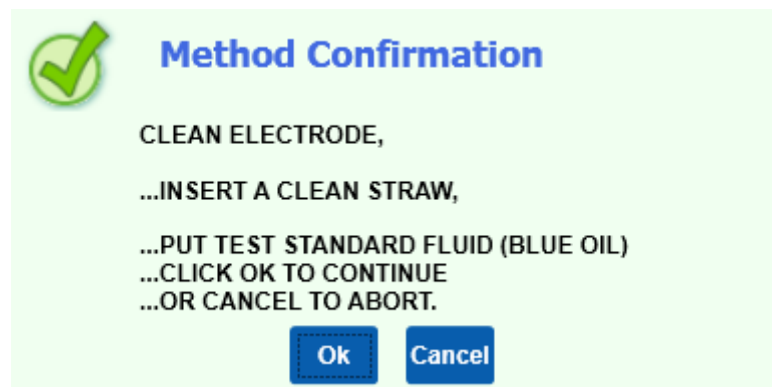


## STANDARDIZE

To standardize the Analyzer, select 'Standardize Metals' from the Standardize Options screen.



When the standardization process begins, you will be given instructions like those shown on the screen below. Press OK to continue or CANCEL to return to the main menu.



Standardization is comprised of two parts, Low Standardization and High Standardization. All the operator has to do is insert a clean sipper straw into the Test Standard fluid (Blue 50 ppm standard), connect to the silver sipper nozzle and follow the instructions. Carefully follow all on-screen instructions completely. The total process will take about 15 minutes to complete. Upon completion, the Analyzer will display a message stating whether or not the standardization was successful. If unsuccessful, the software will prompt you on what to do next.

## **IV. HOW TO ANALYZE AN OIL SAMPLE**

### **COLLECTING THE OIL SAMPLE & SAMPLE DATA**

To analyze oil from any component, you must first obtain a sample. There are two methods for sampling the oil. You can either catch a sample during a drain or you can pull a sample through the dipstick. Provisions for sampling have either been provided with the OSA4™ Analyzer. Refer to the Training Manual or other supporting documents for detailed instructions.

### **SAMPLE INTRODUCTION**

When you have a sample to analyze, remove the lid from the bottle, and shake the sample thoroughly. Select a sipper straw from the box attached to the right side of OSA by grabbing it at the bend of the straw where the ridges are located. Place the straw into the bottle - long side down - and slide the straw onto the silver sipper nozzle as shown below.

### **TEST SELECTION**

The analysis of your oil depends on the type of sample you are running. You must specify if the sample comes from a transmission, gasoline, diesel engine, etc. and also the application you will be using to run the sample.

The Main Menu page (shown below) is where the initial application is first selected. The available modes are –

ON-ROAD TRUCK (which includes Bus, RV, and Trucks)

AUTO

OFF-ROAD

MARINE

INDUSTRIAL

RAILROAD

COMMERCIAL GENSET

Ensure you are in the proper application - The applications differ based on 1) Databases used for equipment selection, 2) Rules and Evaluation statements used on the reports, and 3) Tests that will be run on the particular sample.



The example used for demonstration will be ON-ROAD Trucking Mode.

Check Base Line, Verify Metals and the Standardization are all logged at the bottom of the Main Menu for reference as to when the next scheduled maintenance item is due. These messages keep track of time since they were run last. If you exceed the time limit- a message will appear stating that you need to run the test(s). It will allow you to run 5 more samples before stopping Analysis.

#### **BEGIN BY SELECTING THE 'START' BUTTON**

Press the blue START button from the main menu, or you can enter a Vehicle ID number in the box above START if the sample has been preloaded or previously run.

After pressing START a Customer Information grid will be shown

## VEHICLE AND CUSTOMER DATA ENTRY

### Select Customer/Unit

HOME

New Customer

Enter Last Name to Search

Last Name      First Name  
 Vehicle ID      City

Customer Name	City	Address	PhoneNumber
ABC TRUCKING	ANYTOWN	12345 MAIN ST	555-555-1212
LUBE'M FAST TRUCK SERVICE	ALBUQUERQUE	4 TRUCK BAY AVE	555-555-4321
SPEEDY DELIVERY SERVICE	BEST CITY	1 FASTLANE DR	555-555-1000

Edit
Select
Delete
Back

V 1.0.0    MEASURED V40    Print NumericHistory    Samples : 0    Analysis : OnRoad-Truck    Mode : Sim

Select the Customer you wish to use and press the 'Select' button. You can sort the customer list by selecting one of the 4 categories in the top right of the screen – Last Name (Customer Name), First Name, Vehicle ID, or City.

If your Customer is not in the list, press the 'New Customer' button in the top left corner and follow the instructions on page 28.

The example below was sorted by the Vehicle ID. This allows you to see all the Vehicles in the system and the applicable Customer Name.

**Select a Vehicle**

Customer Name : ABC TRUCKING Phone : 555-555-1212  
 Address : 12345 MAIN ST ANYTOWN IOWA 51501 Fax : 555-555-2121 **Change**

**New Vehicle**

Vehicle ID	CustomerName	Vehicle Make	Vehicle Model
AB123456	ABC TRUCKING	FREIGHTLINER	FLD120
HZ200700	ABC TRUCKING	PETERBILT	362
OU812	ABC TRUCKING	INTERNATIONAL	4400

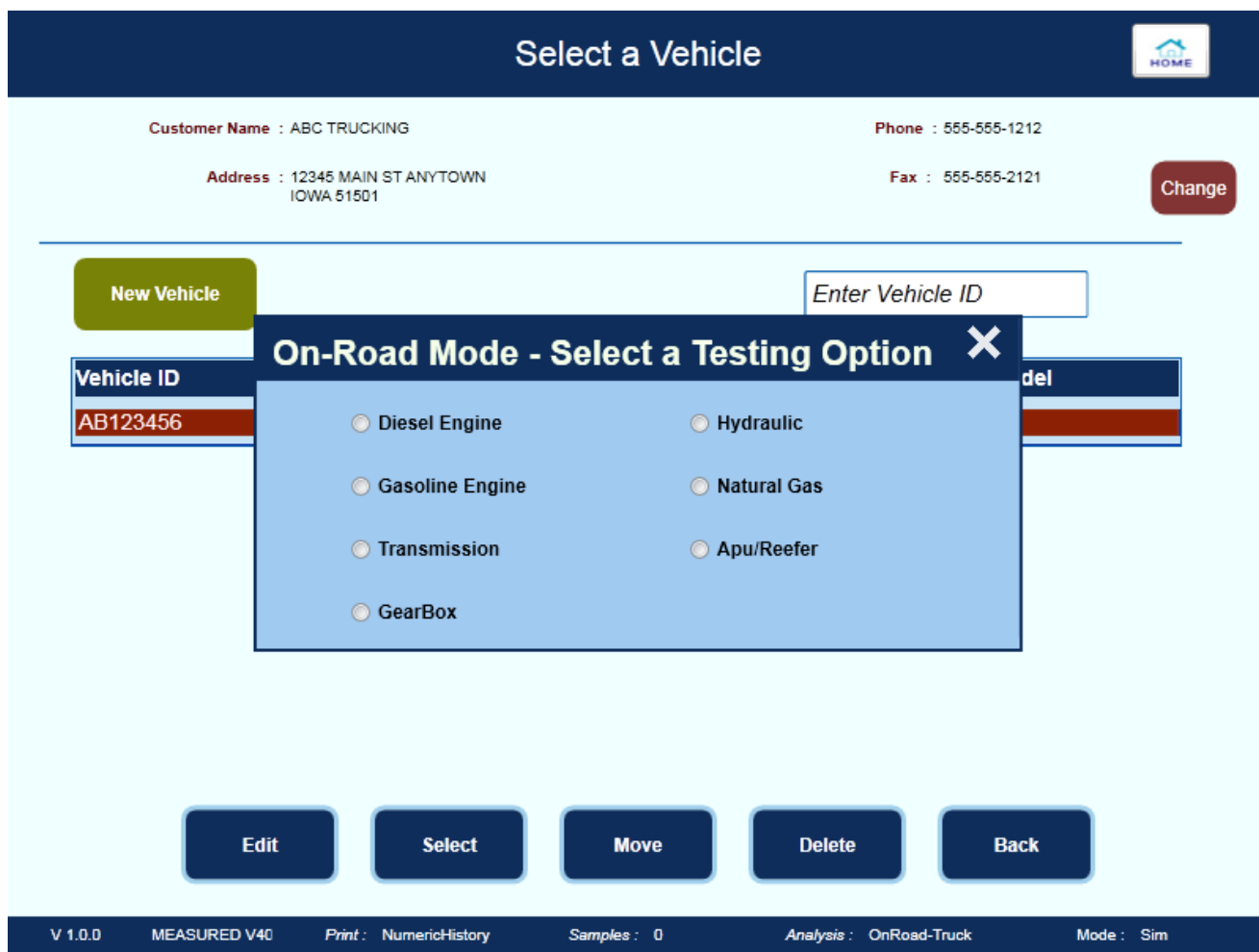
**Edit Select Move Delete Back**

V 1.0.0 MEASURED V40 Print : NumericHistory Samples : 3 Analysis : OnRoad-Truck Mode : Sim

Select the Vehicle ID you wish to run and press the 'Select' button. The example above used Vehicle ID AB123456 corresponding to Customer – ABC TRUCKING.

You can use this Vehicle, or select a new Vehicle ID by choosing the 'New Vehicle' button. If you choose the New Vehicle button – proceed to page 29.

Highlight the Vehicle you want to use and press the 'Select' button. The following screen will appear asking you to choose a component testing option.




Choose the testing option from the choices above, and the next screen will appear. This example uses a Diesel Engine option.

Select the component you wish to use from the list and press the 'Select' button.

Note that you can change any of the settings (Customer, Vehicle Info) by choosing the 'Change' button to the right of the selection.

## On-Road Diesel Component Information



**Customer Name :** ABC TRUCKING

**Address :** 12345 MAIN ST ANYTOWN IOWA  
51501

**Vehicle ID :** AB123456

**Vehicle Make :** FREIGHTLINER

**Vehicle Model :** FLD120

Change

Change

---

**Component Make :** \* CUMMINS

**Component Model :** \* ISX-450

**Component Number :**

**Component Year :**  Example - 2011

**Turbo :**  Yes  No

**Oil Changed at Last Sampling :**  Yes  No

**Oil Capacity Units :**  Quarts  Gallons  Litres

**Sump Capacity :** \*  Quarts

**Usage Units :**  Miles  Hours  Kilometers

**Hours Since New or Overhaul :**

**Miles Since New or Overhaul :** \*

**Description :**

Oil Info

Back

\* Indicates Required Field

V 1.0.0MEASURED V40Print : NumerichistorySamples : 0Analysis : OnRoad-TruckMode : Sim

You can now edit the fields shown above. When finished, select the 'Oil Info' button to move to the next screen.

## Oil and Analysis Information

<b>Customer Name :</b> ABC TRUCKING	<b>Address :</b> 12345 MAIN ST ANYTOWN IOWA 51501 <span style="float: right; border: 1px solid #ccc; padding: 2px 5px; background-color: #800000; color: white; border-radius: 3px;">Change</span>
<b>Vehicle Make :</b> FREIGHTLINER	<b>Vehicle ID :</b> AB123456 <span style="float: right; border: 1px solid #ccc; padding: 2px 5px; background-color: #800000; color: white; border-radius: 3px;">Change</span>
<b>Vehicle Model :</b> FLD120	<b>Fleet ID :</b> 12345
<b>Component ID :</b> NA	<b>Component Type :</b> DIESEL ENGINE
<b>Component Make :</b> CUMMINS	<b>Miles on Component :</b> 345678 <span style="float: right; border: 1px solid #ccc; padding: 2px 5px; background-color: #800000; color: white; border-radius: 3px;">Change</span>
<b>Component Model :</b> ISX-450	<b>Component Year :</b> 2008

<b>Oil Brand : *</b> <span style="border: 1px solid #ccc; padding: 2px 10px;">SHELL</span>	<b>Sample Notes :</b> <span style="border: 1px solid #ccc; padding: 2px 10px;">FIRST SAMPLE</span>
<b>Oil Type : *</b> <span style="border: 1px solid #ccc; padding: 2px 10px;">ROTELLA T</span>	<b>Operator :</b> <span style="border: 1px solid #ccc; padding: 2px 10px;">FRED</span>
<b>Oil Weight Selection : *</b> <div style="border: 1px solid #ccc; padding: 5px; margin-top: 5px;"> <input type="radio"/> Common Weights  <input checked="" type="radio"/> All Weights  <input type="radio"/> Specific Weights                 </div>	<b>Date Taken : *</b> <span style="border: 1px solid #ccc; padding: 2px 10px;">1/10/2013</span>
<b>Oil Weight : *</b> <span style="border: 1px solid #ccc; padding: 2px 10px;">15W40</span>	<b>Synthetic : *</b> <input type="radio"/> Yes <input checked="" type="radio"/> No
	<b>Miles on Oil : *</b> <span style="border: 1px solid #ccc; padding: 2px 10px;">18700</span>

Analyze
Back

\* Indicates Required Field

V 1.0.0 MEASURED V40 Print : NumenHistory Samples : 0 Analysis : OnRoad-Truck Mode : Sim

Fill out the required information on the Oil Info page. The oil brand and oil type are selected using the drop down lists. If your oil is not listed in the drop down box, select custom as an oil brand and enter your oil brand and oil type in the extra fields provided. You will be asked to save these custom oils when you finish the entry process. You can add sample notes and the operators name if desired. Press the 'Analyze' button when finished and the screen below will be shown

## Oil Analysis Activation

---

Change

**Customer Name :** ABC TRUCKING

**Address :** 12345 MAIN ST ANYTOWN IOWA  
51501

---

Change

**Vehicle Make :** FREIGHTLINER

**Vehicle Model :** FLD120

**Vehicle ID :** AB123456

**Fleet ID :** 12345

---

Change

**Component Make :** CUMMINS

**Component Model :** ISX-450

**Miles on Component :** 345678

**Component ID :** NA

**Component Type :** DIESEL ENGINE

**Sump Capacity :** 40 Q

**Component Year :** 2006

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Back

**Oil Brand :** SHELL

**Oil Type :** ROTELLA T

**Oil Weight :** 15W40

**Miles on Oil :** 18700

---

**Analyze :**  Physical Properties (IR)

Metals (OES)

Basic Metals Only

**Print Understanding Your Report :**  Yes  No

**Report Style :**  Numeric  NumericHistory

**Auto-Print Report :**  Yes  No

**Viscosity Mode :**  CALCULATED

MEASURED (40C and 100C)

40C Only

100C Only

Reload Defaults

Click here to **GO**

Set my selection as default

V 1.0.0
V40C
Print : NumericHistory
Samples : 0
Analysis : OnRoad-Truck
Mode : Sim

The ability to Change any of the selections is available along with the ability to select which tests you want to perform on the sample. Physical Properties, Metals (Basic and Extended), Measured Viscosity (if unit is equipped with a Viscometer). Calculated will be selected if there is no Viscometer present. Any combination of the tests can be run.

You can also choose which type of report you need, whether or not to print an ‘Understanding your report’ and also whether the report prints automatically at the end of the sample run.

Selecting the ‘Set my selection as default’ check box saves your set-up settings for future samples.

Press the GO button when ready to Analyze the sample.

A message box will also prompt you to place a clean straw on the sipper intake, and then place the bottle under the straw.

## NEW CUSTOMER

If the Customer you are running the sample for is not listed—press the ‘New Customer’ button and the screen below is shown. Fill out as much information as possible to ensure that the proper customer is aligned with the correct unit information.

**New Customer Information** [X]

Company / Last Name \*

First Name :

Address :

City :

State :

ZipCode :

Phone :

Fax :

Email :

**Save** \* Indicates Required Field

1.1    Calculated    Print    Numeric History    Samples : 120    Analysis : Off-Road    Mode : Sim

Press the ‘Save’ button when data entry is completed and follow instructions on entering unit information.

## NEW VEHICLE

If a vehicle has not been analyzed before or is not preloaded into the system, it is necessary to use the New Vehicle data entry section. When the 'New Vehicle' button is pressed the following screen is shown.

The screenshot displays the 'Select a Vehicle' interface. A modal dialog box titled 'New Vehicle Information' is open, containing the following fields:

- Vehicle ID : \* AB123456
- Vehicle Make : \* FREIGHTLINER
- Vehicle Model : \* FLD120
- Fleet ID : 12345
- Vehicle Year : 2006 *Example - 2011*
- Jobsite :
- Description :

Buttons for 'Change' and 'Save' are visible. A red asterisk indicates required fields. The background shows a 'New Vehicle' button and a 'HOME' icon.

Footer information: V 1.0.0 MEASURED V40 Print : NumericHistory Samples : 0 Analysis : OnRoad-Truck Mode : Sim

Fill out the data entry as completely as possible for the Vehicle by selecting the drop down arrow and selecting the proper make and model. If the make and model you require is not listed, select 'Custom' from the drop down choices and fill in your data in the field that appears. You will then be asked to save this custom make and model at the end of the data selection. There are extra fields to add Jobsite and Description if needed.

Once the data is complete, press the 'Save' button and follow the instructions to complete the sample.

### THE ANALYSIS CYCLE

The analysis takes about 10 - 12 minutes to complete (based on the components in your Analyzer) after the data entry and manual tasks have been performed. The status bar indicates progress as the sample is processed. If you want to stop the analysis, press the STOP button. The stop process takes 15-30 seconds to complete.

The screenshot displays the 'Oil Analysis Activation' web interface. At the top, a dark blue header contains the title and a 'HOME' button. Below the header, a form contains several fields with 'Change' buttons: Customer Name (ABC TRUCKING), Address (12345 MAIN ST ANYTOWN IOWA 51501), Vehicle Make (FREIGHTLINER), Vehicle ID (AB123456), Vehicle Model (FLD120), and Fleet ID (12345). A central modal window with a green background is titled 'Analysis in Progress' and shows a progress indicator of 67% completed. The modal also displays 'Accessing RuleEditor...' and a large red 'Stop' button. Below the modal, there are radio button options for 'MEASURED (40C and 100C)', '40C Only', and '100C Only'. To the right, an 'Auto-Print Report' section has 'Yes' selected. At the bottom of the modal area, there is a 'Reload Defaults' button and a 'GO' button with a checkered flag icon. The footer of the interface includes a 'Set my selection as default' checkbox and a status bar with the following information: V 1.0.0, V40C, Print: NumericHistory, Samples: 0, Analysis: OnRoad-Truck, and Mode: Sim.

### ON-SCREEN REPORTING

When the analysis is complete, an analysis report may be briefly displayed on the screen. An example of the on-screen report is shown below. The report will include the results of the analytical tests along with a diagnostic statement. Severity codes will also be printed with the test results. Green indicates normal conditions.

After the results are displayed, the Analyzer will begin the Auto Flush process and ask you to perform the task of removing the sample. Remove the sample and press OK so that the Analyzer can reset and be ready for the next analysis.

**Report**

Detail
Understanding Report
Print
Close

<b>ABC TRUCKING</b> 12345 MAIN ST ANYTOWN IOWA 51501 Phone: 555-555-1212 Email: BILL@ABCTRUCKING.CO Fax: 555-555-2121	Vehicle ID: AB123456 Truck Make: FREIGHTLINER Truck Model: FLD120 Vehicle Year : 2006 FleetID : 12345 Component ID: NA Component Make: CUMMINS Component Model: ISX-450	Component Year: 2006 Component Type : DIESEL ENGINE Sump Capacity: 40 Quarts
--	--	--

Sample ID	Date Taken	Miles on Component	Miles on Oil	Oil Weight	Oil Brand	Oil
1	1/10/2013	345678	18700	15W40	SHELL	ROTI

Comments: EARLY PISTON RING, OR CYLINDER BORE WEAR INDICATED. POSSIBLE PISTON RING OR WRIST PIN WEAR INDICATED. VISCOSITY LOWER THAN TYPICAL FOR THE GIVEN OIL TYPE WITHIN SPECIFICATIONS. TO CONFIRM, RESAMPLE AT 5,000 MILES - 8,000 KM - OR 100 HOURS.

Sample ID	Wear Metals(ppm)							Contaminant Metals (ppm)				Multi-Source Metals (ppm)					Calcium
	Iron	Chromium	Aluminum	Copper	Lead	Tin	Vanadium	Silicon	Sodium	Potassium	Titanium	Molybdenum	Nickel	Manganese	Boron	Magnesium	
1	237	35	39	14	6	8	X	8	8	>2	X	5	X	X	X	X	

Sample ID	Contaminants			Physical Properties									
	Fuel	Soot	Water	Glycol	Nitration	TBN	Oxidation	V40C	V100C	Vindex	V40C Limit	V100C Limit	Viac Mode
1	-	1.8	0.2	-	11.8	9.7	9.4	5	X	X	92 - 124	12.5 - 16.3	V40

A= ABNORMAL
S= SEVERE
NA= NON APPLICABLE
ND= NOT DETECTED
X= NOT TESTED
C= CALCULATED

The On-screen reporting gives you the ability to print and view the report at the end of the analysis cycle.


## V. PRINTING REPORTS

### OPTIONAL REPORT FORMATS

Depending on how the Analyzer has been configured, the Analyzer may automatically print a hardcopy of the analysis in the following formats.

#### NUMERIC OR NUMERIC HISTORY REPORT

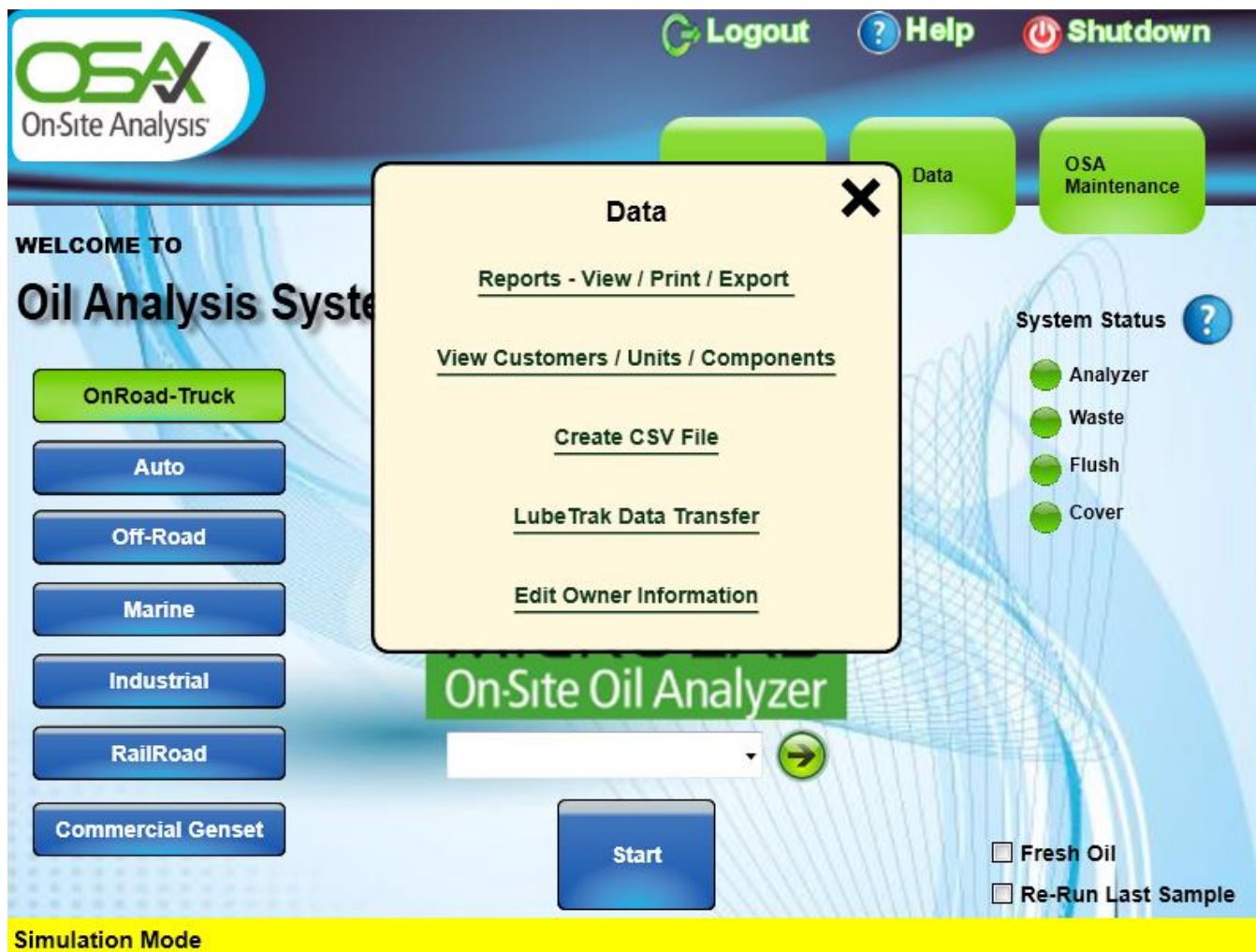
The Numeric Report is a standard laboratory style report with wear metal concentrations reported in parts-per-million and physical properties that are quantified in their appropriate units. The results range from normal to severe. A diagnostics statement is included which suggests problem sources and recommended service actions. Numeric History can contain up to 3 different sample results per page.

<b>ABC ENERGY TENN</b> 334 ELM STREET NASHVILLE TN 67098 <b>Phone:</b> <b>Em ail:</b> <b>Fax:</b>		<b>Machine ID:</b> 558 <b>Machine Make:</b> CATERPILLAR <b>Machine Model:</b> 12 H <b>Machine Year:</b> NA		<b>Component ID:</b> NA  <b>Component Year:</b> NA <b>Component Type:</b> DIESEL ENGINE  <b>Component Location:</b> CENTER  <b>Sump Capacity:</b> 30 Quarts		 <b>ABC ENERGY</b> 123 MAIN ST ATLANTA GA Phone: 555-555-1212														
Sample ID	Date Taken	Hours on Component	Hours on Oil	Oil Weight	Oil Brand	Oil Type	Oil Changed													
4374	3/18/2013	7809	321	19W40	CHEVRON	DELO 400	No													
Comments: CYLINDER, CRANK OR CAM SHAFT WEAR INDICATED. PISTON WEAR INDICATED. EVIDENCE OF WATER TREATMENT CHEMICALS PRESENT, BUT BELOW DETECTION LIMITS OF GLYCOL. SOOT LEVEL HIGHER THAN TYPICAL. CHECK FOR FAULTY COMBUSTION, PLUGGED AIR FILTERS OR PROLONGED IDLING, ETC. CHECK FOR SOURCE OF COOLANT LEAK. CHECK FOR POWER LOSS, BLOW-BY, SMOKING, OIL CONSUMPTION, ETC. ADVISE USE OF ADDITIONAL DIAGNOSTIC TOOLS TO DETERMINE COURSE OF CORRECTIVE ACTION. DRAIN OIL AND CHANGE FILTER IF NOT ALREADY DONE. RESAMPLE AT 1/2 NORMAL DRAIN INTERVAL.																				
Sample ID	Wear Metals (ppm)						Contaminant Metals (ppm)			Multi-Source Metals (ppm)				Additives (ppm)						
	Iron	Chromium	Aluminum	Copper	Lead	Tin	Vanadium	Silicon	Sodium	Potassium	Titanium	Molybdenum	Nickel	Manganese	Evon	Magnesium	Calcium	Barium	Phosphorus	Zinc
4374	187	10	20	5	7	<2	6	<2	85	42	0	80	0	0	1	90	3310	0	584	1619
Sample ID	Contaminants				Physical Properties															
	Fuel	Soot	Water	Glycol	Nitration	TBN	Oxidation	V40C	V100C	Vindex	V40C Limit	V100C Limit	Visc. Mode							
4374	-	2.1	<0.1	-	<2.0	7.4	5.2	110	15.6	151	92 - 124	12.5 - 16.3	M							

A= ABNORMAL    S= SEVERE    NA= NON APPLICABLE    ND= NOT DETECTED    X= NOT TESTED    C= CALCULATED    M= MEASURED

## PRINTING HISTORY REPORTS

To print the report for a sample that has just been analyzed, select the DATA button on the Main Menu, then select 'Reports – View / Print / Export' from the Data Settings.



The Search by button on the right top can be used to change the sorting options from Sample ID, Vehicle ID and Last Name (Customer Name). Once the sample is found, select it and the report will be displayed and printed.

### Reports - View / Print / Export

Enter Sample ID

Search by

Sample ID  
 Vehicle ID  
 Last Name

**Select a Sample from the List**

Sample ID	Analysis Date	Vehicle ID	Customer Name	Component Make
4	2013-01-10	HZ200700	ABC TRUCKING	CATERPILLAR
3	2013-01-10	OU812	ABC TRUCKING	NAVISTAR
2	2013-01-10	HZ200700	ABC TRUCKING	CATERPILLAR
1	2013-01-10	AB123456	ABC TRUCKING	CUMMINS

Select

Cancel

## VI. FLUSHING

### AUTO FLUSH AFTER SAMPLE RUN

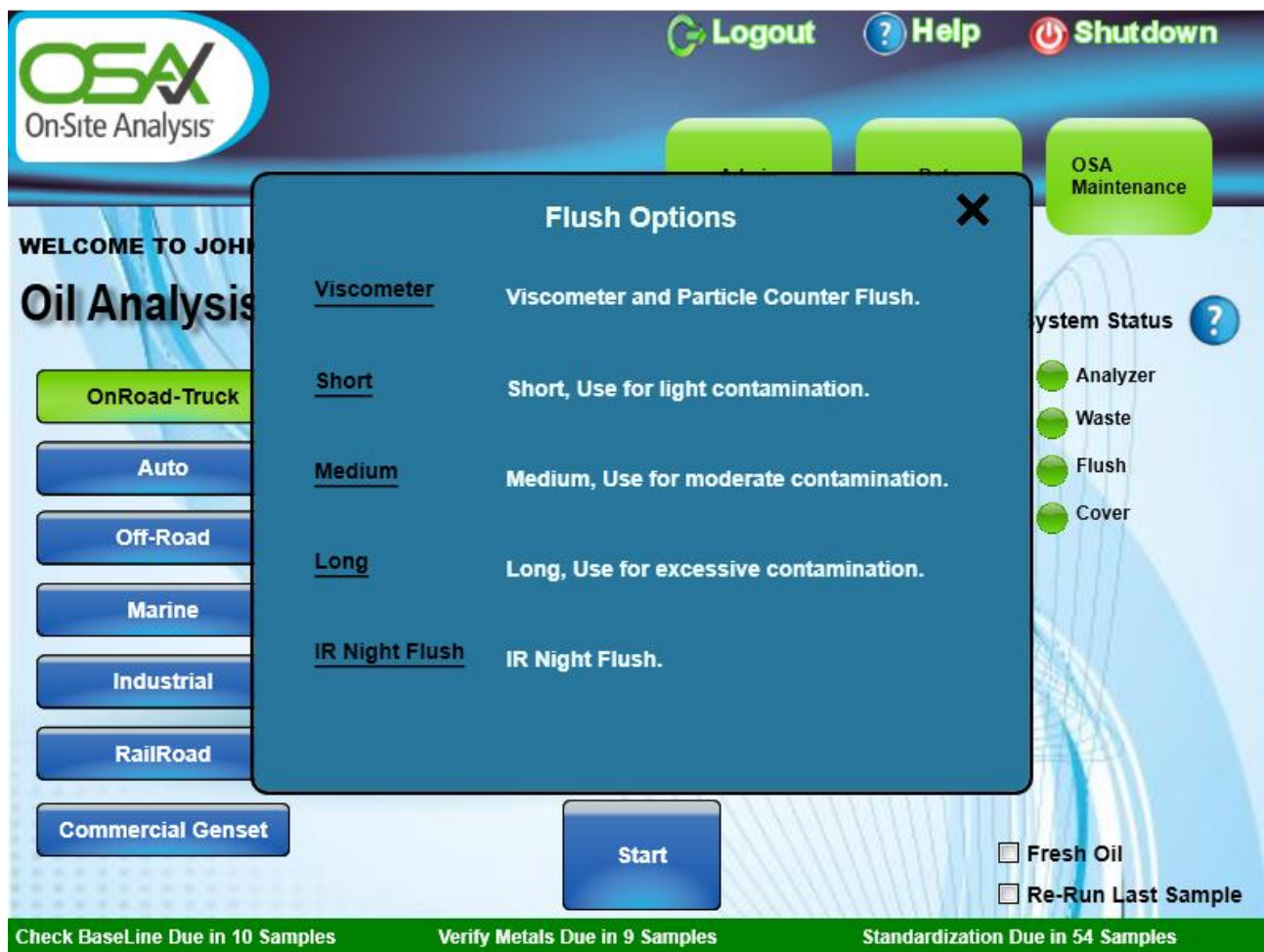
The computer controls the Auto Flush. The software evaluates the last sample's level of contamination and determines what type of flush to perform on the system. The user has no control over the duration of the Auto Flush.

The other Flush options are contained within the OSA Maintenance button located on the main menu –



## MANUAL FLUSH

Selecting Flush gives you the following options-



## VISCOMETER FLUSH

The Viscometer and Particle Counter Flush (if equipped on your unit) allows the user to perform additional cleanings directly to the Viscometer and the Particle Counter. This function gives the user additional tools to fight sample carry over and contamination contained within these two components.

## SHORT FLUSH

The short flush applies an extra flush to the system when light contamination is encountered.

## MEDIUM FLUSH

The medium flush applies an extra flush to the system when mid-range contamination is encountered.

## LONG FLUSH

The long flush applies an extra flush to the system when heavy contamination is encountered.

When doing a SHORT, MEDIUM or LONG Flush, the screen below will prompt you to put a 3 ounce bottle under a clean straw.



## IR NIGHT FLUSH

The IR Night Flush should be selected each night when the unit will no longer be used. This flush is used to 'soak' the IR module cell windows and ensure they stay clean from soot buildup. Selecting this button starts a procedure that checks the amount of sooty samples run during the day. If there were any run, the instructions on the screen will prompt you through an automated process.



## VII. STANDARDIZING EXTENDED METALS

### EXPLANATION

Occasionally, it is necessary to standardize the extended metals of the OSA4™ Analyzer in order to compensate for minor changes affecting the Analyzer's calibration.

You do not have to standardize the Analyzer unless 1) you have adjusted the Electrode Gap, or 2) the Test Extended Metals Standard routine prompts you to, or 3) the message box tells you to at the beginning of a sample.

You should run the Test Extended Metals Standard routine 3 days / 72 hours after a Full Standardization, or whenever you question the Analyzer's performance.

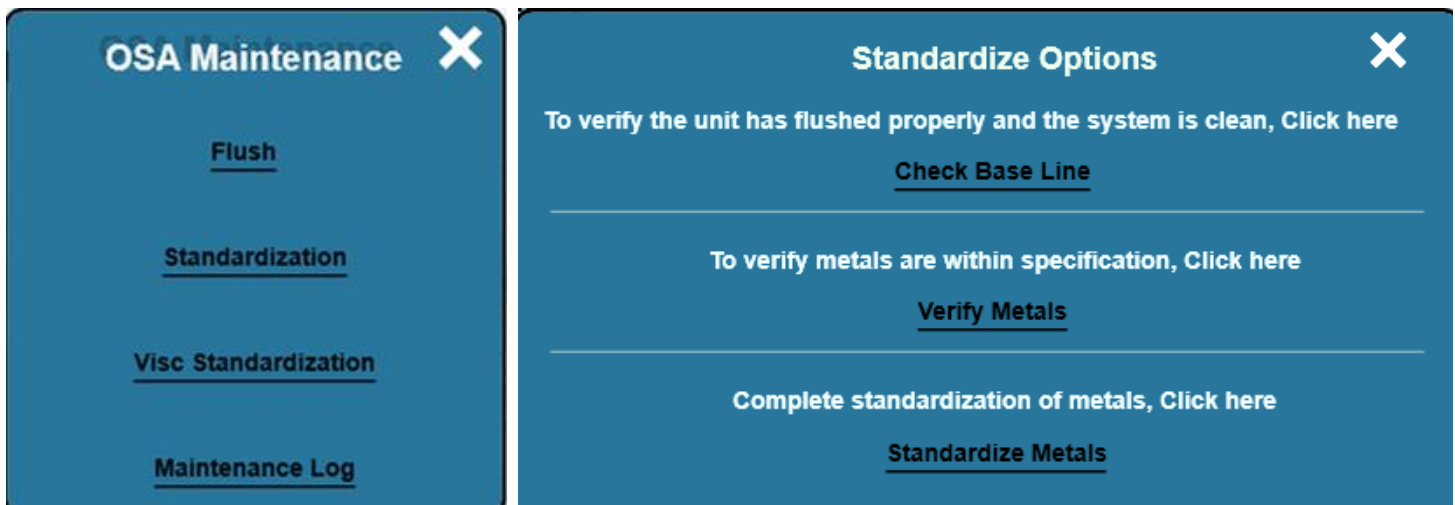
Prior to running the Test Extended Metals Standard routine, a Baseline Test should be performed.

The 10 Basic Metals include – Iron (Fe), Chromium (Cr), Lead (Pb), Copper (Cu), Tin (Sn), Aluminum (Al), Molybdenum (Mo), Silicon (Si), Sodium (Na), and Potassium (K).

The Extended Metals package includes the 10 Basic Metals plus – Titanium (Ti), Manganese (Mn), Vanadium (V), Boron (B), Magnesium (Mg), Calcium (Ca), Barium (Ba), Phosphorous, Nickel, (Ni) and Zinc (Zn).

### STANDARDIZATION

Select OSA Maintenance from the Main Menu, and then select Standardization. From the Standardize options screen, select 'Standardize Metals'.



Clean the electrodes, and place a clean straw into the (blue) **Test Standard Fluid** and connect to the silver sipper nozzle.

A message will appear asking the following, “Standardization of basic metals is not required at this time. Do you still wish to standardize basic metals ” Select the **YES** button to proceed.

Press **OK** , as shown on screen pictured below after cleaning electrodes and inserting Test Standard Fluid (blue).

After 30% has elapsed on the status bar, a message will appear on screen asking to again clean the electrodes. Do so and press the **OK** button when finished.

This method will last 10-15 minutes

A message will then appear stating “Basic Metal Standardization Completed”. If you see otherwise, Select **CANCEL** and repeat previous extended metals standardization steps.

This now indicates that Basic Metal Standardization is completed. Press **OK** button to continue on to Extended Metal Standardization.

A message may appear asking the following, “Standardization of extended metals is not required at this time. Do you still wish to standardize extended metals ?” press **YES** button to continue.

Clean the electrodes thoroughly, and place a clean straw into the (yellow) Low Concentration Standard - and connect to the silver sipper nozzle.

Press the **OK** button when ready to continue

A message will appear on screen asking to clean the electrodes when the status bar is at 40%. Do so and select the **OK** button when finished.

This method will last 10 minutes.

A message will appear stating “**Extended Metals LCS Standardization Stand Completed**”.

If error message appears, press **CANCEL** and return to beginning steps for LCS Standardization.

Extended metals Low Concentration Standard is now complete. Select the **OK** button to continue on to Extended metals High Concentration Standard. Clean the electrodes thoroughly, and place a clean straw into the (brown) High Concentration Standard - and connect to the silver sipper nozzle. Select **OK** when ready (as shown below).

This method will last approximately 10 minutes.

A message will appear stating “**Extended Metals HCS Standardization Completed**” (as shown below) If you see otherwise, CANCEL, and repeat previous steps for the HCS standardization.

Extended metals High Concentration Standard is now finished. Select the **OK** button.

A message stating “Standard is Finished” will appear. Select the **OK** button to begin automatic flushing procedure.

Follow screen instructions and select **OK** on all flushing messages that appear.

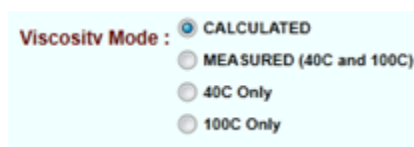
**\*\* Extended Metal Standardization is now complete \*\***

## VIII. DUAL TEMPERATURE VISCOMETER (DTV)

### EXPLANATION

The Dual-Temperature Viscometer (DTV) is a fully integrated component for the OSA that generates a 100° Centigrade Viscosity, a 40° Centigrade Viscosity, and a Viscosity Index. This patented device works seamlessly in the background generating these measurements during the course of a normal OSA sample run.

If your OSA is equipped with a DTV, you will be prompted at the end of the data entry cycle to choose what type of Viscosity you would like to run.



The **Calculated** Button does not use the DTV and calculates the viscosity of the oil based on the weight first entered during data entry and applying the measurements and physical property tests against this starting point.

The **Measured** Button runs both V40 and V100 simultaneously

The **40C Only** runs only a Viscosity at 40 C

The **100C Only** runs only a Viscosity at 100C.

### OPERATING THE DTV

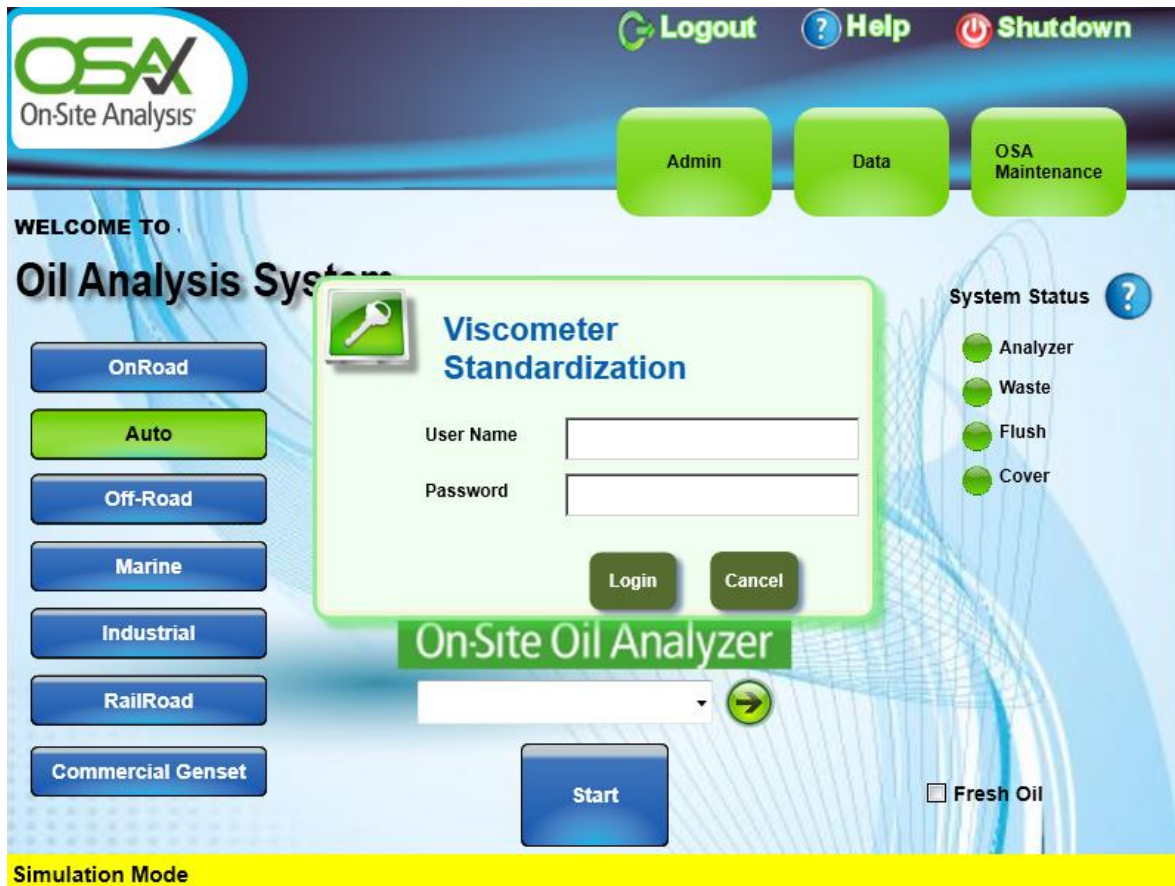
Operation of an OSA with the DTV is the same method used in [How to Analyze a Sample](#). The time frame is longer because of the additional DTV component. Five (5) ounce sample bottles are needed when running a sample using the DTV. Never reuse the 5 ounce sample bottles after the test is completed.

### STANDARDIZING THE DTV

Once every 6 months the DTV will need to be standardized. Included with your OSA will be two viscosity standard bottles: Low Viscosity Standard (Pink Fluid) and High Viscosity Standard (Green Fluid). Pour these into separate 3 ounce sample bottles and label them accordingly. From the Main Menu Select the OSA Maintenance Button, then Visc Standardization Button.



A log in will appear that is password protected so that only instructed personnel can standardize the Viscometer. Enter your user name and password given during setup and training.



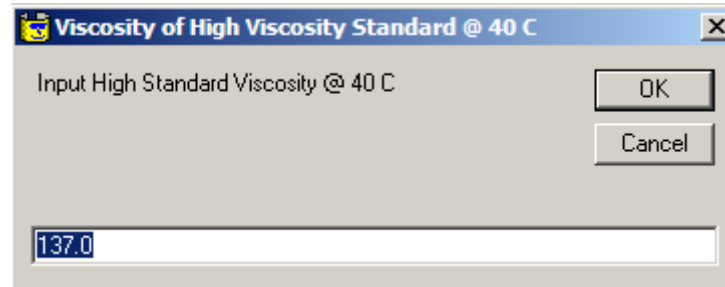
On the labels of your bottles of Viscosity Standard (Low and High) you will have measurements for Viscosity at 40° C and 100° C. As you move through the Viscosity standardization process you will need these measurement numbers to enter in the appropriate fields for standardization.



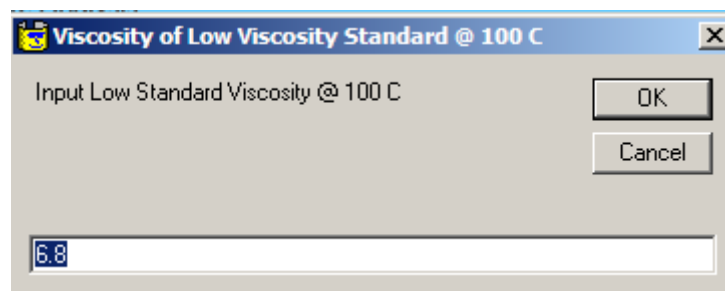
The first message as shown below will appear. Make sure that the number from your **Low Viscosity Standard at 40°C (on the pink fluid bottle label)** is entered into this field, then Press OK.



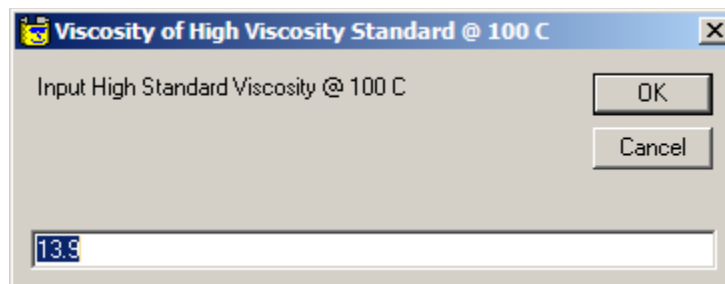
The message as shown below will appear. Make sure that the number from your **High Viscosity Standard at 40°C (on the pink fluid bottle label)** is entered into this field, then Press OK.



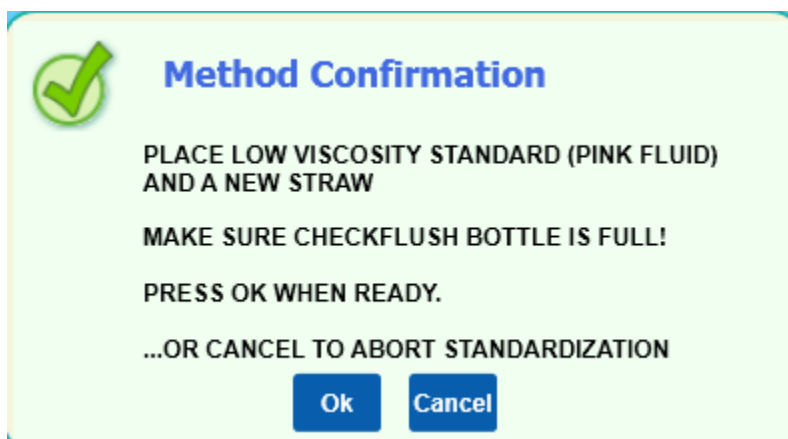
The message as shown below will appear. Make sure that the number from your **Low Viscosity Standard at 100°C (on the green fluid bottle label)** is entered into this field, then Press OK.



The message as shown below will appear. Make sure that the number from your **High Viscosity Standard at 100°C (on the green fluid bottle label)** is entered into this field, then Press OK.



Press OK and a message box as follows will appear.



Place a clean straw into the Low Viscosity Standard (Pink Fluid) - and connect to the silver sipper nozzle and press OK.

Once this process has finished another message will come up asking you to insert the High Viscosity Standard (Green Fluid).

Pull the Low Viscosity Standard out from the sipper nozzle. Place a clean straw into the High Viscosity Standard (Green Fluid) - and connect to the silver sipper nozzle after this message appears.

The Viscosity Standardization process will be concluded after the High Viscosity Standard has finished. Once completed, you can remove the standard bottle from the sipper nozzle and continue running samples.

## VIV. ADDENDUMS

# A D D E N D U M A

Instruments equipped with a particle counter module

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## Sample Preparation Procedure for Particle Measurement

If the sample to be measured has been standing for any period of time, particle settlement and agglomeration will occur. It is essential that the agglomerates be broken up and the contaminant particles become dispersed evenly throughout the contents of the sample bottle in an ultrasonic bath. Energize the bath for 30 seconds or until no surfacing air bubbles are observed. Remove the sample bottle from the ultrasonic bath and gently turn the sample bottle over five times, taking care not to introduce air bubbles into the liquid prior to analyzing with the OSA Oil Analyzer, particle counter function. Reference sample preparation procedure outlined below.

- 1) Fill ultrasonic bath with 3 inches of water, turn on heater and energize for a minimum of two minutes (to degas the system).

### **WARNING**

DO NOT ENERGIZE AN EMPTY ULTRASONIC BATH.  
Energizing an empty ultrasonic bath may cause damage to the instrument

- 2) Vigorously shake the sample bottle by hand for 15 seconds.

### **NOTE**

A minimum of 4 ounces of sample is required when using the particle counting function of the OSA Oil Analyzer

- 3) Place the sample bottle in an ultrasonic bath and energize the bath for 30 seconds or until no surfacing bubbles are observed.
- 4) Remove the sample bottle from the ultrasonic bath then gently turn the bottle over five times, taking care not to introduce air bubbles into the oil fluid.
- 5) Place the sample bottle under the sipper of the OSA and immediately start analysis. Reference section IV-How to Analyze an Oil Sample (page 20) of this manual.

# A D D E N D U M B

Instruments equipped with sample bottle cap overpressure module

## Over Pressure Sample Bottle Cap Module

When high viscosity oil samples are to be measured (> ISO320), the analyzer will prompt the user to utilize the sample bottle over pressure cap module, as shown below:

The screenshot displays the 'Oil Analysis Activation' interface. A central dialog box titled 'Method Confirmation' is overlaid on the screen. The dialog box contains the following text:

- Method Confirmation** (with a green checkmark icon)
- SAMPLER BOTTLE WILL BE PRESSURIZED!
- TIGHTEN PRESSURE CAP - STRAW MUST BE CONNECTED TO SAMPLE NOZZLE.
- WARNING: PERSONAL INJURY IS POSSIBLE IF STRAW IS NOT CONNECTED TO SAMPLE NOZZLE.
- PRESS OK TO RUN WITH PRESSURE..
- PRESS CANCEL TO PROCEED WITHOUT PRESSURE.

At the bottom of the dialog box are two buttons: 'Ok' and 'Cancel'. The background screen shows various settings for the analysis, including Customer Name, Asset Make, Asset Model, Component ID, Sump Capacity, Oil Brand, Oil Type, Viscosity Mode, and Auto-Print Report.

Follow the instructions below when prompted on the screen.

- 1) Ensure that the inside of sample bottle cap is clean by wiping with a clean cloth.
- 2) Install sample bottle cap onto sample bottle
  - a. Align the sample bottle and cap, then rotate bottle until cap is tight.

### NOTE

Sample bottle cap MUST be on tight  
 A loose fit will result in an air leak preventing instrument from achieving proper air pressure within the sample bottle

- 3) Remove the sample tray located directly beneath the sample intake nozzle, as shown below - This will allow sample bottle to be placed in the well underneath, providing clearance for the over-pressure sample cap.



- 4) Loosen straw fitting ( no need to fully remove fitting ) located in the center of the sample bottle pressure cap, then insert straw through center fitting and finger tighten the fitting.

### **NOTE**

Do NOT over tighten fitting around straw.  
Over tightening the straw input fitting may result in collapsing/damaging the straw causing an air leak preventing instrument from achieving proper air pressure within the sample bottle

- 5) As shown below, set sample bottle into sample "well" below intake nozzle, and attach the straw sipper to the sample intake nozzle:



6) Start analysis.  
Reference section IV-How to Analyze an Oil Sample (page 20) of this manual.

7) Follow all prompts in the order that they appear.

Ensure that the straw has been inserted over the analyzer's intake nozzle prior to activating the overpressure function.

When overpressure function is activated, contents of the sample container will be forced out through the straw.