SGA-1000

Safety Gas Analyzer

USER'S GUIDE

800.678.7072 · www.bionix.com

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INNOVATIVE SOLUTIONS FOR EVERYDAY PROBLEMS

Thank you for your purchase. Bionix is committed to providing you with the tools to help make required testing and compliance to various regulations easier.

Bionix provides a one-year parts and labor warranty. Please register your product online within 30 days of purchase.

Visit https://www.bionix.com to register and for complete warranty details.

Introduction

Welcome to the SGA-1000 Safety Gas Analyzer, developed by Bionix. The SGA-1000 was developed with all of your medical gas outlet testing needs in mind. No longer will you have to juggle flow meters, pressure gauges, concentration analyzers or pen, and paper. All of these features and more are incorporated into the SGA-1000 Safety Gas Analyzer. The SGA-1000 tests, records and arranges your data in an easy to read format with real-time results. In an instant, you know if the outlet that you are testing is good or bad. If the outlet fails, you can instantly look at the test results from that outlet and know why it failed. All testing criteria are defaulted to NFPA 99 and Bionix recommended standards, but you can change this criterion to match your unique medical gas outlet system. After your testing has been completed, you can export all of your results into an easy to ready report that is simply exported via a wireless data transfer or by a printer.

The SGA-1000 operates via the SGA Commander™ App that is available in the Google Play Store. SGA Commander™ controls all outlet testing and also saves, sorts and catalogs data. The app can connect to the analyzer in two ways, Bluetooth Wirelessly or a USB Wired connection. The SGA Commander™ App can save multiple files and templates of varying size depending upon the data capacity of the Android device. Outlet information can be loaded before you test, entered as you are testing or even inserted once testing has been completed. Each test includes outlet location field information (floor, area, room number and outlet number). There are options to add your comments and to add Tester's Notes to every outlet. Tester's Notes document common conditions that affect the safe operation of medical gas and vacuum outlets. This makes it easy to identify problems that need immediate attention. You can add your personal information to each data file to identify the tester, and each outlet is time and date stamped.

Creating medical gas outlet testing reports has never been easier than with the SGA-1000. Tests are color-coded to match the color used on the outlets for easy identification. To further facilitate your medical gas outlet maintenance, test results can be sorted in a variety of ways to group data in the way that is most efficient for your needs.

The SGA-1000 is a portable device, which provides a cradle for displaying the tablet for Android. This design makes outlet testing easy and effortless. Bionix has provided a portable battery back-up unit so that you can charge your tablet on the go. Ensure that the battery backup is charged up before you test and attach it while you test for additional Android device battery life.

The new SGA-1000 with SGA Commander™ is your complete solution to managing your medical gas outlets testing. Automated testing and outlet evaluation eliminates the guesswork. Program versatility allows for data collection that is customized to your facility's requirements and pre-formatted reports greatly simplify documentation.

Capabilities and Tests Performed

Expected Gas:

Once an outlet test is initiated, the SGA Commander™ application knows what gas to expect depending upon the adapter connected to the hose.

Detected Gas:

Determined by measuring the percentage of Oxygen, Nitrous Oxide and Carbon Dioxide in the gas. The range of acceptable values for each gas are as follows:

Outlet Type	O2 %	N20 %	CO2 %
Oxygen	70 - 100	0 - 30	0 - 30
Air	10 - 30	0 - 30	0 - 30
Nitrogen	0 - 10	0 - 10	0 -10
Nitrous Oxide	0 - 10	70 -100	0 - 10
Carbon Dioxide	0 - 10	0 - 10	70 -100
Vacuum and WAGD	N/A	N/A	N/A

Gas Concentration:

Determined by an electro-chemical oxygen cell and an NDIR spectrometer to detect the percentage of oxygen in the gas for Oxygen, Air and Nitrogen. There is no pass or fail criteria for oxygen concentration. The application records the actual percentage of O2 that is measured in the gas.

Non-dispersive infrared (NDIR) technology is used to detect the percentage of Nitrous Oxide in Nitrous Oxide gas outlets. An independent Carbon Dioxide detector is used to measure the percentage of Carbon Dioxide. The analyzer will record the actual percentage measured in the gas. Independent CO2 detector.

Static Pressure:

The static pressure is the pressure at the outlet when there is no flow. Pass/fail limits are adjusted by the operator at the start of a new data file. *Accuracy: ± 1% of Measured Pressure.*

Flow Pressure or Flow Test:

The flow pressure is the pressure sensed during a flow test. The SGA-1000 draws gas from the outlet at an increasing rate until the specified test flow rate is reached, or the pressure drops below the minimum value. Flow and pressure are then both recorded. If the test flow rate cannot be achieved, the outlet will fail, and the SGA-1000 will display both flow and pressure readings. *Accuracy: ± 1% Measured Flow*

Pressure Drop:

The pressure drop is calculated as static pressure minus flow pressure at the specified test flow rate. *Accuracy: ± 1% Measured Pressure*

Transient Flow:

For Medical Air and Oxygen outlets serving critical care areas, the analyzer shall allow a transient flow rate of 170LPM for 3 seconds. The flow rate is recorded. The test is performed as per NFPA 99 Health Care Facilities, 2015 edition, Section 5.1.12.3.10.5. *Accuracy: ± 1% Measured Flow*

Vacuum Tests:

The SGA-1000 has two options for testing Vacuum inlets and WAGD (Waste Anesthetic Gas Disposal) inlets:

Vacuum Flow:

Vacuum flow is the flow that occurs when the inlet is opened wide. The inlet fails the flow test if the measured flow is below the pass/fail limit. *Accuracy: ± 1% Measured Flow*

Vacuum Pressure:

Vacuum pressure is a test of the vacuum inlet static pressure. This test is performed while an adjacent inlet on the same zone is flowing 85LPM (3 SCFM). The flow test can be set using the Vacuum Flow Regulator. The inlet fails the static pressure test if the pressure is not within the pass/fail limits. *Accuracy: ± 1% Measured Pressure*

Data Collection Capacity:

Data files store test results for approximately 10,000 outlets. Data storage capacity depends on the storage capacity of the tablet being used with SGA Commander™ to test outlets. Bionix recommends backing up the collected data files and clearing the existing files.

Environmental Operation Specifications

TMRA (Temperature Maximum Rated Ambient)	40°C
Temperature Range	0 - 40°C
Humidity Range	30 - 90%

Use the SGA-1000 Safety Gas Analyzer only as specified in this User's Guide. Using the SGA-1000 in a way other than specified in this guide may result in an unsafe or hazardous condition.

Components of your SGA-1000 Safety Gas Analyzer

- The SGA-1000 Analyzer Interface
- Analyzer Charger
- Tablet for Android
- Tablet Charger
- Gas Hose Assembly
- Set of Adapters
- Rechargeable External Battery Pack
- Briefcase with specialty cut foam for storing all of your components
- User's Guide

Technical Support

If you encounter any difficulty with the SGA-1000, please don't hesitate to contact Bionix at 800-678-7074.

Contact Information

For assistance, please contact Bionix at the following location:

Analyzer Technical Services Office 1670 Indian Wood Circle Maumee, OH 43537	**Toll Free Phone**: (800)678-7074 **Toll Free Fax**: (800)539-9319 **e-mail**: techservices@bionix.com

Our website can be found at www.bionix.com for technical support or product information.

Care of the SGA-1000 Safety Gas Analyzer

Charging the Battery

The analyzer should operate for approximately 8 hours per battery charge. To charge the interface battery, plug the charging cable into the side panel power port (located next to the power button). An overnight charge is sufficient. Please see the included Tablet for Android manual for more information regarding tablet battery life and displayed codes, colors and modes.

Routine Maintenance

- Ensure that both the tablet, battery backup and the analyzer have a full charge before every test session.
- Check to see if there is a new SGA Commander™ application in the Google Play Store before every use. This will ensure that you have the most current software version and optimize your testing results and experience.
- Be aware of the annual calibration date for your analyzer and send it to Bionix when it is due. Annual calibration will ensure that your analyzer has its O2 sensor inspected yearly, that it has the most current analyzer firmware.

Annual Calibration

NFPA requires that medical gas safety test instruments shall be tested periodically, but not less than annually for acceptable performance as per NFPA 99 Health Care Facilities 2015 edition, Section 6.3.3.1.5.

Your new SGA-1000 will arrive ready to use. To ensure proper operation, we strongly recommend that the analyzer is returned to Bionix for yearly evaluation, cleaning and calibration. The analyzer may also be sent to Bionix if malfunctions are suspected.

Steps to send your analyzer to Bionix for calibration:

1. Place all of the analyzer components in the briefcase. The briefcase should be packed in a box with ample padding. To ensure optimum performance, the analyzer should be calibrated with all its components including gas hose and adapters.
2. Include the name and phone number of the person who should be contacted if there are any questions regarding the calibration of the analyzer.
3. Ship the package to:

   Bionix
   Analyzer Technical Services Office
   1670 Indian Wood Circle
   Maumee, OH 43537

4. Bionix recommends insuring the package for the full purchase price.

Getting started with your SGA-1000 Safety Gas Analyzer

Turn on the gas analyzer interface by pushing in the green power button on the left side of analyzer interface.

Power on your Android device. Please consult the manufacturers user's manual for more information regarding the features of the Android device.

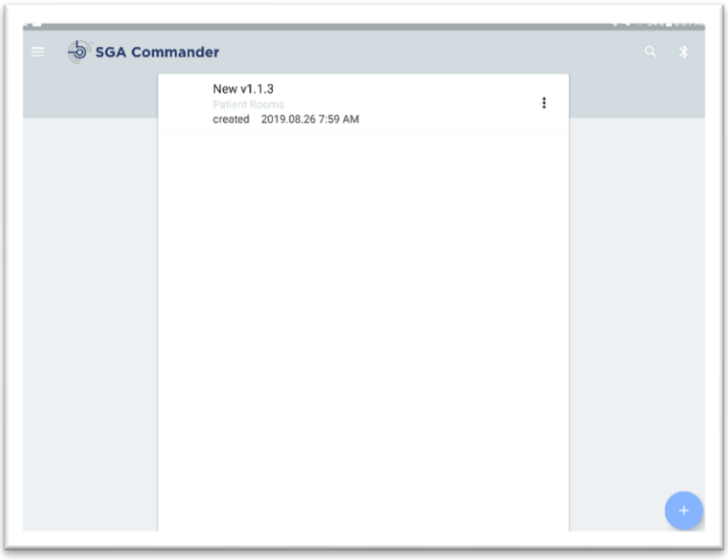
The SGA Commander™ Application is located on the home screen of your Android device. Select it once to open the application. If you are using an Android device that does not have SGA Commander™ installed on it, you can easily find it in the Google Play Store app for download.

SGA Commander™ App

The SGA Commander™ Application is an Android based software program that sends commands and receives data from the SGA-1000 Safety Gas Analyzer interface. The app records the results of medical gas outlet testing to a data file which can be exported into a PDF format or CSV file. The SGA Commander™ Application is the main logic center of the SGA-1000 Safety Gas Analyzer. The analyzer interface cannot conduct any medical gas outlet testing without the SGA Commander™ Application.

Homepage

The homepage can be found when initially opening the application. From this page, you can navigate to several of the application's features. The top border includes a main menu drop down, search feature and Bluetooth connection indicator. All the testing sessions are listed in the bottom grid.



TEST FILE SELECTION

Previously saved test files can be found in the grid. Within the individual testing files, you can export these files as a template, export the root .csv file, export a report to PDF, delete or rename the file.

SEARCH

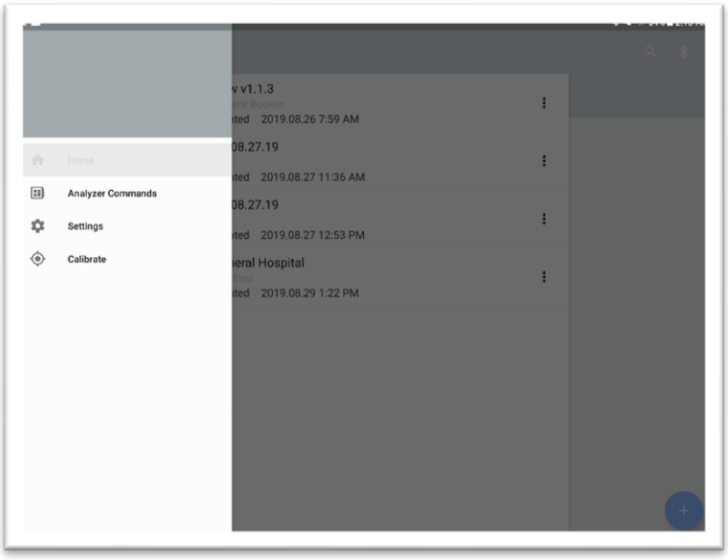
You can search for previously created and saved testing files using this tool.

BLUETOOTH

This option allows the app to connect to the interface via Bluetooth. You cannot test with the analyzer if you are not connected to it via Bluetooth or USB wired connection.

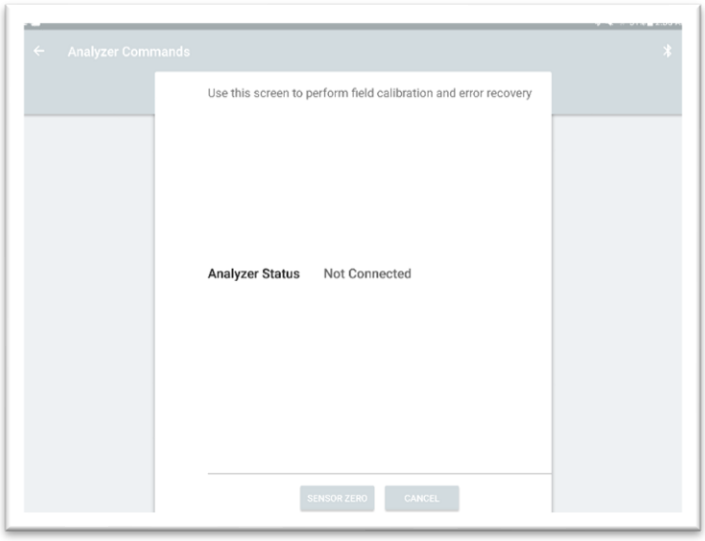
Main Menu

The main menu can be found in the top left of the homepage, from here you can utilize troubleshooting commands to the analyzer. You can also access the settings which show software versions, the calibration date, country gas colors and the N2 zero toggle.



ANALYZER COMMANDS

THESE COMMANDS ARE EASY TROUBLESHOOTING FEATURES TO HELP OPTIMIZE THE PERFORMANCE OF THE ANLAYZER.



SENSOR ZERO – USE THIS COMMNAD TO RESET THE PRESSURE & FLOW SENSOR TECHNOLOGY OF THE ANALYZER. THIS OPTION SHOULD BE PERFORMED EVERY 4 HOURS TO ENSURE OPTIMAL ACCURACY.
1. SELECT ANALYZER COMMANDS FROM DROP DOWN OPTION.
2. CONFIRM THE ANALYZER IS NOT CONNECTED TO ANY OUTLET, AND DISCONNECT ADAPTER.
3. SELECT SENSOR ZERO.
4. UPON COMPLETION, RETURN TO HOMEPAGE FOR TESTING.

CANCEL – USE THIS COMMAND TO CLEAR ANY EXISTING QUEUED COMMANDS.

SETTINGS

PROVIDES THE FEATUREED SETTINGS OF THE ANALYZER AND THE APPLICATION.

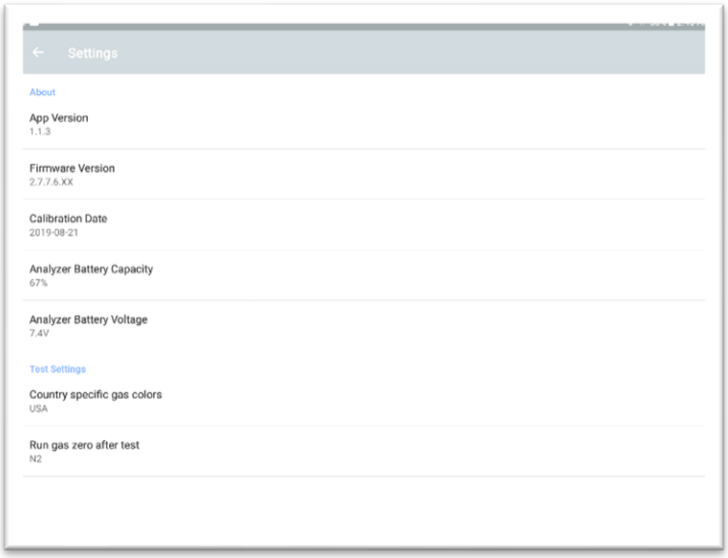
APP VERSION – CURRENT VERSION OF THE SGA COMMANDER APPLICATION FOR ANDROID

FIRMWARE VERSION – CURRENT SOFTWARE VERSION OF THE ANALYZER INTERFACE

CALIBRATION DATE – THE DATE THAT THE ANALYZER WAS LAST CALIBRATED, BIONIX RECOMMENDS THAT ANALYZERS RECEIVE AN ANNUAL CALIBRATION.

ANALYZER BATTERY CAPACITY – CURRENT BATTERY LIFE OF THE ANALYZER INTERFACE

ANALYZER BATTERY VOLTAGE – CURRENT BATTERY VOLTAGE THE ANALYZER INTERFACE

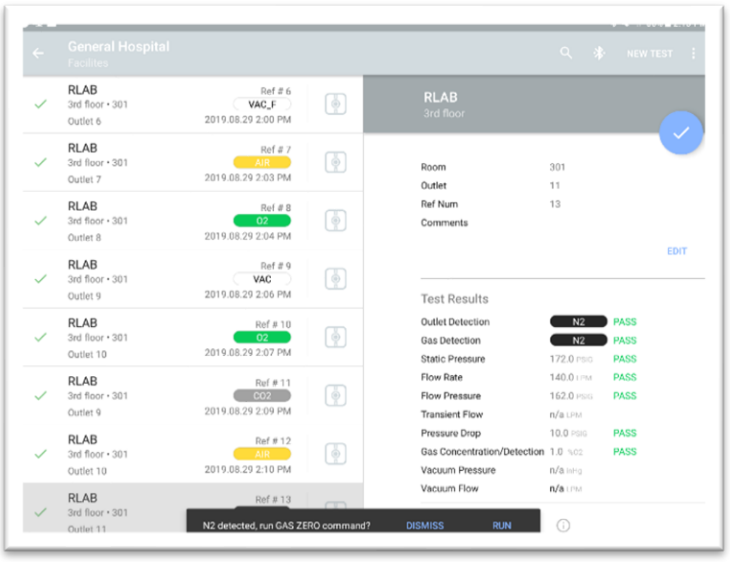


PLEASE NOTE: THE ANALYZER WILL NOT FUCTION CORRECTLY AT BATTERY VOLTAGE LESS THAN 6.2VOLTS.

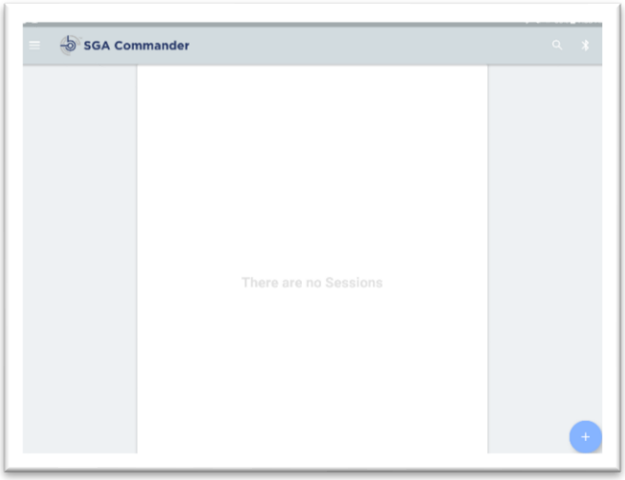
COUNTRY SPECIFIC GAS COLORS – CHANGES THE COLORS OF THE OUTLETS TO THE COUNTRIES OF CHOICE. EASILY SWITCH FROM US TO CANADIAN COLORS.

RUN GAS ZERO AFTER N2 TEST – THE GAS ZERO WILL CLEAR OUT ALL SETTINGS OF THE GAS CONCENTRATION SENSORS.

THE APPLICATION WILL PROMPT THE USER TO RUN A GAS ZERO AFTER A SUCCESSFUL N2 TEST. THIS OPTION MAY BE TURNED OFF AT ANY TIME IN SETTINGS.



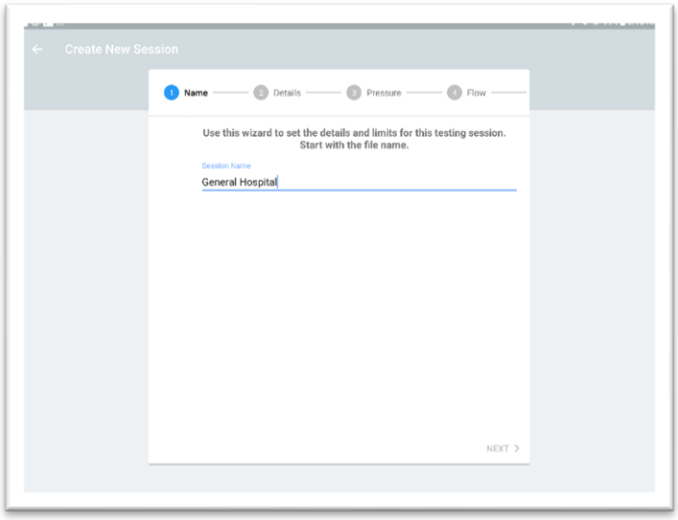
Create New Test Session Wizard



Use this wizard to set the details and limits for a testing session. The easy to use wizard will provide 5 step process for the user to setup a new testing file. To initiate, select the blue + sign button on the lower right-hand side of the homepage.

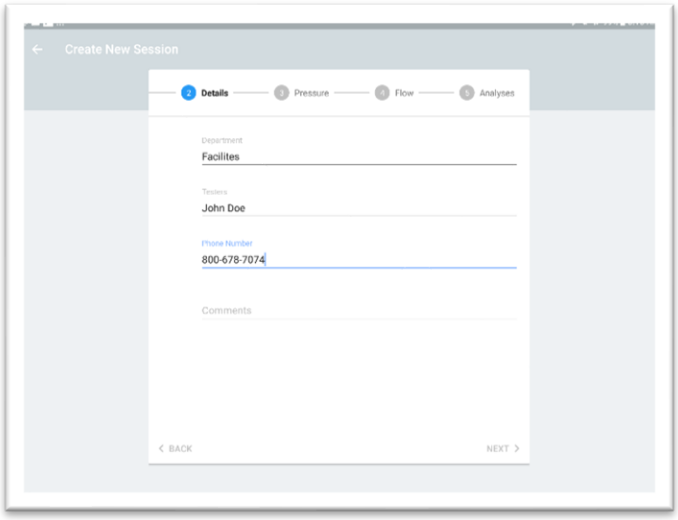
STEP 1 - FILE NAME

- Create a file name the testing session will be referred to going forward.



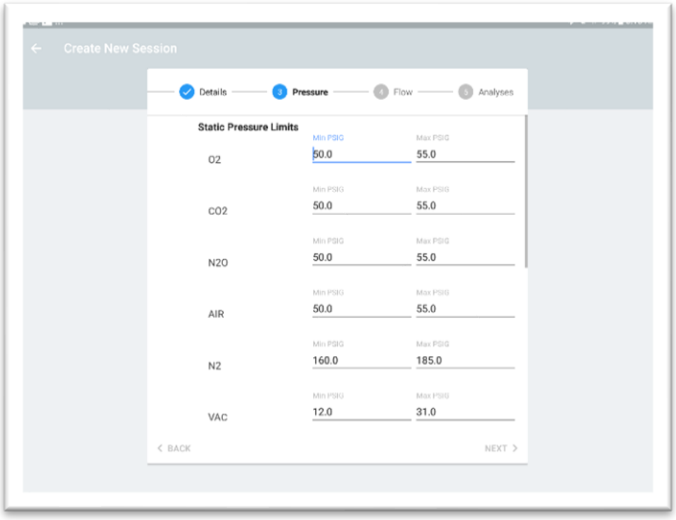
STEP 2 - DETAILS

- Fill in the Details portion of the file, which includes Department, Tester(s), Phone Number and Comments. Please note: these features are optional and will appear on the cover page of the data report.



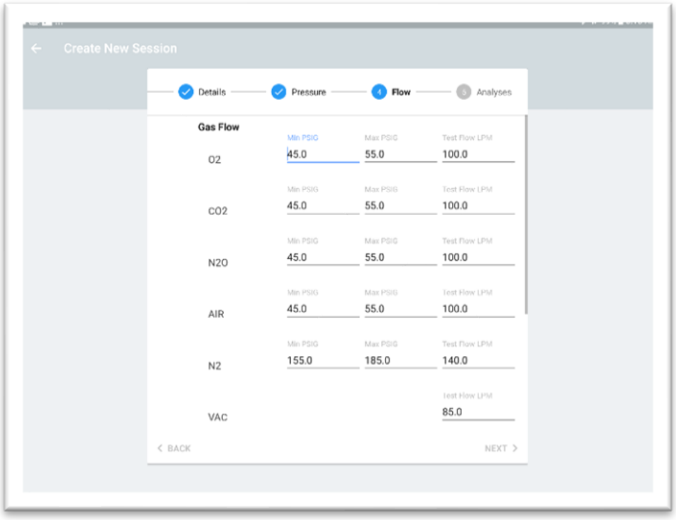
STEP 3 - PRESSURE

- Select the minimum/maximum static pressure limits for the testing session. Pressure drops can be modified here. Once the limits are chosen, they cannot be modified. Please note: that the default values for these pressure settings are compliant with NFPA99, 2015.



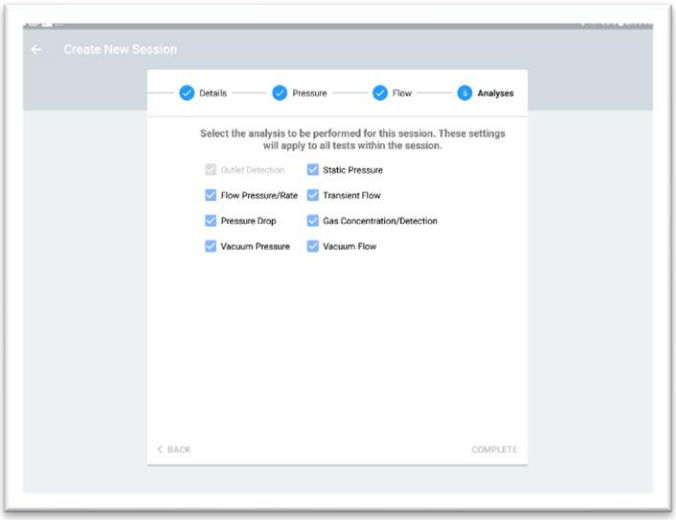
STEP 4 - FLOW

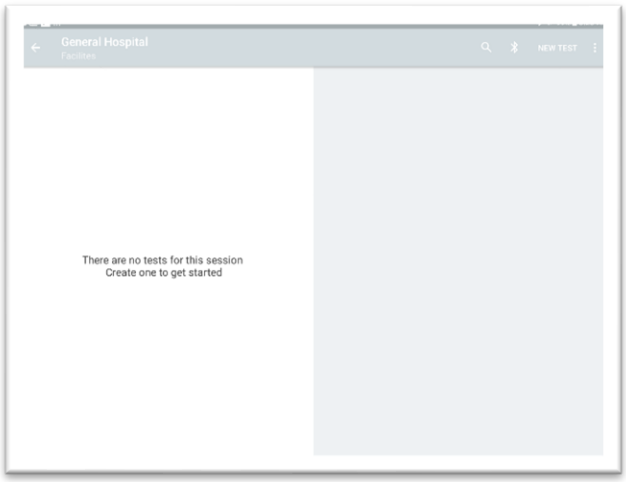
- Select the minimum/maximum flow pressure and flow rates for both gas flow and transient flow. You can also select the minimum/maximum values for the flow pressure. Once the limits are chosen, they cannot be modified. Please note that the default values for these pressure settings are compliant with NFPA99, 2015.



STEP 5 - ANALYSES

- Select the tests to be performed during the test session. As a default, all tests are selected as is recommended by Bionix. If there is a test that you don't necessarily need, you would deselect it here. Only the selected tests will be performed and cannot be modified.

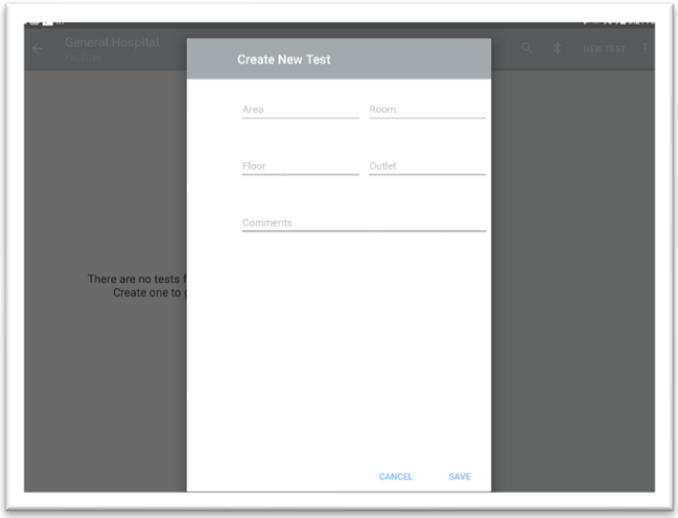




Once the test session is completed, the testing page opens. The top border includes the file name, search option, Bluetooth connection indicator and additional drop down.

New Test

Select New Test button, to create the first outlet test row. A new test entry will contain all of the data for a single gas outlet test. There are five descriptor fields that can be filled in by the user, listed on the left-hand grid. The remaining ten fields are automatically filled with data results received from the analyzer interface as the test is being performed. Notice each test entry is given a reference number that is issued in the order of the testing entry creation.



Outlet Descriptors

A new test entry will contain all of the data for a single gas outlet test. This data can be entered into the fields by the user prior to or after outlet testing.

AREA – THE AREA OF THE FACILITY THAT IS BEING TESTED. FOR EXAMPLE, TYPE "NICU" IF THE NICU IS THE AREA BEING TESTED.

FLOOR – TYPICALLY THE FLOOR OF THE FACILITY THAT IS BEING TESTED.

ROOM – THE ROOM NUMBER IN WHICH MEDICAL GAS OUTLETS ARE BEING TESTED.

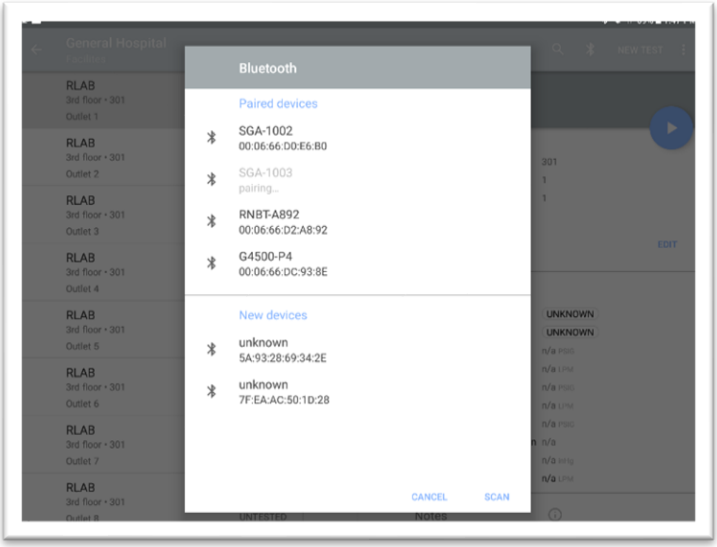
OUTLET – THE OUTLET NUMBER IN THE SEQUENCE OF TESTING. IF THE ROOM BEING TESTED HAS 12 OUTLETS, THE TESTS WILL HAVE THE OUTLETS IN THE ORDER IN WHICH THEY WERE TESTED.

COMMENTS – AN OBSERVATION OR INFORMATION ABOUT THE OUTLET THAT THE USER MAY WANT TO RECORD.

Testing Outlets with the SGA-1000

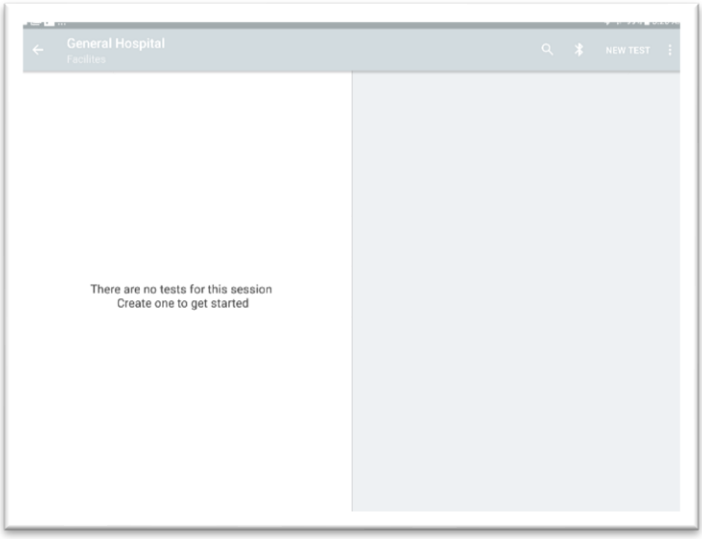
Gas Testing Setup

To initiate a medical gas outlet test you will need to connect an Android device (the tablet provided) running SGA Commander™ to the analyzer Interface via Bluetooth.



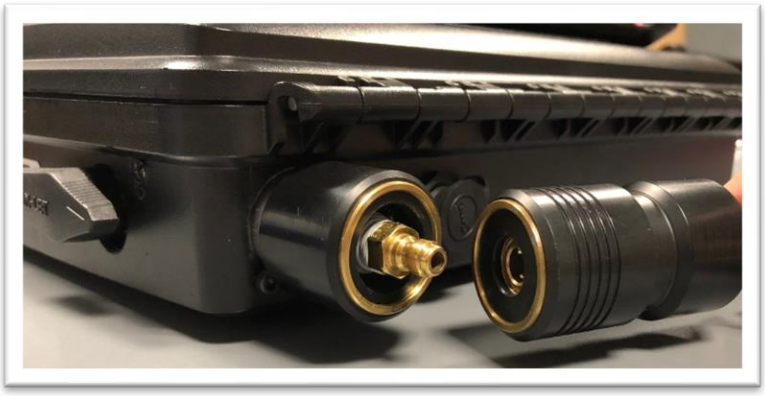
To initiate this process, power on the analyzer interface.
On the Android device, select the Bluetooth icon. Select the SGA-1000 device that is listed.
If this is the first time connecting to the analyzer interface, select *SCAN FOR ANALYZERS*. Once the analyzer is found by the Android device, select it, and the analyzer should connect. The user will be asked to confirm a passkey that is randomly generated between the two devices. Select **OK.**

The Bluetooth icon changes to confirm the connection. Please note: if the icon reverts back to original icon without dots the user will need to reconnect.



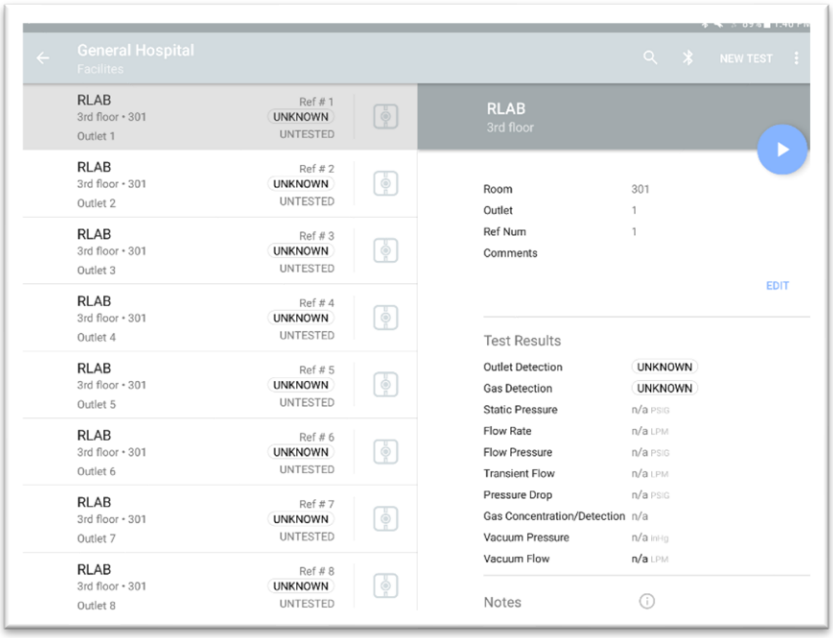
Testing Outlets

1. Connect the SGA-1000 Gas Hose into the rear of the analyzer interface, the smaller diameter side of the hose connects to the brass nipple piece on the rear of the analyzer interface. Confirm the connection is secure.



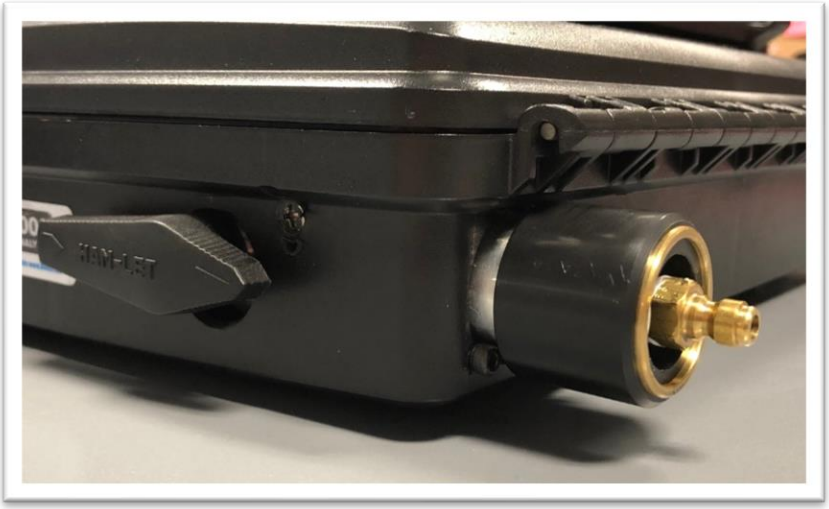
2. Select the appropriate gas outlet adapter to use for the outlet test and connect it to the other side of the SGA-1000 Gas Hose. Connect the Gas Outlet Adapter into the outlet that you will be testing. It is normal to have a slight hissing coming from the analyzer when it is plugged into an outlet that has flowing gas.

3. To begin the test, select **Blue Circular Play Button** and the analyzer will then perform its tests. The results will populate accordingly.



Special Instructions for Positive Pressure Testing

1. Confirm the manual valve on the left side of the analyzer is open. The valve should be parallel to the analyzer gas hose connection, and the analyzer case.



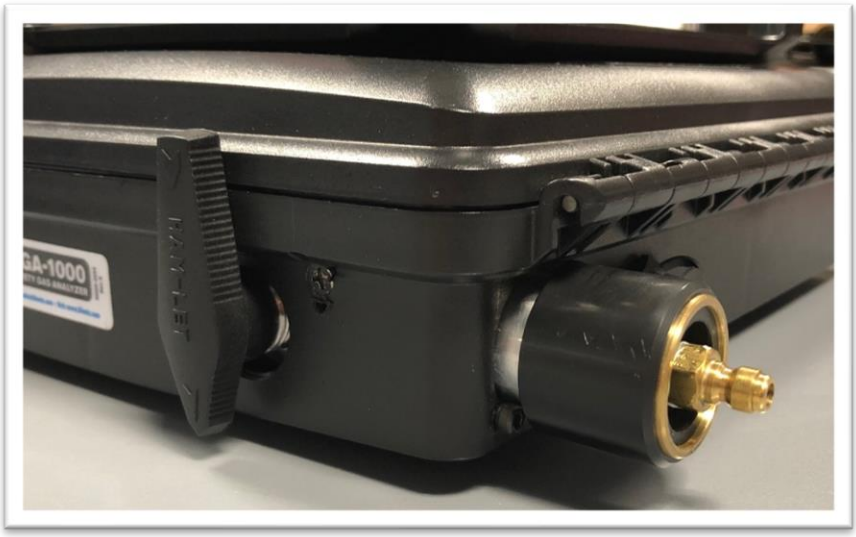
2. Attach the desired gas outlet adapter for the outlet to the gas hose. If necessary, change the area identification in the test file.
3. Visually inspect the outlet. Purge the outlet if you suspect that it might contain moisture or contamination. Do not use the analyzer to test outlets with liquid or solid contamination or outlets with over 200 psi pressure.
4. Plug the adapter into an outlet and then select **PLAY** button.
5. The analyzer will detect the expected gas type from the gas outlet adapter that you've selected to test with. A series of tests will run automatically.
6. Your results will record in the test entry field. Disconnect the adapter from the outlet. Be careful not to separate the adapter from the hose.

PLEASE NOTE: For optimal performance do not test a nitrous oxide outlet immediately after a carbon dioxide outlet test. Perform either an Air, Oxygen or Nitrogen test in between. This will ensure the NDIR is clear from the previous gas.

If you encounter any difficulty with the SGA-1000, please don't hesitate to contact the Bionix Technical Services office at 800-678-7074.

Special Instructions for Vacuum & WAGD Testing

Prior to testing Vacuum and WAGD inlets, the user must first close the valve on the right-hand side of the analyzer interface. The valve should be perpendicular to the interface.



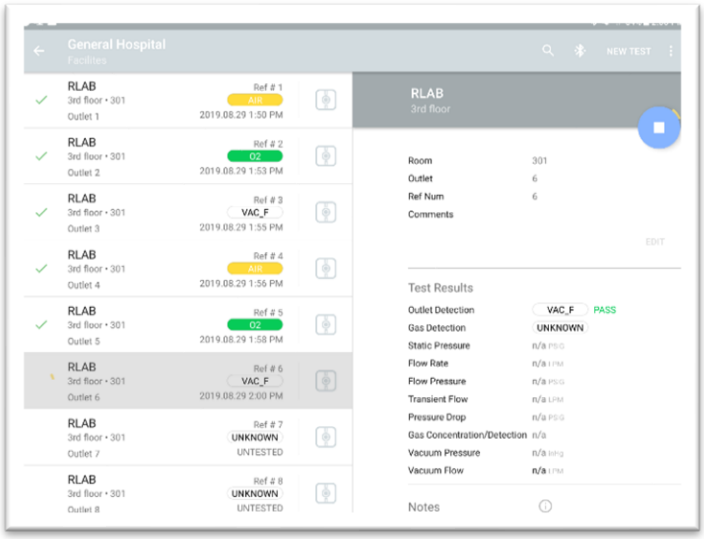
Follow the instructions below for your adapter type. Your analyzer will come with one of two adapters: a flow test or a pressure test only adapter.

Vacuum/WAGD Pressure Only Test (using the VAC/WAGD Pressure Only adapter):

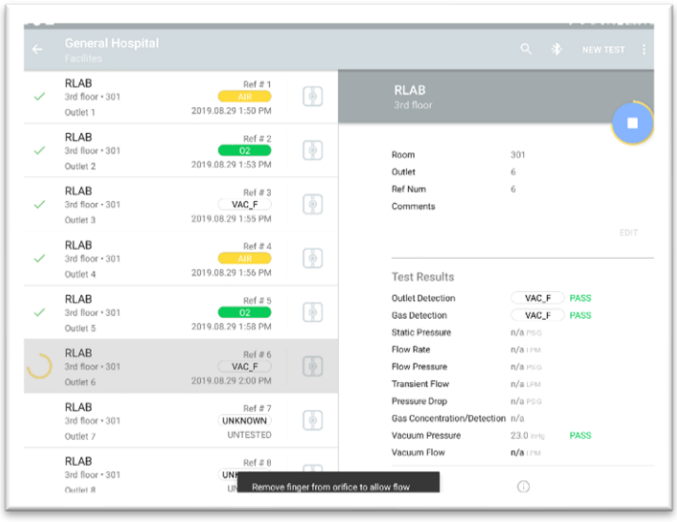
1. Close the valve on the right-hand side of the analyzer interface. The valve should be perpendicular to the interface.
2. Set the flow in a nearby vacuum inlet, on the same zone as the inlets to be tested, to 3 SCFM (85 LPM). This can be done easily using the Vacuum Flow Regulator (sold separately) or any hand-held flow meter.
3. Using the Vacuum Pressure Only adapter, plug in and select PLAY. The analyzer will take a pressure reading.
4. Your results will record in the test entry field. Disconnect the inlet adapter from the inlet. Be careful not to separate the adapter from the hose.
5. Close flow on the Vacuum Flow regulator and disconnect from the inlet.

Vacuum/WAGD Flow Test (VAC/WAGD adapter with brass flow orifice):

1. Close the manual valve on the right-hand side of the analyzer interface. The valve should be perpendicular to the interface.
2. Using the VAC/WAGD adapter with the brass flow orifice, connect to the inlet.
3. Plug in and select **PLAY**.
4. Once the test displays the Expected Gas, cover the orifice of the Vacuum/WAGD Adapter with your finger. The analyzer will take a pressure reading.

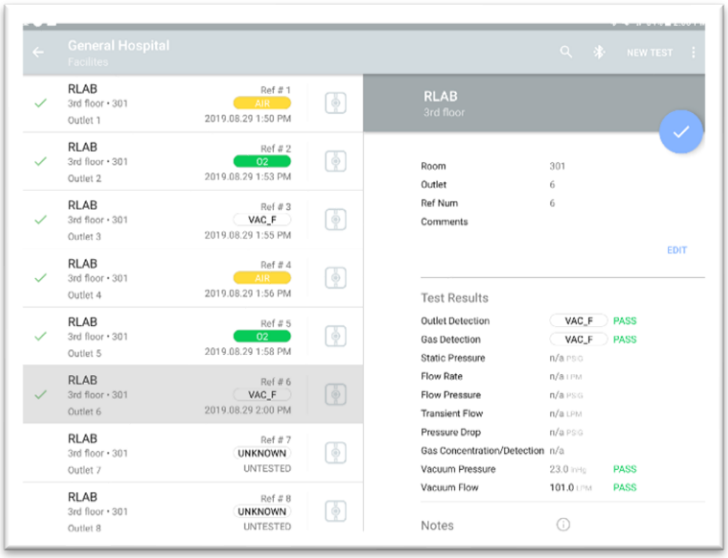


5. Once the pressure reading is recorded and displayed, a message will appear prompting the user to remove his/her finger to allow flow.



6. Allow flow and the analyzer will initiate the flow test.

7. The results will record in the test entry field. Disconnect the inlet adapter from the inlet. Be careful not to separate the adapter from the hose.



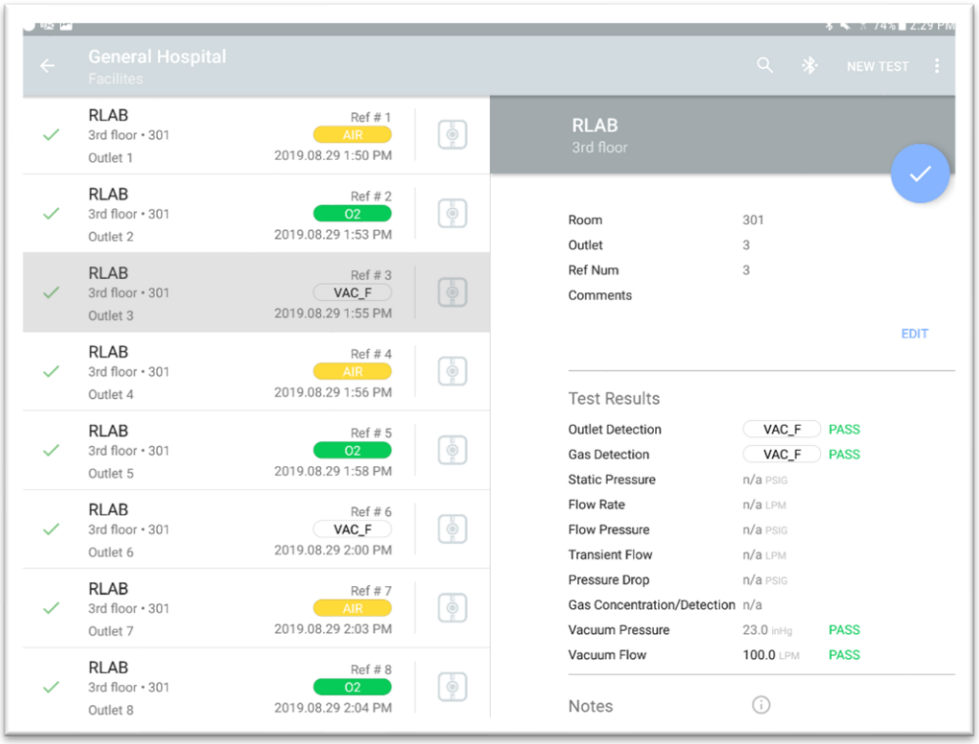
***Please note**: After completing a vacuum test, always open the manual valve to avoid complication with positive pressure testing.*

If you encounter any difficulty with the SGA-1000 please don't hesitate to contact the Bionix Technical Services office at 800-678-7074.

Test Completion

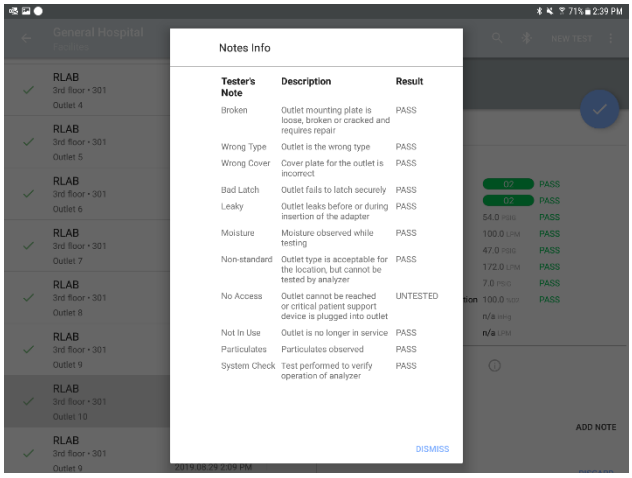
When an outlet test has concluded, the analyzer will send the test data to the SGA Commander™ App. The testing field will show a status message of PASS or FAIL.

The actual measured test results for an outlet can be viewed by selecting the test entry individually. Touching the line of data on the left will show the test results on the right of the screen. If there are any comments that you would like to add to the test entry then, you can select the **COMMENTS** field and write in your information. Comments can be used to take notes about the particular outlet or any other information that the user may find useful on the testing file report.



Entering Tester's Notes

The Bionix SGA Commander™ app is programmed with several helpful notes that can be used to identify certain issues or circumstances with an outlet. These notes export from the testing data file to the final report for easy identification of these outlets.



TESTER'S NOTE SUMMARY

A list of preprogrammed notes and their meanings can be found in the BIONIX SGA Commander™ App. To find this list you select the Notes button at the bottom of the results screen for a specific outlet. This will display the Tester's Note Summary section for your reference.

ADDING A TESTER'S NOTE

1. On the left side of the device screen, highlight the testing entry that you are assigning the note to.

2. On the right side of the screen, select the **Notes** option and select it by pressing down on the data line under it.

3. Scroll down until you find the note that you would like to add, select it and the app will save that information to the Tester's Note data line.

Auto-Incrementing Test Creation

After an outlet test has been completed, select the gas outlet graphic to auto-create the next test entry. The SGA Commander™ App will instantly create a new field under the one that had just completed. The descriptor data in this new field will port over to the new field automatically. The reference number and the outlet number will automatically count up to the next sequential number.

Once you leave the area you were testing medical gas outlets, you can change the next entry to reflect the new area in which you are testing. For example, you are testing in the NICU of a medical facility and the information is as follows:
REF. No.: 1
FLOOR: 2
AREA: NICU
ROOM: 107
OUTLET: 1

There are 12 outlets in this room. As you are testing, the entry fields are auto-incrementing by one in the Reference Number and the OUTLET fields. The Floor, Area and Room fields are porting over their information to the new testing entry. When you reach the last outlet, your testing entry descriptors look like this:
REF. No.: 12
FLOOR: 2
AREA: NICU
ROOM: 107
OUTLET: 12

The next room that you need to test on this data file is on the other side of the medical facility. On the next testing field (Ref. No. 13), you need to change the descriptor data to reflect the new area being tested. In this new area, my descriptor data will be:
REF. No.: 13
FLOOR: 7
AREA: PEDS
ROOM: 408
OUTLET: 1

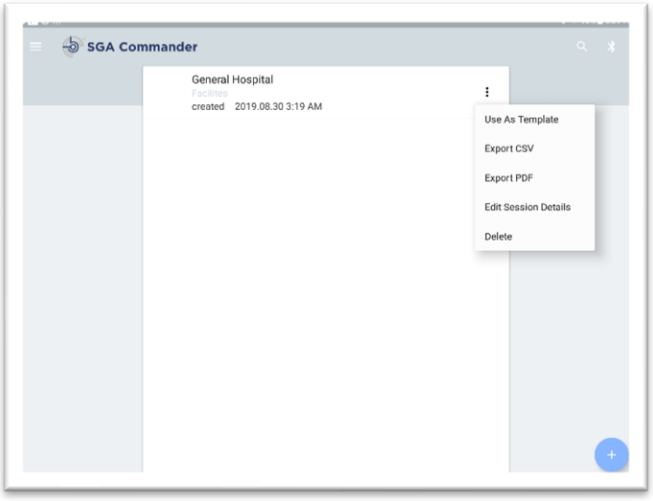
After testing 15 outlets in this room, the last tested entry will display the following descriptor data:
REF. No.: 28
FLOOR: 7
AREA: PEDS
ROOM: 408
OUTLET: 15

Any field that is changed will port over to the next field unless changed by the user. The only field that you cannot change is the Reference Number Field.

Auto-Save

All data results are automatically saved in the test session. There is no separate save feature. When an outlet testing session is complete, simply return to the main menu by selecting the back arrow in the top border. Choose the drop down of the desired test session.

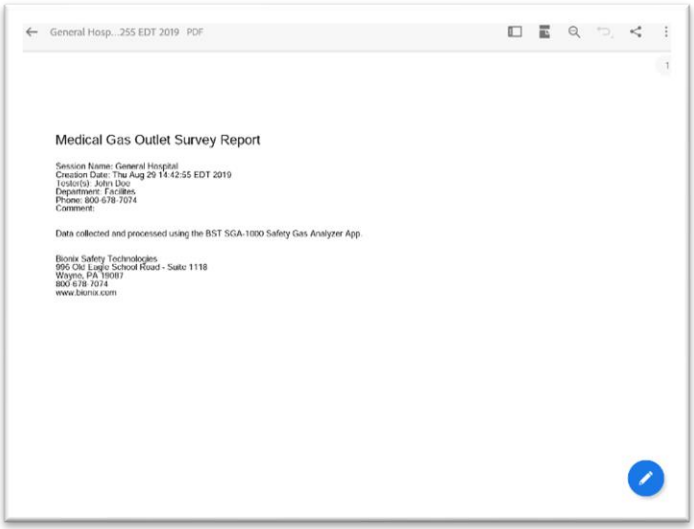
Report Generation – Exporting PDF or CSV



The SGA Commander™ App easily generates testing reports that can be exported to e-mail, a printer or the cloud. From the Homepage, chose the desired test session and select the individual drop down options.

Export PDF

Choose this option to automatically create PDF report of all data results, including Cover Page, Explanation of Codes page, Summary and Comments page.

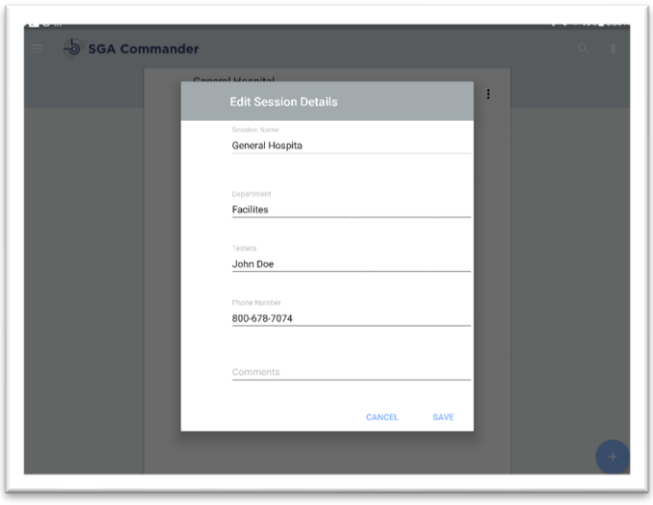


Export CSV

Choose this option to automatically create CSV report of all data results, only the test limits and data results will be included in this option.

Edit Session Details

This option provides the ability to edit the test session details, i.e. file name, department, users, etc.



Use As Template

This option provides the ability to use an existing file to generate a new test session with blank data results. The new test session wizard will pop-up to allow user to edit or simply keep it the same.

Warranty

Bionix warrants the model SGA-1000 Safety Gas Analyzer to be free from defects in material and workmanship under normal use and service for a period of one year from date of purchase. This warranty shall not apply to any unit or parts subject to alteration, misuse, neglect, accident, or abnormal conditions of operation.

This warranty is limited to repair or replacement by Bionix of any parts found by Bionix to be defective. Such repair or replacement will be made without charge, provided the analyzer is returned within one year of the original date of purchase. If the failure is found to be caused by alteration, neglect, accident, or abnormal conditions of operation, parts and repairs will be billed at the prevailing charges.

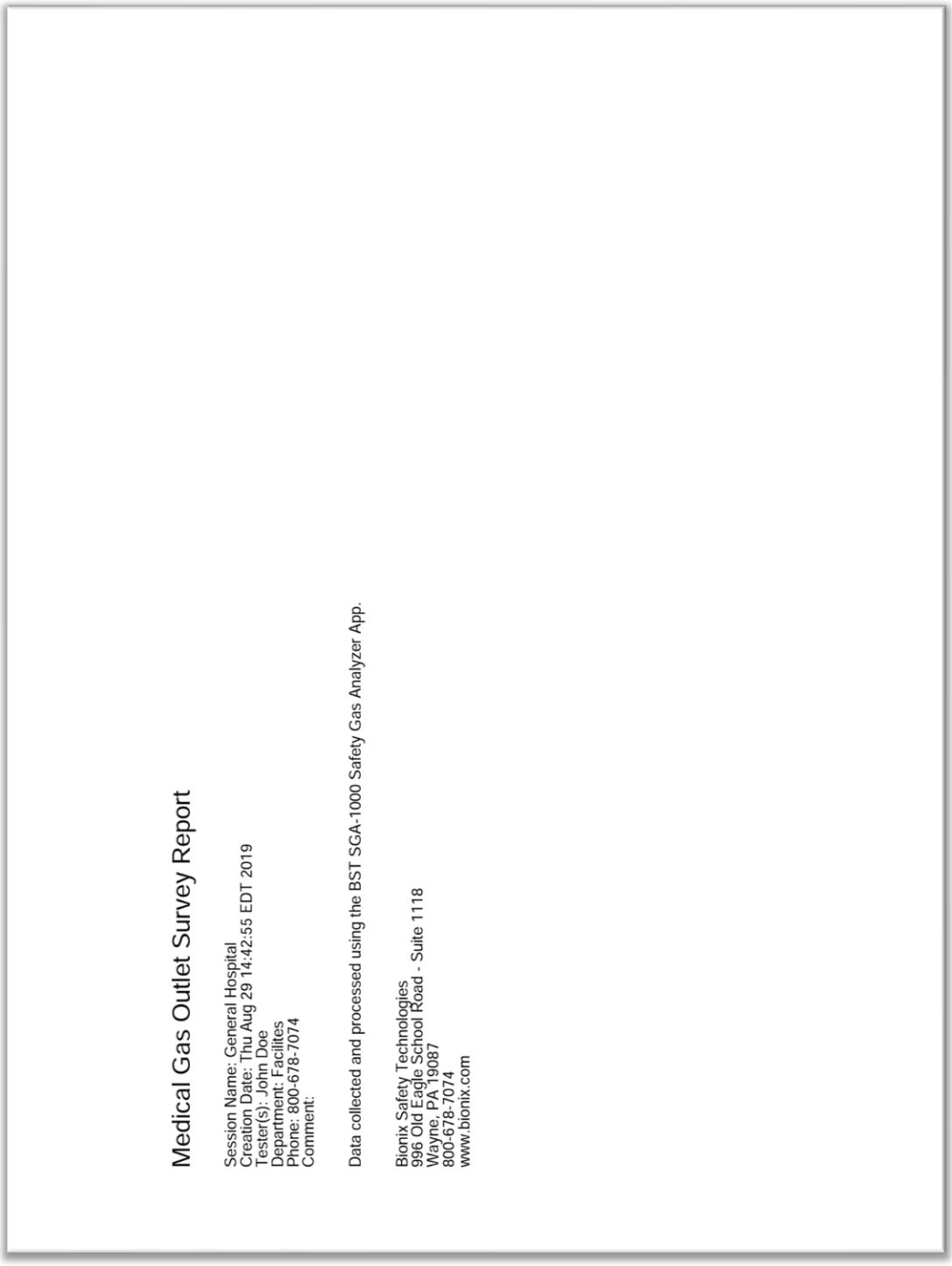
Bionix's liability for damages for any cause whatsoever will be limited to the payment actually received by Bionix.

IN NO EVENT WILL BIONIX BE LIABLE FOR ANY LOST PROFITS, INCIDENTAL DAMAGES, SPECIAL DAMAGES, OR CONSEQUENTIAL DAMAGES, EVEN IF BIONIX HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

IN ADDITION, BIONIX WILL NOT BE LIABLE FOR ANY DAMAGES OF THE CUSTOMER BASED UPON A THIRD PARTY CLAIM.

THE FOREGOING WARRANTIES ARE IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS OF A PARTICULAR PURPOSE.

Appendix A: Sample Report



Medical Gas Outlet Survey Report

Session Name: General Hospital
Creation Date: Thu Aug 29 14:42:55 EDT 2019
Tester(s): John Doe
Department: Facilites
Phone: 800-678-7074
Comment:

Data collected and processed using the BST SGA-1000 Safety Gas Analyzer App.

Bionix Safety Technologies
996 Old Eagle School Road - Suite 1118
Wayne, PA 19087
800-678-7074
www.bionix.com

Explanation of Codes

This report contains test results of a survey of medical gas outlets at the facility listed above. Outlets were tested for gas type, static pressure, and pressure during flow and concentration.

Notes may have been added by test personnel when appropriate.

No tests of gas purity were performed

The significance of the data in each column is as follows:

LINE - Maintains a count of the number of outlets tested.

FLOOR, AREA, ROOM, and OUTLET - Gives the location of the outlet within the hospital and within the room.

EXPECTED GAS - The gas type as marked on the adapter plugged into the inlet end of the analyzer gas hose. This adapter is chosen to match the gas type marked on the gas outlet. (Oxygen, Nitrous Oxide, Air, Carbon Dioxide, Nitrogen, Vacuum, or WAGD)

DETECTED GAS - The gas type actually flowing from the outlet.

STATIC PRESSURE - The pressure at the outlet with no flow.

Gas	O2 (PSIG)	N2O (PSIG)	Air (PSIG)	CO2 (PSIG)	N2 (PSIG)	VAC (inHgG)	WAGD (inHgG)
Min. Pressure	50.0	50.0	50.0	50.0	160.0	12.0	12.0
Max. Pressure	55.0	55.0	55.0	55.0	185.0	31.0	31.0

GAS FLOW - Gas is drawn from the outlet at an increasing rate until flow reaches the test value or pressure drops below the minimum value listed below. Flow and pressure are then recorded.

Gas	O2 (PSIG)	N2O (PSIG)	Air (PSIG)	CO2 (PSIG)	N2 (PSIG)
Min. Pressure	40.0	40.0	40.0	40.0	145.0
Max. Pressure	55.0	55.0	55.0	55.0	185.0
Test Flow	100.0 LPM	100.0 LPM	100.0 LPM	100.0 LPM	140.0 LPM

PRESSURE DROP - Is static pressure minus the pressure measured at the flow listed in the "FLOW RATE" column.

Gas	O2 (PSIG)	N2O (PSIG)	Air (PSIG)	CO2 (PSIG)	N2 (PSIG)
Max Drop	15.0	15.0	15.0	15.0	15.0

VACUUM FLOW - (Performed with brass flow orifice adapter) - Maximum flow into the vacuum inlet and pressure drop in the analyzer are recorded.

NOTE - Notes are entered by test personnel and reflect observations beyond the scope of the automatically performed tests. A single test can have multiple notes. They are summarized in the table as follows:

PASS - all notes were acceptable

FAIL - any note was unacceptable

STATUS - The outlet is:

PASS - all test results are acceptable

FAIL - if any test result is unacceptable

UNTESTED - if the outlet was not tested

Medical Gas Outlet Test Data

Cmt	Ref	Floor	Area	Room	Outlet	Expected Gas	Detected Gas	Static Pressure	Flow Rate	Flow Pressure	Pressure Drop	Transient Flow	Gas Conc	VAC Pressure	VAC Flow	Note	Status	Timestamp
n/a	1	3	RLAB	301	1	AIR	AIR	53.0 PSIG	100.0 LPM	47.0 PSIG	7.0 PSIG	173.0 LPM	20.0 %O2			PASS	PASS	08/28/19 01:50 PM
n/a	2	3	RLAB	301	2	O2	O2	53.0 PSIG	100.0 LPM	47.0 PSIG	7.0 PSIG	172.0 LPM	100.0 %O2			PASS	PASS	08/28/19 01:53 PM
n/a	3	3	RLAB	301	3	VAC_F	VAC_F							23.0 PSIG	100.0 LPM	PASS	PASS	08/28/19 01:55 PM
n/a	4	3	RLAB	301	4	AIR	AIR	53.0 PSIG	100.0 LPM	46.0 PSIG	7.0 PSIG	170.0 LPM	21.0 %O2			PASS	PASS	08/28/19 01:56 PM
n/a	5	3	RLAB	301	5	O2	O2	54.0 PSIG	100.0 LPM	47.0 PSIG	7.0 PSIG	171.0 LPM	100.0 %O2			PASS	PASS	08/28/19 01:58 PM
n/a	6	3	RLAB	301	6	VAC_F	VAC_F							23.0 PSIG	101.0 LPM	PASS	PASS	08/28/19 02:00 PM
Replace sticker	7	3	RLAB	301	7	AIR	AIR	53.0 PSIG	100.0 LPM	46.0 PSIG	7.0 PSIG	171.0 LPM	21.0 %O2			PASS	PASS	08/28/19 02:03 PM
n/a	8	3	RLAB	301	8	O2	O2	54.0 PSIG	100.0 LPM	47.0 PSIG	7.0 PSIG	172.0 LPM	100.0 %O2			PASS	PASS	08/28/19 02:04 PM
n/a	9	3	RLAB	301	9	VAC	VAC							23.0 PSIG		PASS	PASS	08/28/19 02:06 PM
Replace sticker	10	3	RLAB	301	10	O2	O2	54.0 PSIG	100.0 LPM	47.0 PSIG	7.0 PSIG	172.0 LPM	100.0 %O2			PASS	PASS	08/28/19 02:07 PM
n/a	11	3	RLAB	301	9	CO2	CO2	52.0 PSIG	100.0 LPM	42.0 PSIG	11.0 PSIG		100.0 %CO2			PASS	PASS	08/28/19 02:09 PM
n/a	12	3	RLAB	301	10	AIR	AIR	53.0 PSIG	100.0 LPM	46.0 PSIG	7.0 PSIG	171.0 LPM	20.0 %O2			PASS	PASS	08/28/19 02:10 PM
n/a	13	3	RLAB	301	11	N2	N2	172.0 PSIG	140.0 LPM	162.0 PSIG	10.0 PSIG		1.0 %O2			PASS	PASS	08/28/19 02:12 PM
n/a	14	3	RLAB	301	12	N2O	N2O	51.0 PSIG	100.0 LPM	42.0 PSIG	10.0 PSIG		100.0 %N2O			PASS	PASS	08/28/19 02:15 PM
n/a	15	3	RLAB	301	13	AIR	AIR	53.0 PSIG	100.0 LPM	47.0 PSIG	6.6 PSIG	172.0 LPM	20.0 %O2			PASS	PASS	08/28/19 02:20 PM
n/a	16	3	RLAB	301	14	O2	O2	54.0 PSIG	100.0 LPM	47.0 PSIG	7.0 PSIG	171.0 LPM	100.0 %O2			PASS	PASS	08/28/19 02:22 PM
n/a	17	3	RLAB	301	15	WAGD_F	WAGD_F							23.0 PSIG	96.0 LPM	PASS	PASS	08/28/19 02:23 PM
n/a	18	3	RLAB	301	16	AIR	AIR	53.0 PSIG	100.0 LPM	47.0 PSIG	7.0 PSIG	172.0 LPM	20.0 %O2			PASS	PASS	08/28/19 02:24 PM
n/a	19	3	RLAB	301	17	O2	O2	54.0 PSIG	100.0 LPM	47.0 PSIG	7.0 PSIG	170.0 LPM	100.0 %O2			PASS	PASS	08/28/19 02:26 PM
n/a	20	3	RLAB	301	18	WAGD	WAGD							23.0 PSIG		PASS	PASS	08/28/19 02:28 PM

Medical Gas Outlet Summary Report

Status	Detected Gas	Static Pressure	Flow Pressure	Pressure Drop	Transient Flow
PASS	20	15	15	15	12
FAIL	0	0	0	0	0
UNTESTED	0	5	5	5	8
TOTAL					**20**

Status	Detected Gas	Static Pressure	Flow Pressure	Pressure Drop	Transient Flow
PASS	100.00%	75.00%	75.00%	75.00%	60.00%
FAIL	.00%	.00%	.00%	.00%	.00%
UNTESTED	.00%	25.00%	25.00%	25.00%	40.00%

Appendix B: Sample Room Abbreviations

Title	Abbreviation
Administrative Offices	ADMIN
Animal Laboratory	ANIM
Audiology	AUD
Autopsy and Morgue	AUT
Blood Bank	BBNK
Blood Gas Lab	BGAS
Cardiac Cath Lab	CATH
Cast Room	CAST
Central Supply	CEN
Chemistry	CHEM
Chemistry, Automated	CHEMA
Clinic	CLIN
Clinic, Dental	CDEN
Clinic, Ear, Nose, & Throat	CENT
Clinic, Endoscopy	CEND
Clinic, Eye	CEYE
Clinic, Medicine	CMED
Clinic, Pediatric	CPED
Clinic, Surgery	CSRU
Clinic, Urology	CURO
Clinical Laboratory	CL
Clinical Laboratory, Cyst	CLCYS
Clinical Laboratory, Hemo	CLHEM
Clinical Laboratory, Micro	CIMIC
Clinical Laboratory, Sero	CLSER
Clinical Laboratory, Urin	CLURI
Clinical Laboratory, Viro	CLVIR
Coronary Care Unit	CCU
Coronary Care Unit, Progressive	CCUP
Cystoscopy	CYS
Dark room	DKRM
Delivery Room	DELR
Delivery Suite	DELS
Dialysis Unit, In-Patient	DIALI
Dialysis Unit, Out-Patient	DIALO
Dietary	DIE
Electrocardiography	ECG

Title	Abbreviation
Electroencephalography	EEG
Electromicroscopy	EMIC
Electromyography	EMG
Emergency Care Facility	ECF
Emergency Room	ER
Emergency Vehicle	EV
Examination Room	EXAM
Fluorescent Microscopy	FMIC
Fluoroscopy	FLO
Fracture Room	FRAC
General Office Area	GO
Heart Station	HS
Histology	HISTO
Housekeeping	HK
Immunology	IMM
Industrial Medical Facility	IMF
Intensive Care Unit, Burn	ICUB
Intensive Care Unit, General	ICUG
Intensive Care Unit, Infant	ICUI
Intensive Care Unit, Medical	ICUM
Intensive Care Unit, Neo	ICUNN
Intensive Care Unit, Neur	ICUN
Intensive Care Unit, Pediatric	ICUP
Intensive Care Unit, Progressive	ICUPRG
Intensive Care Unit, Respiratory	ICUR
Intensive Care Unit, Surgical	ICUS
Labor Room	LABOR
Laundry	LAU
Library	LIB
Medical Records	MEDR
Multiphasic Screening	MULTI
Nuclear Medicine	NUC
Nursery	NUR
Nursery, Intensive Care	NURI
Nursery, Premature	NURP
Nurses Station	NS
Occupational Therapy	OCC

Appendix D: Notes

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