

3.0 Operation

3.0 OPERATION - GENERAL

The operation of the INNOV-X XRF Instruments is very simple. Power to the instrument is controlled by the ON/OFF button on the base of the pistol grip. This power button connects the main battery to the electronics, and x-ray power assembly as well as charges the Compaq iPAQ Pocket PC® (iPAQ). The iPAQ operates on the Microsoft Windows CE ® operating system and is activated separately by the power button on the right top face, just over the display.

3.1 WORKING with the Compaq iPAQ Pocket PC®

The Microsoft Windows CE ® operating system and INNOV-X software provided on the iPAQ handheld computer are operated by user input through the touch screen. Please refer to the iPAQ reference manual for additional details on the operation, specifications and user interface of this powerful computer.

General tips

- The Start Menu is found in the upper left corner of the iPAQ screen. This is used to launch all applications, including the Innov-X Systems Analyzer software.
- The instrument is designed as a “point and shoot” system that requires little, if any, entry of information for most operations. In the event the user modifies the grade library, enters testing information data, or performs other features, it will be necessary to enter data via the virtual keyboard, which can be accessed by tapping the keyboard icon in the lower right corner. The iPAQ also includes character recognition software. This can be selected from the drop-down menu to the right of the keyboard icon.
- The File toolbar which will be used to Change Functions, Screens and Options is located at the bottom of the screen.
- It is possible to cut, copy, rename and delete files from within Windows File Explorer by selecting the file to be modified and holding the stylus on the screen for 2 seconds.
- Pressing buttons on the bottom of the iPAQ will perform various functions that are described in the iPAQ documentation. The button on the right hand side of the analyzer is the iPAQ task manager. Pressing this button will show all programs that are currently open. Open files can be closed from this menu.
- The upper right corner of the iPAQ will display a circle with **ok** in it, or the symbol ⊗. When the Innov-X software is active, the **ok** will be used to enter data and close screens, while the ⊗ merely minimizes screens.
 - Occasionally, the ⊗ symbol will appear in screens where you enter data. If this happens, tapping anywhere in the screen will bring up the **ok** button.
 - If you wish to exit the Innov-X software, select **File** → **Exit**, rather than tapping the ⊗ button. You may need to close three screens to completely exit the software.

Changing the Display Font Size

1. Tap the Upper Left Corner for the Start Menu.
2. Select Internet Explorer.
3. Select **View** → **Text Size**.
4. Select the desired size.

3.2 OPERATION - MAIN SOFTWARE SCREENS

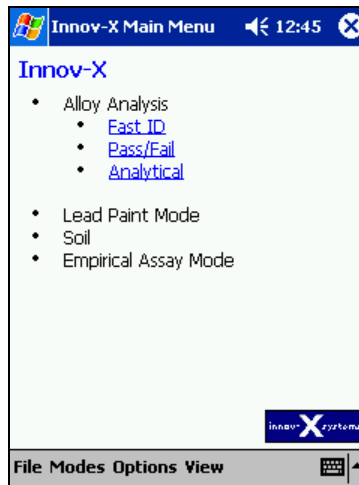
The Innov-X Software consists of three main screens:

- ❑ **Main Menu screen:** Used to select the analysis mode, access old testing results, etc.
- ❑ **Analysis Screen:** Used to change settings, edit libraries, setup sorting methods, etc.
- ❑ **Results Screen:** Displays results from current reading, allows scrolling back to previous test results.

3.2.1 Innov-X Main Menu

The main menu below appears upon startup. The Main Menu allows you to choose an analysis mode, as well as perform certain administrative functions such as changing your login password. The modes which are available on the analyzer are shown in blue. Innov-X software can be upgraded at any time, often via the internet. Please contact the Innov-X Sales Department at 866-446-6689 for upgrade information.

- **Use the Main Menu to select the desired analysis mode.** The analysis mode can be selected by either tapping on the name of the method (shown in blue) or by selecting the appropriate mode from the Modes menu.
- The administrative password can be changed by selecting *Options* → *Change Password*.
- It is possible to go directly to the Results Screen by selecting *View*→*Results*. If the results screen is opened in this manner, it is possible to view results when the iPAQ is not connected to the analyzer.



3.2.2 The Analysis Screen

Selecting a mode opens up the analysis window for that mode. All of the data acquisition and analyzer control is done from this window. This window allows the user to start or stop an analysis, change testing parameters, and modify the fingerprint and grade libraries.

The analysis screen can be selected from the Main menu, once it is open, it runs continually while the software is active. From the results menu, it is always possible to go back to the Analysis screen by selecting *File* → *Exit*.

The analysis screen for FastID is shown below. Screens from other modes are very similar and will be described in further detail later in this manual. The analysis screen shows the name of the mode that is currently active, a start/stop button for starting and stopping tests, an info button that is used to enter test specific information, and a battery indicator. In addition, a message appears directly below the name of the mode which will indicate the current state of the analyzer. Typically it will say “Ready to Test” but it will

provide other information in certain circumstances. The information displayed on the bottom of the screen, directly above the Start button provides additional information about analyzer settings and will be described later in the manual.



3.2.3 The Results Screen

The Results Screen displays the current reading and old data. All data handling functions such as exporting and deleting readings are carried out from this screen. Once the Results Screen is open, the user may start new tests without going back to the analysis screen.

The results screen is automatically shown at the completion of any analysis. It can also be accessed from the analysis screen for any mode or the **Main Menu**, by selecting **View → Results**.

In the default mode, the Results screen displays the Grade ID for **FastID** and **Analytical Modes**, and Pass/Fail Results for **Pass/Fail Mode**. The information which is displayed can be changed by selecting the **View** menu. It is possible to show just the Grade Id, the Grade ID and Chemistry, or the spectra for a reading. In addition, it is possible to view Test Information and a Pass/Fail log.

3.3 PASSWORDS - ABOUT PASSWORD PROTECTION

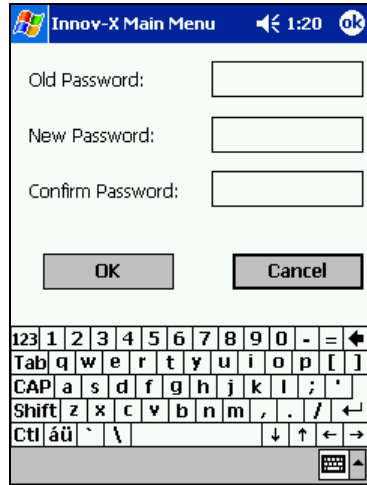
Certain functions such as adding and deleting fingerprints from the libraries, and Pass/Fail setup have been specified as Administrative Level Functions. These functions are described in detail in later sections of the manual. In order to use these functions, a password must be entered. The default password is set as the letter "Z". This password can be entered whenever the system prompts you for a password.

In addition, some features such as Calibration and Elemental Regions are protected with a factory password. These features can only be modified by a factory authorized technician.

Changing the Administrative Password.

The security password may be changed at any time from the **Innov-X Main Menu** by choosing *Options* → *Change Password*. When the change password option is selected, this screen will appear.

If you are changing the password for the first time, enter the letter “Z”; otherwise enter the current system password. Then, choose a password and enter it twice, once in the “New Password Box” and again in the “Confirm Password” box. Passwords may be any combination of letters or numbers. Any password should be something that can be easily remembered but is difficult for someone else to figure out.

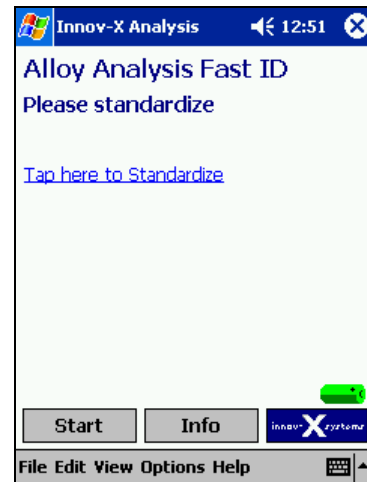


3.4 STANDARDIZATION

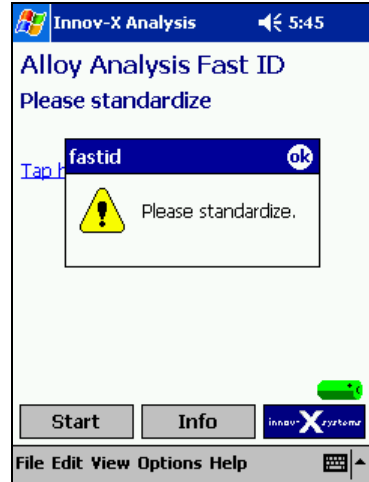
In order to verify that your analyzer is working correctly, it is necessary to periodically standardize the instrument. This automated procedure involves collecting a spectrum and comparing a variety of parameters to values stored when the instrument was calibrated at the factory. If there are any problems with the instrument, they will be indicated by an error message.

The standardization procedure takes about 1 minute. Standardization must be done any time the analyzer hardware is restarted and must be repeated if the instrument is operating for more than 4 (four) hours. It is possible to re-standardize the instrument at any point while the software is running. Standardization is always initiated from the Analysis Screen of any Mode.

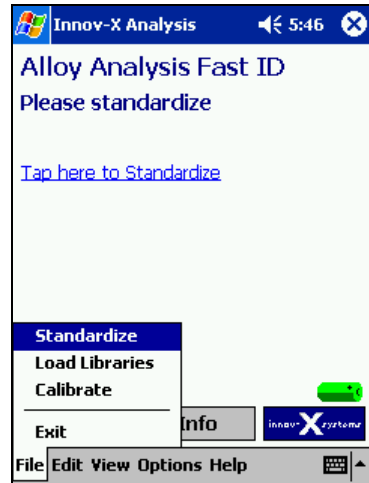
If the analyzer is restarted, you will be required to standardize the instrument before performing any measurements. This is indicated by the message **Please standardize** on the analysis screen



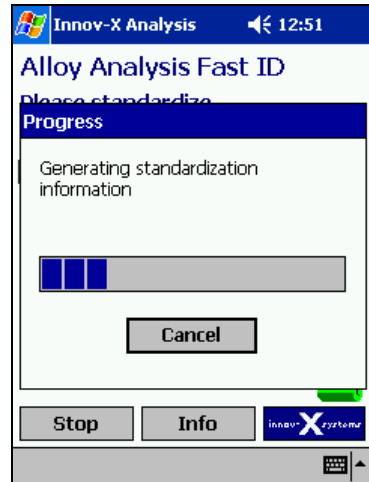
It is not possible to start a test before standardization. If Start is pressed, or the trigger is pulled before the standardization procedure is completed, a message box will appear. Press **ok** to dismiss the message.



To initiate the standardization procedure, click the standardization piece on the front of the instrument. Verify that the solid portion of the piece completely covers the analysis window. Tap the words **Tap here to Standardize** or selected *File* → *Standardize*.

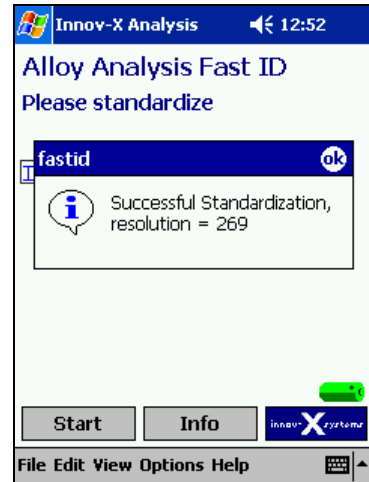


When standardization is in progress, the red light on the top of the instrument will blink indicating that the X-ray tube is energized and the shutter is open. In addition, the amber light on the back of the instrument will be illuminated, and a status bar will appear tracking the progress of the measurement.



When standardization is complete, the message “Successful standardization” will appear, along with the resolution of the instrument. Tap **ok** to dismiss the message and the instrument is ready for testing.

It is good practice to keep a log of the standardization values for your instrument. A large change in resolution (>50) may indicate a hardware problem with the unit.



Standardization Errors

The analyzer is designed with several diagnostic checks during the standardization process. If the standardization fails, the instrument will prompt the user regarding the next step. Generally the next step is to simply repeat the standardization.

Several errors could occur while standardizing:

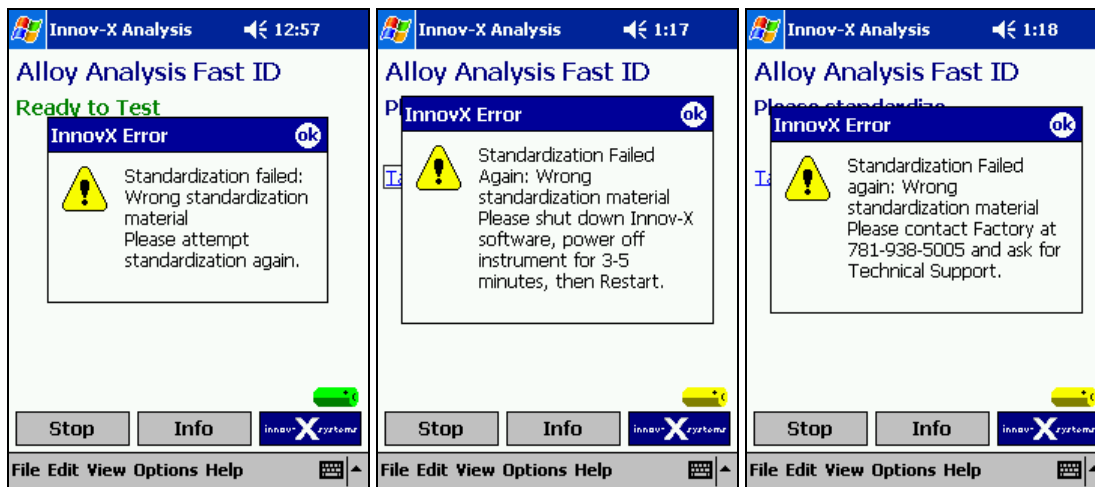
1. “Wrong Standardization Material.”
2. “Resolution too High”
3. “Error in Count Rate”

Take note of any error messages, as it may be necessary to relay this information to a Technical Support Engineer.

When standardization fails, verify that the standardization mask is in place and attempt standardization again. To restandardize after a failure, tap the “Tap Here to Standardize” icon on the display, or choose **File** → **Standardize**. Make sure that the solid part of the standardization mask is covering the window rather than the side with the welding collimator.

If standardization fails again, exit that software and power off the instrument. Restart and restandardize. Try replacing the battery after a second failure. Occasionally a weak battery can cause a standardization failure. Sometimes a battery may be completely charged, but still cause problems with standardization. In this case, removing and replacing the battery will fix the problem.

If the standardization fails after several attempts, contact the Innov-X Systems Service center at **866-446-6689**.



Lead Paint Analysis

4.0 Lead Paint ANALYSIS

Two modes exist for lead based paint (LBP) analysis:

- ❑ **Inspection Mode,**
- ❑ **Fixed Time Mode**

Inspection Mode

Inspection Mode automatically ends the test when the analyzer reaches a Positive or Negative determination with 95% confidence. Inspection Mode is the mode tested for the Innov-X Performance Characteristic Sheet (PCS) and is therefore the recommended testing mode for residential lead paint inspections or those done for Title X compliance. Inspection Mode is a variable time mode. It is designed to arrive at a Positive or Negative determination as fast as possible but still meet the 95% confidence requirements of the PCS. The further the lead paint level is from the action level (default action level is 1.0 mg/cm²), generally the faster the test.

Fixed Time Mode

Fixed Time mode always tests up to the test time set by the user (default is 15 seconds). Fixed Time mode is typically used when operators want to get high precision lead measurements, as opposed to rapid testing versus the 1.0 mg/cm² action level. Examples of when operators use Fixed Time mode is for renovation, elevated blood-lead (EBL) investigations or OSHA compliance. In these cases, operators often want to measure any detectable lead, as opposed to lead near the 1.0 mg/cm² Federal standard.

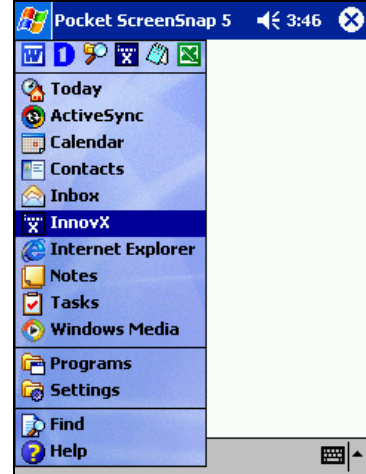
4.1 STARTING THE INSTRUMENT AND TAKING A MEASUREMENT

The basic startup and testing procedure is described below. All screen shots were taken using a different testing mode, however, the basic procedure is the same for all three alloy modes.

4.1.1 BASIC OPERATION

1. Install a freshly charged battery in the instrument.
2. Turn on the analyzer by pressing the power switch located on the base of the instrument.
3. Verify that the iPAQ is correctly seated on the top of the unit. If the iPAQ is properly connected, the amber light on the upper right side of the iPAQ next to the power button will blink, indicating that the iPAQ is receiving charge from the analyzer.
4. If the iPAQ is not on, turn it on by pressing the power button on the upper right side of the iPAQ.

5. Start the Innov-X Systems Software by selecting the Start Menu from the upper left hand corner of the iPAQ screen. Select the Innov-X Systems Software from the drop down menu.



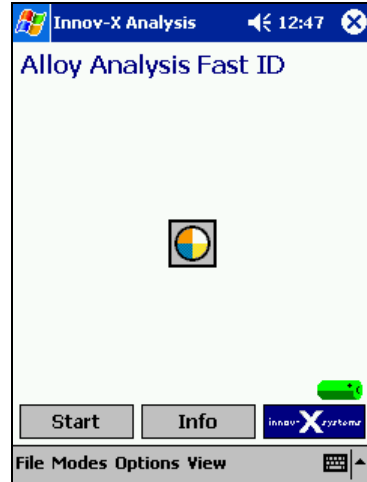
6. A notice will appear reminding the user that this instrument produces ionizing radiation and requires a trained user. Select **START** to start the Innov-X Systems Software package. Selecting **QUIT** will exit the Innov-X Software.



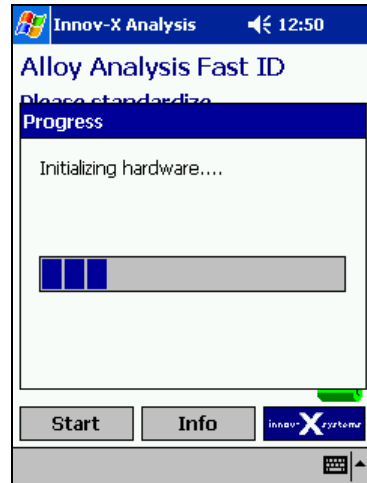
7. The Main Menu will open. Tap the name of the Mode you will be using to open that mode. Select **Lead Paint Mode**.



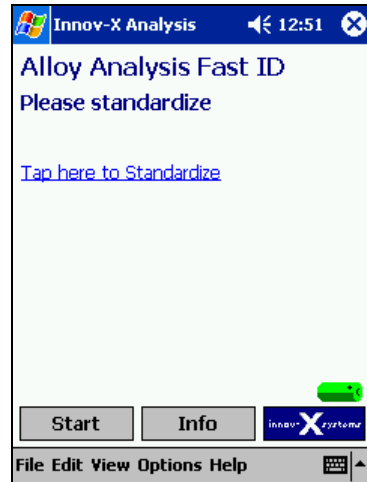
8. There may be a brief pause while the instrument loads the various parameters needed for operation. While this occurs, an icon will appear in the center of the iPAQ screen.



9. Once the measurement mode has been selected, the instrument will go through a 1 minute hardware initiation during which the electronics will stabilize and the detector cooling will be initialized. This is indicated by a progress bar.



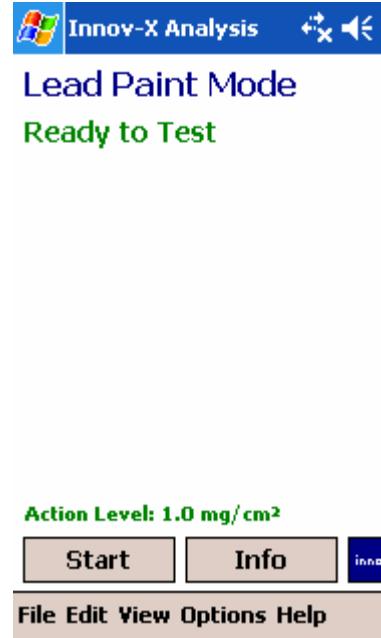
10. The message **Please Standardize** will appear. It will not be possible to analyze a sample without a successful standardization. Place the standardization jig in front of the analyzer window. Tap the blue words **Tap here to Standardize**. The analyzer will take approximately 1 minute; a status bar will be displayed throughout the measurement. Standardization is described in more detail in section 4.4.



11. When standardization is complete, the resolution of the analyzer will be displayed. Tap **ok** to dismiss this screen.



12. The analyzer is now ready to take a measurement. Note that the pre-set action level is displayed at the bottom of the testing screen. The lead test may be started by pulling the trigger or by tapping the START icon on the screen. Most operators use the trigger operation.

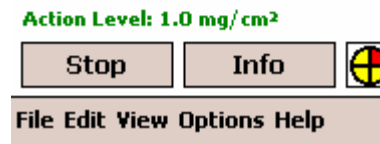
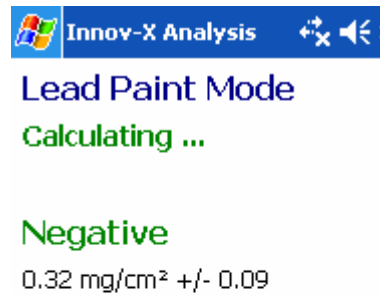
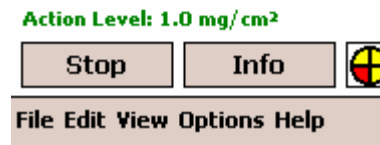
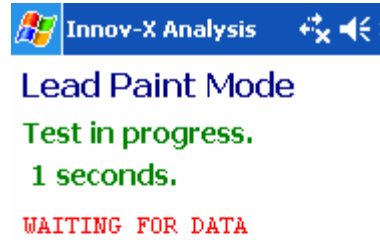


13. Hold the analyzer up to the sample to be analyzed. Make sure the sample is as flush against the analyzing window as is possible. You may start an analysis either by pulling the trigger or by selecting start from the iPAQ screen. **Note: You do not need to hold the trigger. A single pull on the trigger starts a test. Another pull on the trigger aborts the test.**

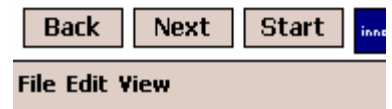
- a. After an analysis is started, the message “Test in Progress.” will appear, followed by the number of seconds elapsed during the measurement. For the duration of the test, the red light on top of the instrument will blink, and the “testing” icon will appear in the lower right corner of the iPAQ.

Note: Some state regulations require a “deadman” trigger meaning that the trigger must be held in to keep the x-ray tube enabled. The deadman trigger may be engaged via a software menu, please contact Innov-X technical support at 1-781-938-5005 for instructions.

- b. When the calculations are complete, there will be a slight delay the first time the results screen is opened any time the software is restarted. An icon will appear in the center of the screen. This indicates that the results program is loading and re-indexing all saved results.



- The results screen will display the results. The information displayed on the results screen may be changed by selecting one of the options under the View menu. This is described later in this chapter under the Results section.



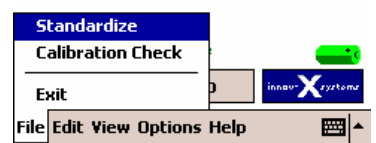
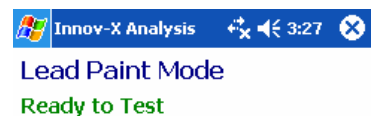
- Once the results screen is open, subsequent readings may be taken either by selecting start from the iPAQ screen, or by pulling the trigger. If at any point, you wish to return to the analysis screen, select **File** → **Exit**.

After the startup procedure is complete, and the analyzer is standardized, you are ready to analyze unknown samples. For first time use, follow these 2 simple steps to familiarize yourself with the analyzer, and ensure that settings are correct.

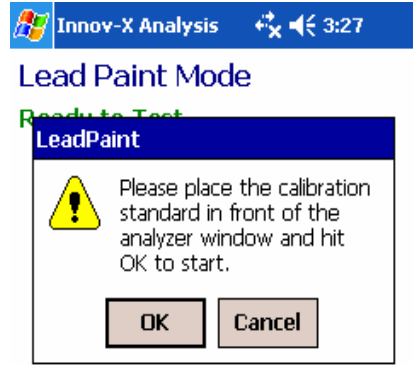
4.1.2 Checking Calibration:

Innov-X recommends checking the analyzer calibration every 4 hours. The analyzer is very stable and it is very unlikely that the user encounters drift in calibration, it is common quality control practice to regularly verify calibration.

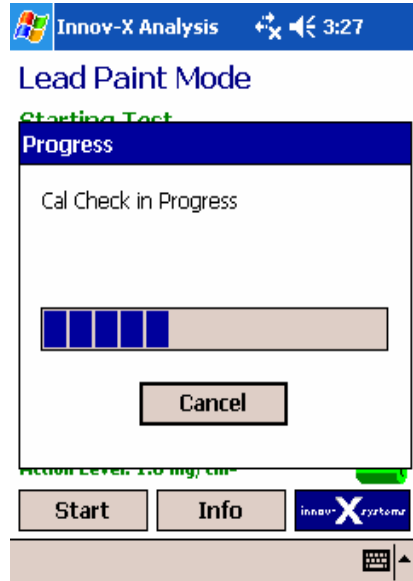
- In order to check the analyzer calibration, get to the Ready to Test screen. From this screen (shown below) tap “Calibration Check.”



2. Place the analyzer onto the calibration block provided, and tap the OK icon on the display. The calibration block is a NIST 2573 SRM of 1.04 mg/cm² of lead paint.



3. The analyzer will proceed to take a 30 second test of the calibration block. A progress bar will appear on the display to indicate the testing status.

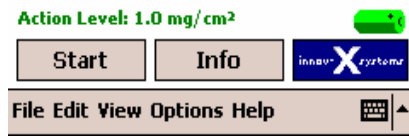
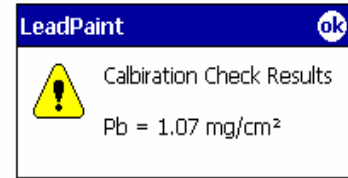


- At the conclusion of the test, the analyzer will display the result. The Innov-X PCS states that a result between 0.85 and 1.2 mg/cm² is within calibration. If the result is outside of this calibration range, repeat the calibration check. If the 2nd calibration check is within the range, continue testing. If the 2nd calibration check is outside the range, contact Innov-X technical support at 781-938-5005.



Lead Paint Mode

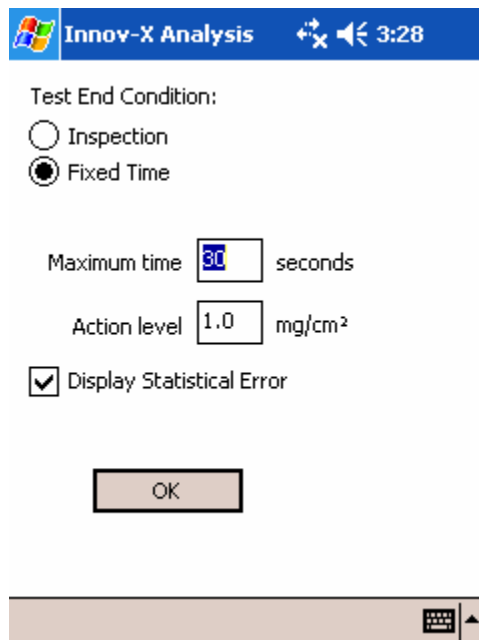
Ready to Test



4.1.3 Setting the Action Level:

The action level defaults to the Federal standard of 1.0 mg/cm². All lead paint testing for HUD or Title X compliance should be performed with the action level set to this value. Exceptions are State, County or City regulations where lower action levels are utilized, for example 0.7 mg/cm².

To set the action level first get to the Ready to Test screen. The top of the display will either say Ready to Test or Results. If it says Results, then select **File**→**Exit** from the bottom left menu item on the display.



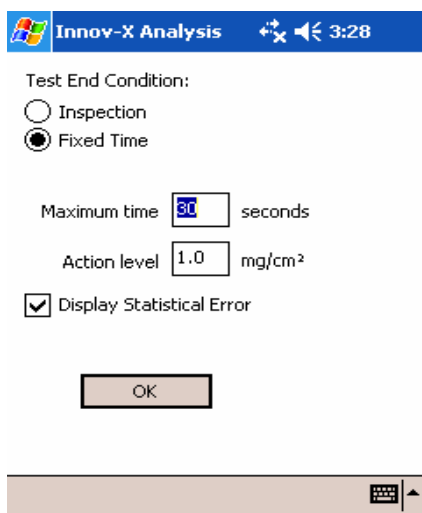
From the Ready to Test screen, select Options -> Setup. The following menu appears as shown above. Highlight the box next to Action Level, tap on the keyboard icon (lower right of screen display). A keyboard will appear. Enter 1.0 for the action level, or whatever value is required, and tap OK.

4.1.4 Setting the Testing Mode:

There are two testing modes: Inspection and Fixed Time. Lead paint inspections for compliance with the Innov-X PCS must be done in Inspection Mode.

To place the analyzer into Inspection Mode, get to the Ready to Test screen.

Choose Options -> Setup to bring up the standard setup screen:



Tap on the circle next to Inspection Mode or Fixed Time Mode, depending on the desired testing, and choose OK.

Display Statistical Error:

The operator may also tap on the “Display Statistical Error” on the setup screen. This option will enable the test precision (+/- value) to be displayed.

Maximum Time:

Maximum Time serves two purposes. In Fixed Time mode, it is the actual testing time used by the analyzer. When an operator begins a test, the analyzer tests until the elapsed time reaches the maximum testing time, then the analyzer automatically terminates the test.

In Inspection Mode, the Maximum Time is also the maximum test time allowed for the analyzer to reach a Positive or Negative determination. In general, in Inspection Mode, the analyzer will make a Positive or Negative decision very quickly – in 2-3 seconds. In some cases, if the lead paint level is very close to the

action level, the analyzer will have to test longer, to achieve a higher precision (lower +/- value) in order to make a decision. The Maximum Test time is the longest test allowed in Inspection Mode. If the elapsed time reaches the maximum, the software forces a Positive or Negative decision.