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This product is covered by one or more of the following U.S. and international patents:

- U.S. Patents 6,285,506; 7,035,374; 7,738,629; 7,738,630

Additional U.S. and international patents are pending.

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## Warranty and Liability

Under the typical terms of purchase, the delivered equipment is covered by Z-SPEC's standard warranty for a period of one (1) year from the date of shipment. If any covered malfunction or damage occurs during this period, necessary repairs or parts replacement shall be made by Z-SPEC or designated service personnel. The warranty does not apply when the equipment is:

- Used in any manner contrary to the instructions in this Guide
- Used in any manner not specified by Z-Spec
- Operated in an unsuitable environment
- Modified, repaired, or serviced by anyone other than Z-Spec-authorized personnel
- Subject to an accident, mishap, disaster, or abuse

Z-SPEC shall not be liable for any damages resulting from any malfunctions of this product, any erasure of data, or any other uses of this product. Z-Spec shall not be liable for customer's incidental, consequential, or special damages, or for lost profits or business interruption losses, in connection with operation of the equipment.

If there are any additional questions, please contact Z-Spec by email [info@zspecinc.com](mailto:info@zspecinc.com) or call at 518-977-3876.

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# Safety

Before installing the instrument, read this guide carefully and follow all procedures.

## Important Symbols

Warnings, cautions, and informative notes are provided throughout this guide as shown below.

	<p><b>Safety Warnings:</b> These warnings apply to safety and/or operating notes that will ensure that the user knows how to safely operate the instrument. Pay special attention to these notes to ensure proper analyzer function and user safety while operating the instrument.</p>
	<p><b>Operational Warnings:</b> These warnings apply to best practices and/or operating notes that are important to ensure that the analyzer delivers the best possible performance. Not following these instructions can lead to analyzer damage or bad data.</p>
	<p><b>General Notes:</b> These notes provide important information about the equipment's operation and restrictions, including best practices to get the best out of your instrument. Always read these notes to ensure proper operation.</p>
	<p><b>Radiation Warning:</b> These warnings apply to ionizing radiation hazards</p>
	<p><b>Electrical Shock Warning:</b> These warnings apply to possibility of electrical shock</p>
	<p><b>Hot Surface Warning:</b> These warnings apply to hot surfaces</p>

## Dangers, Warnings, and Cautions

Improper use may result in radiation, electrical, chemical, or thermal exposure!

- Follow all local, state, and federal regulations when operating this equipment
- This product must only be used by authorized and adequately trained personnel
- Do not alter the unit in any way

Before starting, review all the following warning statements:

	<p><b>Radiation Exposure: CAUTION:</b> THIS PRODUCT PRODUCES X-RAYS WHEN ENERGIZED DURING NORMAL USE. TO BE OPERATED ONLY BY QUALIFIED PERSONNEL. Operating it as described in this guide and the full User Manual ensures that radiation safeguards work properly to limit radiation exposure, keeping it well below the levels that are considered safe. Unintended exposure can cause serious injury. Do not try to disassemble any portion of the analyzer.</p>
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	<p><b>Hazardous Sample Handling:</b> When handling hazardous samples, follow proper instructions for their storage, disposal, and care. Many samples are flammable; keep them away from fire. Wear proper personal protective equipment (PPE). See your facility's standard operating procedures for proper PPE usage.</p>
	<p><b>Beryllium Exposure:</b> The X-Ray detector has parts that contain beryllium. In some countries, beryllium is a controlled substance, subject to regulations concerning the disposal of chemical waste. Follow all proper disposal procedures when disposing of this substance. Beryllium inhalation may cause serious and/or chronic lung disease. Beryllium exposure poses a potential cancer hazard, based primarily on animal testing. In case of any damage to the exposed beryllium window, contact Z-SPEC to obtain a RMA to return unit.</p>
	<p><b>Electrical Exposure:</b> If any main system components are opened or disassembled, electrical components will be exposed that can produce a dangerous electrical shock. The X-Ray components operate at high electrical voltages of up to 50 kilovolts, which can be lethal. It is the customer's responsibility to ensure the electronics are properly grounded to earth. Service of the analyzer must be performed by authorized service personnel who are trained to work with high-voltage equipment.</p>
	<p><b>Thermal Exposure:</b> The components inside the equipment can reach high temperatures that can be potentially hazardous to the user.</p>
	<p><b>WARNING</b>  This product can expose you to chemicals including lead/lead compounds which are known to the State of California to cause cancer or birth defects or other reproductive harm. For more information, go to:  <a href="http://www.p65warnings.ca.gov">www.p65warnings.ca.gov</a></p>

### Radiation Safety Statement

This Product conforms to all applicable Standards under U.S. 21 C.F.R. Chapter I, Subchapter J and IEC EN 61010-1.

Each product is delivered with a radiation survey report that summarizes the radiation emission testing performed at the Z-Spec factory before shipment. The Product should be surveyed periodically by appropriate radiation safety personnel or qualified outside contractors.

### Radiation Safety Compliance

This Product is sold with the understanding that the user assumes sole responsibility for radiation safety, as well as any state, provincial, or local regulatory compliance. Such regulations may require but are not limited to: machine registration, personnel qualification, periodic survey requirements, maintaining a safety program, and/or maintaining a dosimetry program. Users must consult the applicable regulating bodies for further information on user responsibilities.

# System Specifications

## Electrical, Physical, and Operational

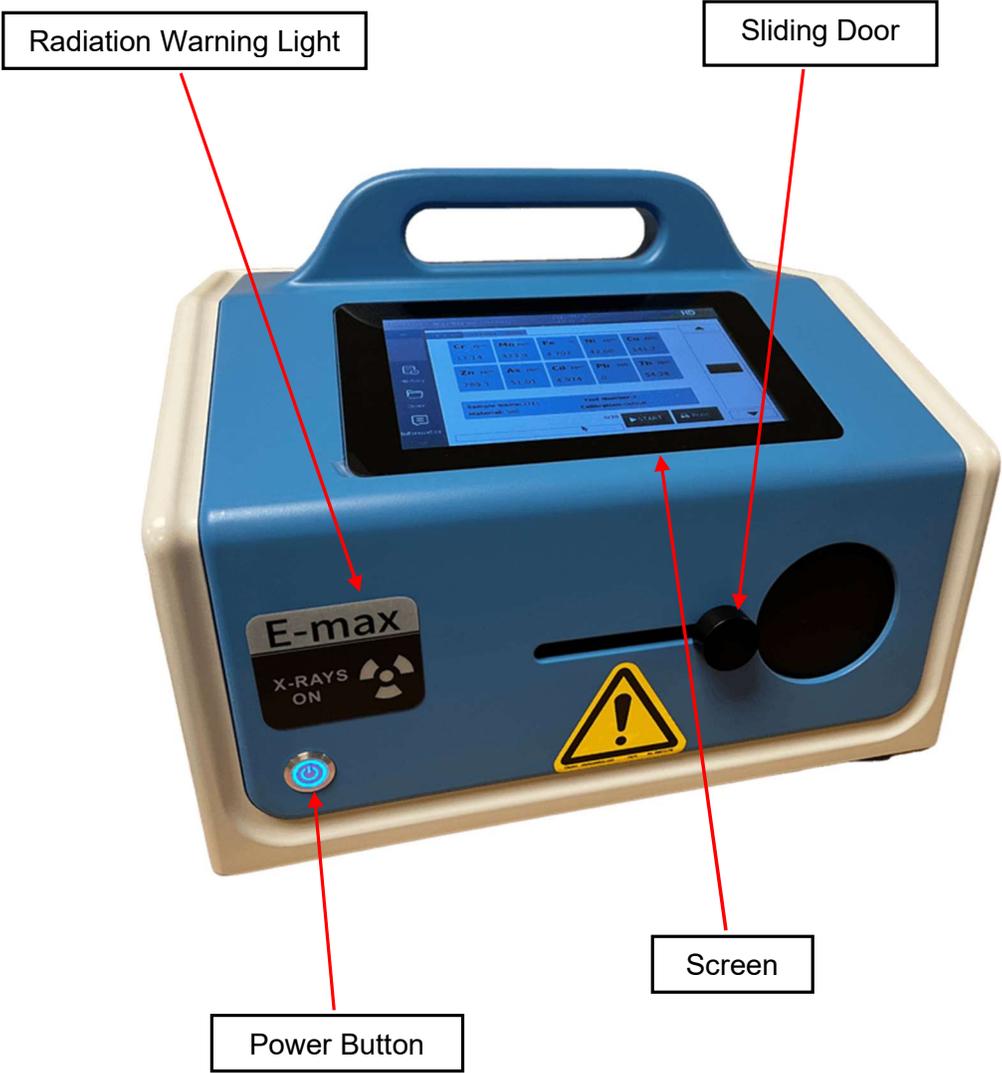
Range, LOD & Applications							
Dynamic Range	Cadmium, 0.05 ppm - 100 wt.%						
Limit(s) of Detection (ppm @ 600 s)	Cadmium 0.05 ppm @ 600s						
	As	Hg	Pb	Cr	Cu	Ni	Mo
	0.2	0.4	0.8	5	0.5	1	0.5
	Zn	Mn	Co	Se	V	Sb	Tl
	0.5	5	16	0.5	40	0.07	0.4
Applications	Elements in soil, food, water, and ground water.						



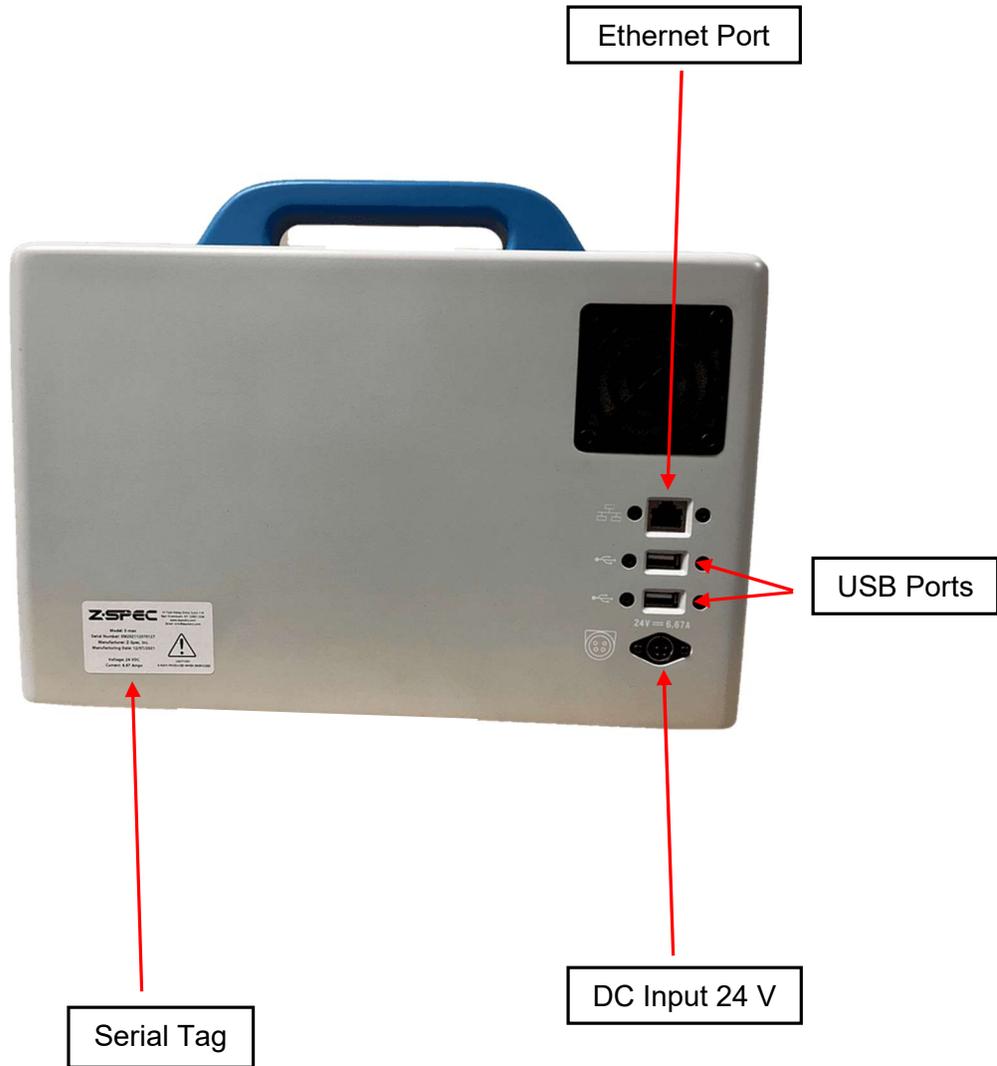
LODs are subject to interference from other elements and results may be higher than shown in this chart

Product Specifications	
Method Compliance	EPA 6200
Measurement Time	30 - 1800s
Sample Film	Polypropylene, 12.0 µm
Data Output	Printout • USB
I/O Ports	Ethernet 10/100, USB
Power Supply	110-240 VAC ± 10%, 50-60 Hz
Operating Temperature	41°F to 104°F (5°C to 40°C)
Operating Humidity	30 – 85 %
Weight	20 lbs. (9 kg)
Dimensions (W x D x H)	9 x 12.6 x 10 in. 23 x 32 x 26 cm

Line Drawing - Front View



Line Drawing - Back View



# Installing E-MAX

## Unpacking the instrument

Z-Spec recommends retaining all shipping boxes and materials for re-use when shipping the analyzer to another location or back to the Z-Spec factory for service.

The table below shows the contents of your shipment. If any of the following supplies are missing or damaged, contact Z-Spec support for assistance.

Shipping Crate Contents

Quantity	Description
1	Analyzer
1	Fan Filter Asm, 40mm Fan
5	Sample Holder
5	Sample Holder Plunger
1	Package Sample Plunger O-Rings
1	Package Sample Holder Rings
1	Spatula
1	Pusher Removal Tool
1	Pack of 100 Films
1	Power Supply, 160W, 100-240V AC input, 24V DC output,
1	Z-Spec USB containing E-MAX documentation
3	E-MAX documentation
1	Radiation Safety Test Report

## Powering on the Analyzer



Use the power supplies/power adapters included with this analyzer. Usage of alternative supplies or adapters can cause damage to the analyzer and can create an electrical hazard.

1. Insert the Z-Spec-provided AC power cord and DC adapter into a properly grounded three prong outlet. If a plug adapter is needed to make this connection, the adapter must be grounded.
2. Insert the AC power cord securely into the main power inlet at the back of the instrument. The connector on the power cord is latching. When installed correctly the cable should click into place and cannot be removed unless the connector itself is pulled.

## Setting the Date & Time

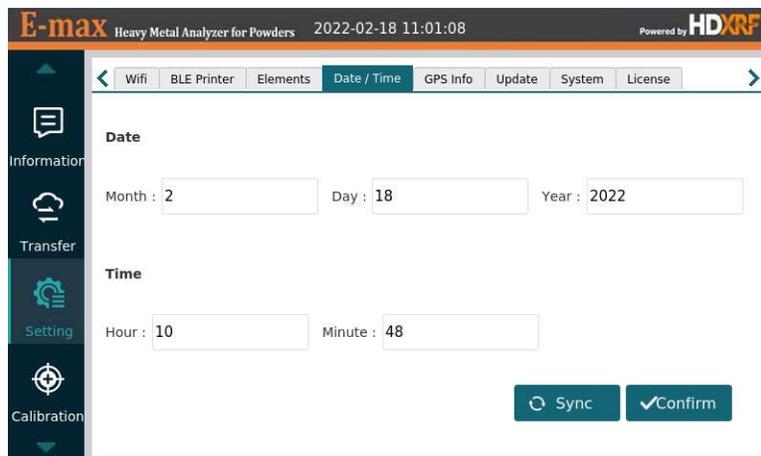
Data files created during measurements are coded with the date and time the measurement was initiated. It is critical that the date and time of the unit are correct because the unit time stamps all measurements, and for auditing purposes, this needs to be correct.

There are two ways to set the date and time on the analyzer:

1. Automatic time and date update:
  - a. After powering up the unit, connect the unit to the company's wifi – connected network. The unit will automatically attempt to synchronize with time servers on the internet.
  - b. On the Main screen notice that the time and date should be set properly.



2. Manually set time and date: (if not connecting to the wifi)
  - a. Once the unit is powered up, locate the Settings button on the left of the screen.
  - b. Then select the Date / Time Button



Date & Time Screen

- c. Enter the date and time to your location and press the “Confirm” button. Or if the unit is connected to the network, press Sync to synchronize with time servers on the internet. Note: The time is in military format (24hrs).
- d. When done, select Confirm.
- e. There will be a pop-up message confirming the change. Press OK and notice the change in the date and time.

## Optional Device Setup

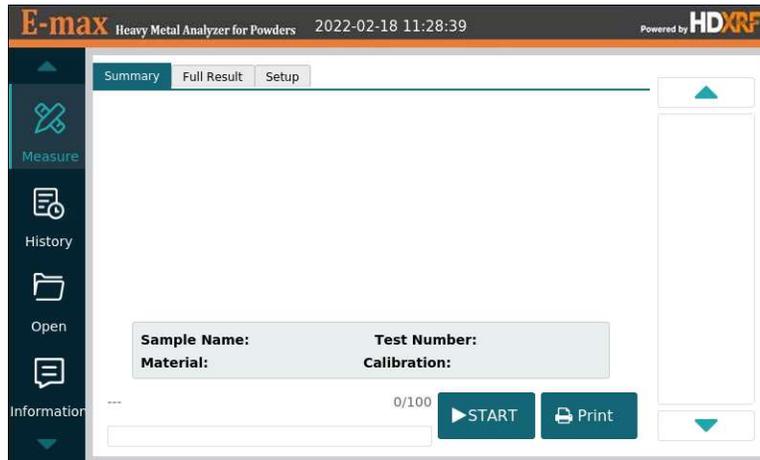
To optimize usage, you can connect the analyzer to a USB mouse, keyboard or printer using the USB ports in the instrument.

# Operation

## Starting the Instrument

After making the proper power connection:

1. Close the sliding door.
2. Press the power button. The button should be illuminated when the unit is powered on.
3. Start-up takes less than one minute, during which time a splash screen will be displayed. During this time, the unit is preparing the user interface and the user must wait until the user interface is displayed before proceeding with operation.



Main Screen

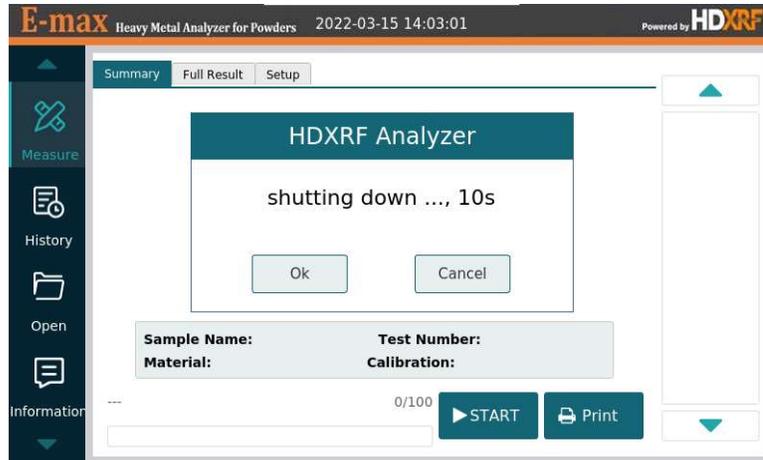


For the best measurement results it is recommended that the unit be allowed 10 minutes of warm up time prior to taking the first measurement.

## Shutting Down the Instrument

To shut down unit:

1. Press the power button for 3 seconds and a pop up will ask you to confirm shutting down the instrument. You can press Ok to shut down right away or Cancel to stop shutting down. If no input, the instrument will shut down automatically after 10s.



2. After about 20 seconds, the power button should no longer illuminate, meaning it is safe to remove power from the unit.



**Unplugging E-MAX:** Never unplug the 24V power supply while the analyzer is running.

## Preparing Samples

For best measurement results follow the sample preparation procedure outlined below.

1. Gather all necessary materials:

- Polypropylene film, 12.0  $\mu\text{m}$
- Sample film ring
- Clean sample cup
- Clean sample plunger
- New plunger o-ring
- Sample
- Sample spatula
- Scissors
- Lint free cloth
- Mortar and pestle, if needed
- Gloves and additional PPE if needed
- Pusher Removal Tool



2. Take the Polypropylene film and lay it over the bottom opening on the sample cup.



3. Place sample ring on the film and slide it over the sample cup. This will capture the film under the ring and around the sample cup opening. Slide the ring down half way, so it can be easily removed later. If there are any wrinkles or tears, this step should be repeated.





**Bad film**



**Good film**

4. Remove the cardboard support from the film.



5. Place a lint-free cloth on a flat surface.

6. Place the sample cup with film, film side down, on the lint-free cloth.



7. Using the spatula, scoop about 1-1.5 grams (or approximately 4 mm in cup) of sample in the sample cup.

- a. Tap the sample down between scoops to remove air pockets and settle sample in sample cup.
- b. If unsure about how much sample is in sample cup, insert sample plunger (without o-ring) to visualize how proud the plunger sits in the sample cup.



Need more sample



Good amount of sample

- c. Add or subtract sample to get the desired amount of sample.

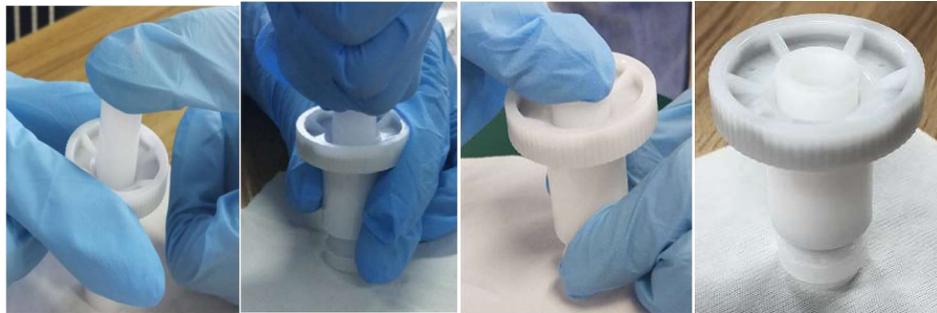


8. Install the plunger o-ring on the sample plunger. It should fit in the groove on the sample plunger.



9. Place the plunger into the sample cup, o-ring side first.  
Note: It is important that the o-ring is in the proper orientation.
  - a. The o-ring should be located in the sample to keep the sample air tight.
  - b. Hold the sample cup firmly against the flat surface while inserting plunger.

- c. This is a tight fit. To get the plunger moving you might have to slightly twist and push.



- 10. Push the sampler pusher into the sample cup as far as it will go. The plunger should be flush or no more than 4 mm above the sample rim.
  - a. Flip sample cup over and look at the sample surface. If the sample is not smooth, press the plunger down until it is smooth.



**Bad sample surface**



**Good sample surface**



For the best results, the sample film surface needs to be flat before every measurement.

- 1. Trim the extra film if need. The sample is now ready to be measured.

### Clean Sample Cups

- 1. Remove sample film ring, and dispose of the sample and sample film.



Removing sample film ring



Removing sample film

2. Use the Pusher Removal Tool to remove the plunger from the sample cup.



3. If the o-ring is dirty, replace it with a new o-ring after cleaning plunger.
4. Rinse the sample cup and plunger with water to clean.



5. Dry off sample cup and sample pusher, using a lint-free cloth.



6. Rinse the inside of the sample cup and the sample pusher with isopropyl alcohol (IPA) and let air dry.



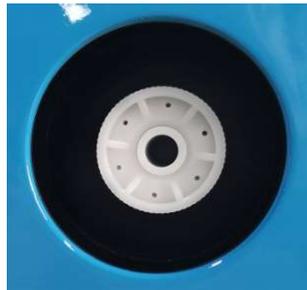
7. Once fully dry they are ready to be used again. If needed, install new o-ring on plunger

### Placing a Sample in the Instrument

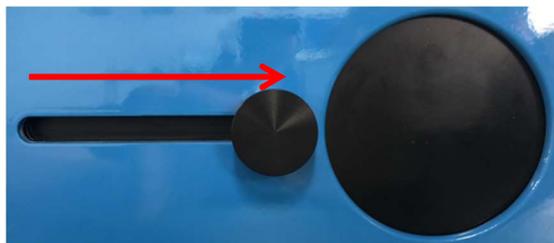
1. Open the sliding door.



2. Re-flatten sample surface on a lint free cloth for best measurement results.
3. Insert the sample into the sample guide and push it all the way in.



4. Close the sliding door.



Z-Spec recommends that for best results each sample should be measured more than once, after the sample has been rotated and the sample surface has been re-flattened between each measurement.



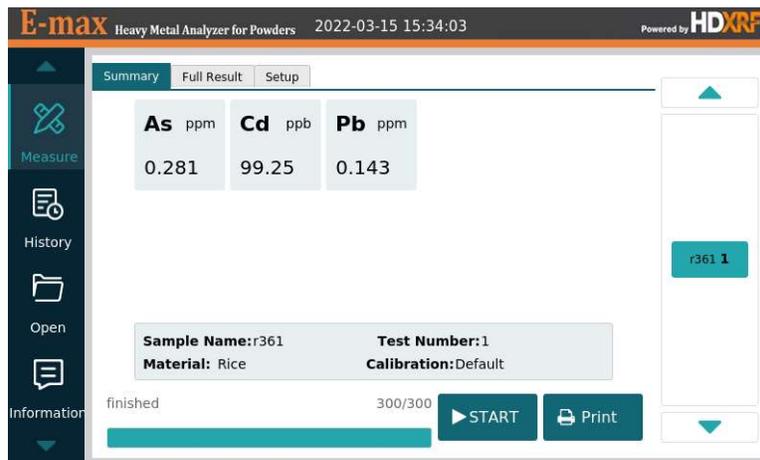
**Sample Sliding Door Closing:** As the sample sliding door closes, it protects the user from radiation hazard when X-ray tube is on. Slide the door all the way to the right and it will be secured by magnetic force. Keep it close during measurement.

## Measuring on the Unit

1. Press the “Setup” button on the Home Screen.

2. Select the type of Material to be measured.
  - a. Soil – this is optimized for soil samples. Soil is a mixture of organic matter and inorganic minerals including  $\text{SiO}_2$ ,  $\text{Al}_2\text{O}_3$ ,  $\text{K}_2\text{O}$ ,  $\text{Fe}_2\text{O}_3$ , etc.
  - b. Rice – this is optimized for rice samples. Rice must be ground into powder (maximum 50 mesh). Other similar grain powder, such as wheat and corn, can use the rice matrix as well.
  - c. Water – this is optimized for water samples with low level metal elements.
  - d. GroundWater\_Plus – this is optimized for trace level cation in concentrated water samples to be used along with the water concentration kit provided by Z-Spec.
  - e. GroundWater\_Neg – this is optimized for trace level anion in concentrated water samples.

3. Select the Calibration to be applied to the measurement. Default is available now, with more customer-built calibration curves available later based on customers' need. It is suggested to select Default calibration at first, as unit just calibrated in the factory. The user should implement customer calibration from time to time, once per several months or half a year as suggested, to achieve more precise results and a better performance of unit.
4. Select the measurement time. The user can select the following measurement times in seconds: 30, 60, 100, 200, 300, 600, 900, 1200
5. Type in the Sample Name and the Operator.
6. Select the # Samples to be measured. Default is 1 for single measurement. For multi-samples measurement # Samples > 1, if "Auto" unchecked, change the sample or sample position as need after each measurement, press "Start" to initiate the next measurement. If "Auto" checked, measure the sample "# Samples" repeats continuously without any input requested in between. The user can select up to 100 samples or repeats.
7. Press "Ok" to end measurement setup and redirect to Home Screen or "Reset" to cancel any change.
8. Press "Start" on the Home Screen to begin the measurement. Press "Cancel" to terminate the measurement. The status of measurement is visible from a progress bar at the bottom of the screen.
9. When the measurement has successfully completed the unit will report the results as shown below:

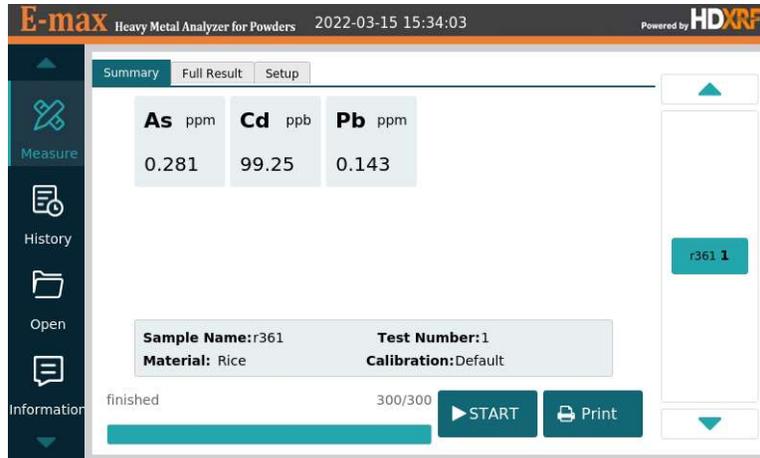


**Warning:** Use of devices that output an RF signal (cell phone, router) may cause distortions in measurements if transmitting within 24 inches (60 centimeters) or at high power.

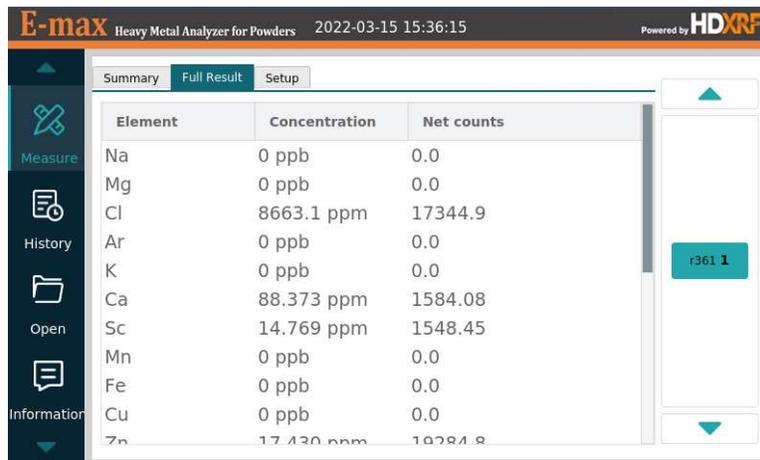
### Navigating Tabs

While the unit is idle or measuring, users can navigate the tabs located on the main screen.

**Summary** – reports the results of a desired set of elements for each measurement. The sample information that was input on the Setup screen before the measurement is also displayed.



**Full Results** – reports all elements the unit can solve for each measurement.



### History Results

From the main screen select the History button and the following screen will appear. This function will allow users to browse previous measurements and select elements display from the dropdown menu.

**E-max** Heavy Metal Analyzer for Powders 2022-03-15 16:45:24 Powered by **HDXRF**

Data Files	Cd	Pb	Zn	Mn
11, 1573	1.451 ppm	1.959 ppm	32.58 ppm	177.9 ppm
10, 1573	1.426 ppm	2.007 ppm	32.81 ppm	179.5 ppm
9, 1573	1.408 ppm	2.152 ppm	32.85 ppm	180.4 ppm
8, 1573	1.453 ppm	2.069 ppm	33.19 ppm	181.4 ppm
7, 1573	1.435 ppm	2.083 ppm	32.83 ppm	183.5 ppm
6, 2711	52.77 ppm	574.5 ppm	145.0 ppm	144.0 ppm
5, 2711	52.66 ppm	575.0 ppm	146.6 ppm	144.3 ppm
4, 2711	52.71 ppm	574.5 ppm	145.9 ppm	146.6 ppm
3, 2711	52.63 ppm	574.6 ppm	145.5 ppm	143.6 ppm

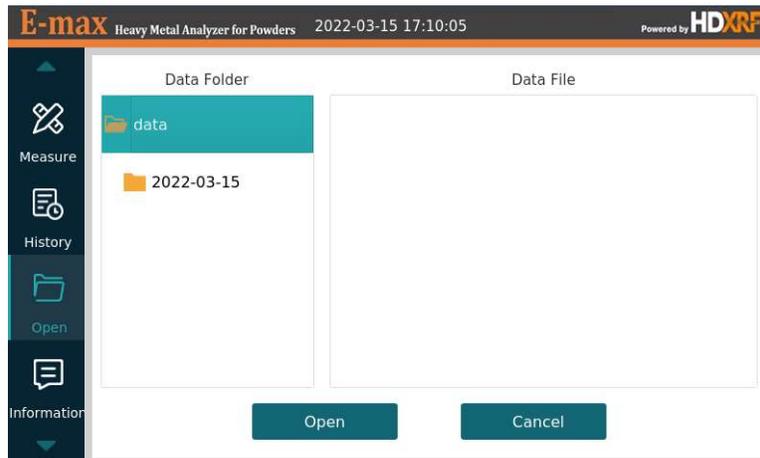
Home ◀ 1 ▶ End Total: 2 Goto  Confirm

## Opening Results

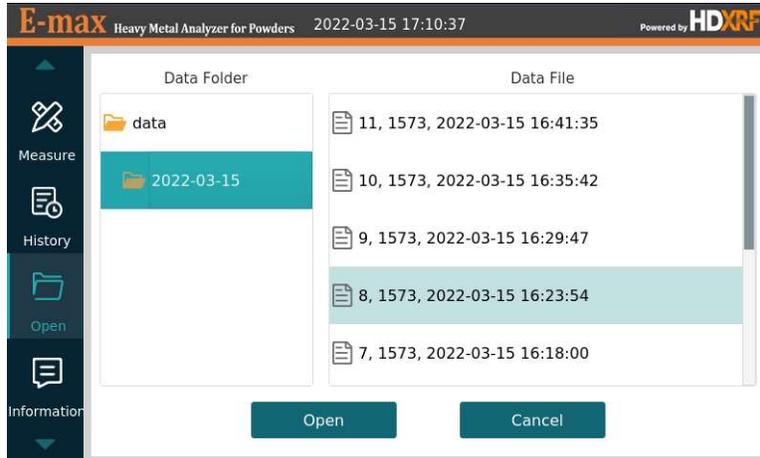
From the Main screen select the Open button and the following screen will appear. This function will allow users to select, browse or open previous measurements. Each time you successfully measure a sample, the unit creates a set of data files in CSV, XML, and HDX formats with a unique name in sequential daily folders, seen on the right side of the screen.

To open file:

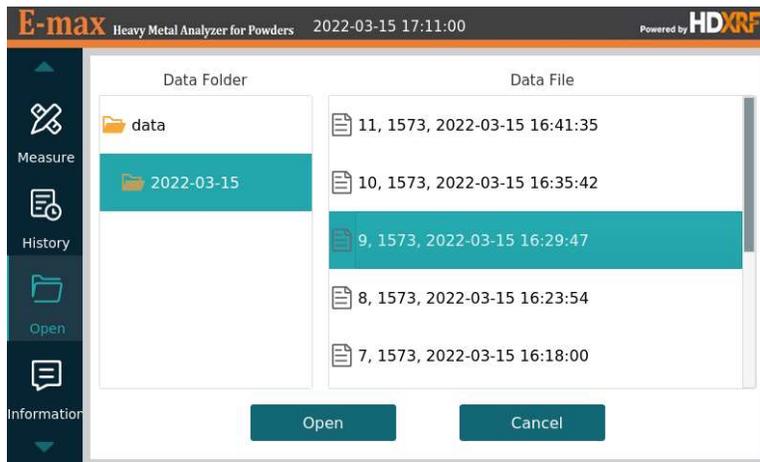
1. From the home screen, select the Open button.
2. Select one of the Date folders on the left side of the screen.



3. All data in the folder will appear on the right side of the screen.



4. Select the desired data file.



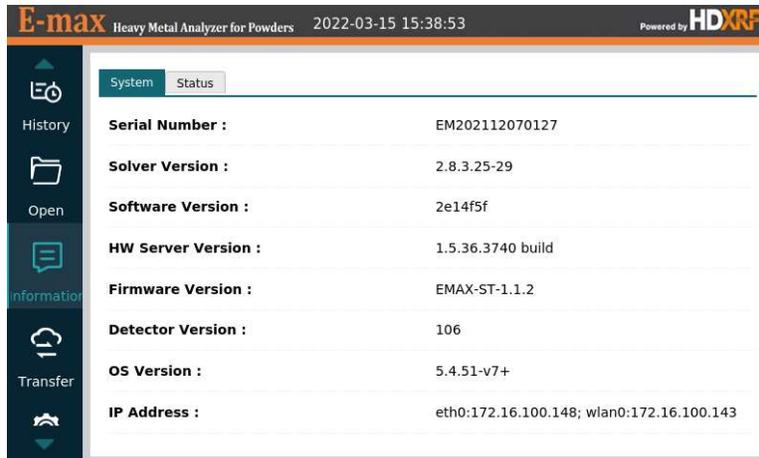
5. Select Open.
6. The unit will navigate back to the home screen and open the selected file.



The scan file's HDX format is proprietary to E-MAX and is not compatible with any other software program.

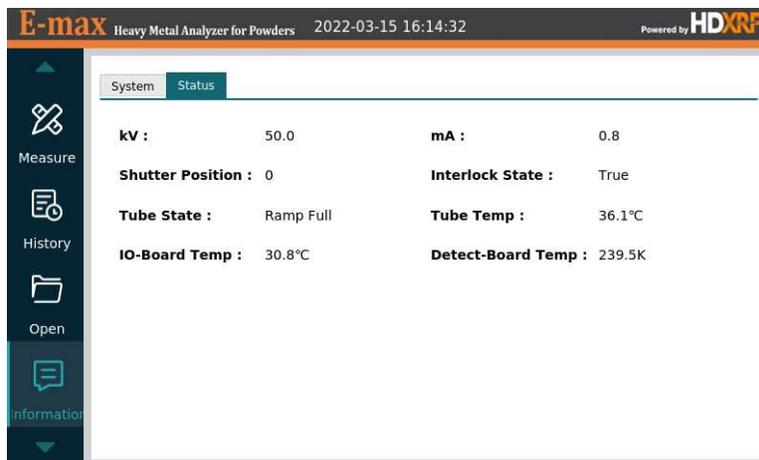
### Information

**System** – reports the system information of this unit, including serial number, solver information, software information, hardware information, firmware information, detector information, and the IP address information.



**Status** – displays the unit’s real-time status for the following fields:

- kV
- mA
- Shutter Position
- Interlock / Tube state
- IO-Board temperate
- Detector-Board temperature

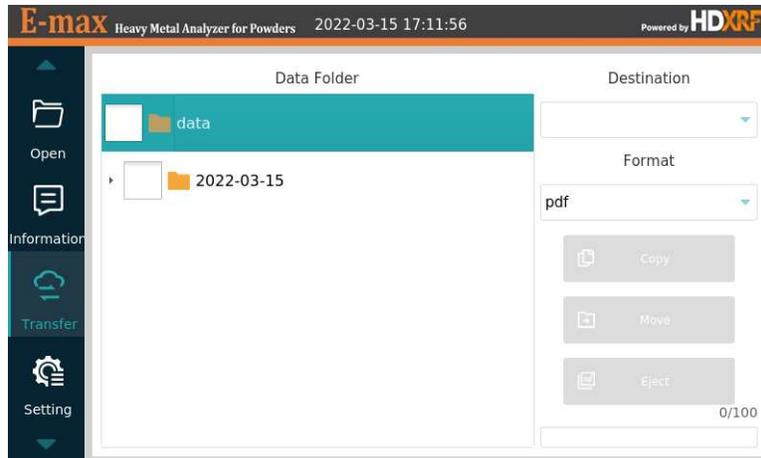


## Data Transfer

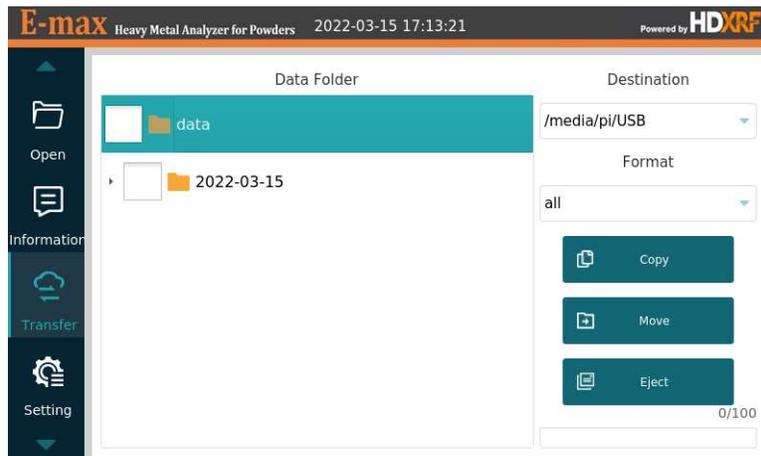
The files generated by the unit can be transferred by using a USB or through internet connected by cable or wifi. Using either way the hdx and csv files can be copied or moved.

### Transfer to USB:

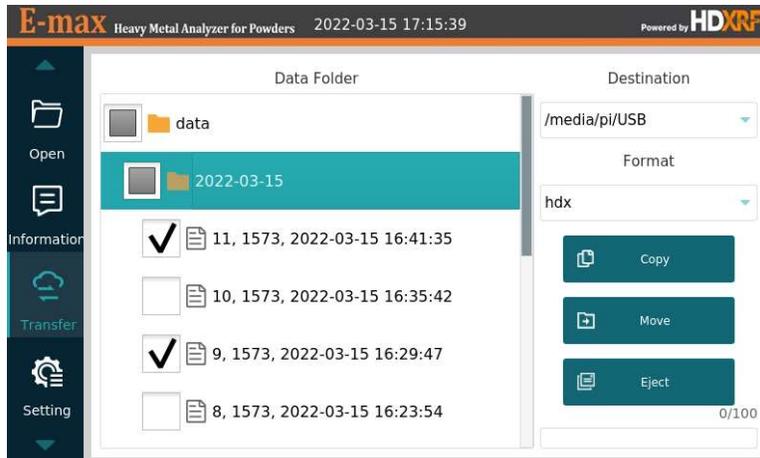
1. Select the Transfer button on the main screen.



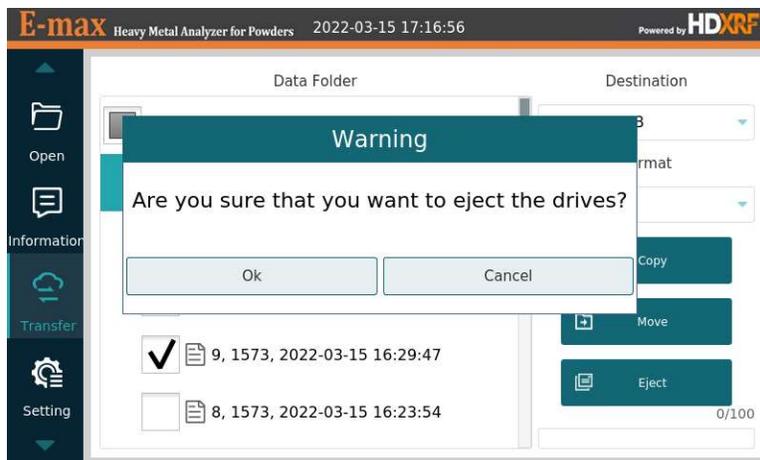
2. Insert an USB in unit, notice that the Destination section is now available.



3. Select either the whole data folder or open the date folder and select the data files. Select XML, HDX, CSV, PDF, or All in the Format.



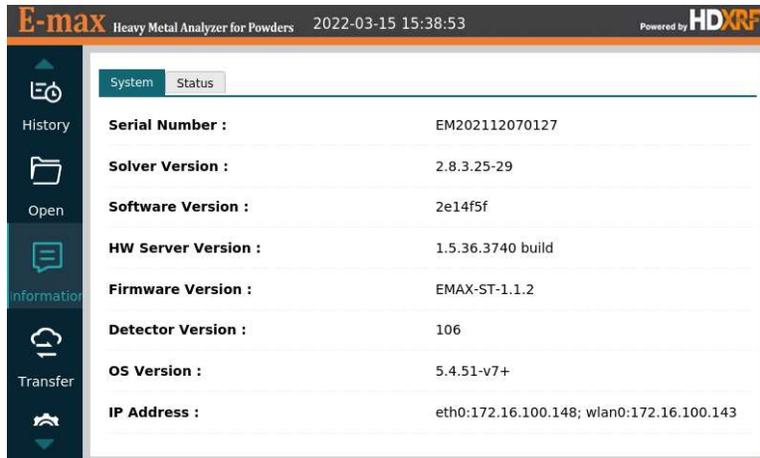
4. Then select either Copy or Move.
  - a. Copy will make a copy the files selected to the USB
  - b. Move will move the selected files to the USB and permanently remove the files from the unit.
5. Once the unit is done copying / moving data files, select Eject button.
  - a. There will be a pop-up that will ask to confirm if you want to remove the USB from the unit.
    - i. If this is true, then select Ok.
    - ii. If you want to move / copy more files, select Cancel



- b. Now you can remove the USB from the unit.

### Transfer Data through the Network:

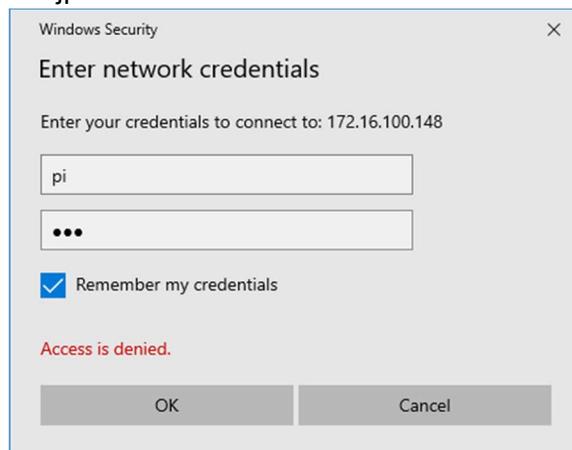
1. Connect unit to the company's server.
2. On the main screen of the unit select the Information-System tab and locate the IP address



3. Now on a PC (also connected to the same wifi as the unit) open a window.
4. In the window path type: `\\IP address`
  - a. Don't use the /xx
  - b. Example using the IP address from the picture above: `\\172.16.100.148`
5. If you successfully connected, there should be a Public folder that becomes available.

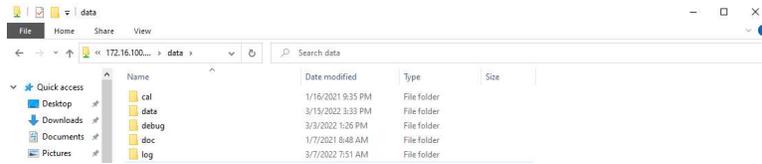


6. Open the data folder. There will be a security pop-up. The login is:  
 User name: pi  
 Password: jps



7. When the Data folder is opened, noticed that there will be a date folder and a handful of other folders (i.e. Cal, Doc and Log). The date folder is where all data is stored per date measured.

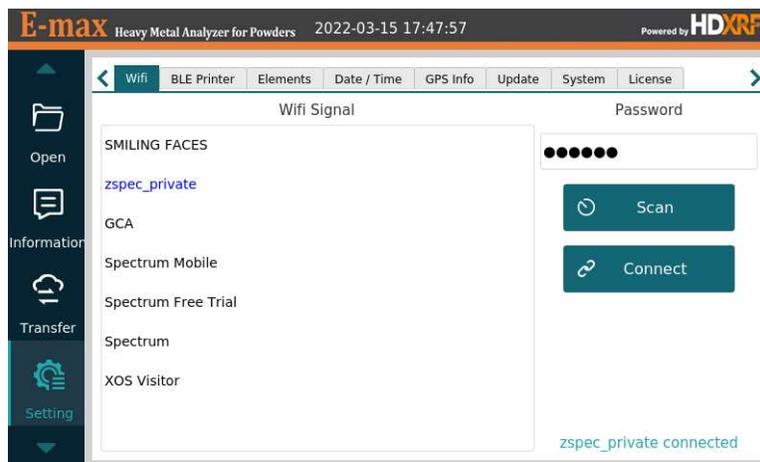
- a. Cal – User defined calibration curves and calibration standards files saved.
- b. Data – date folders with all data stored per date measured
- c. Doc – Software documentation, such as licenses.txt saved here.
- d. Log – All log files located here.



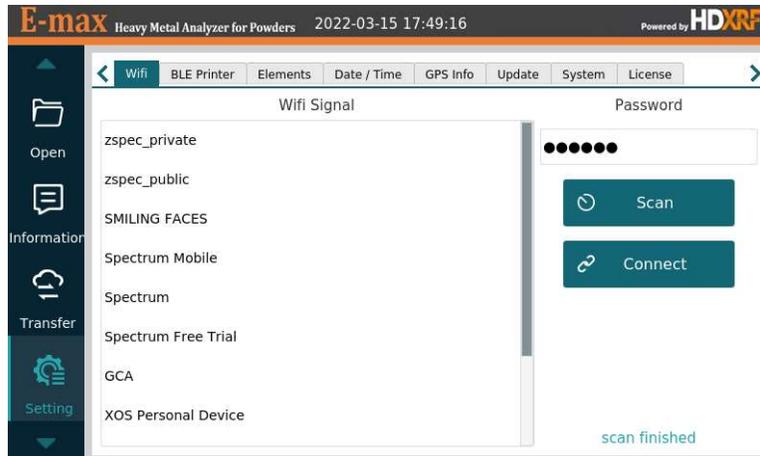
The folders and data in the Data folder are Read Only.

## Setting

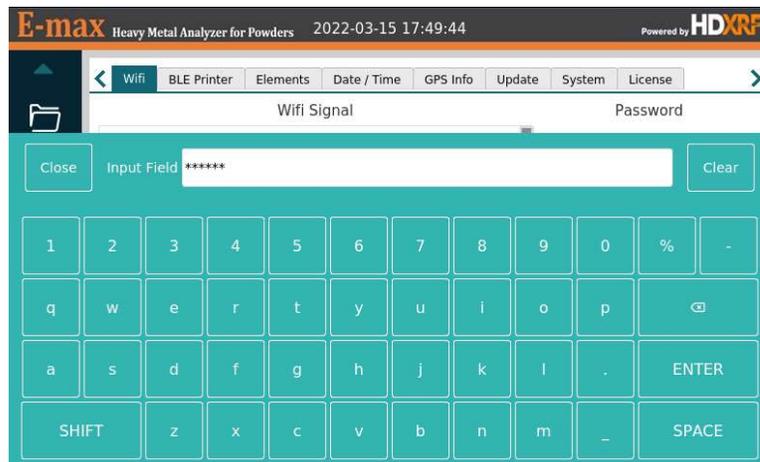
**Wifi** – This allows the user to connect unit to the wifi.



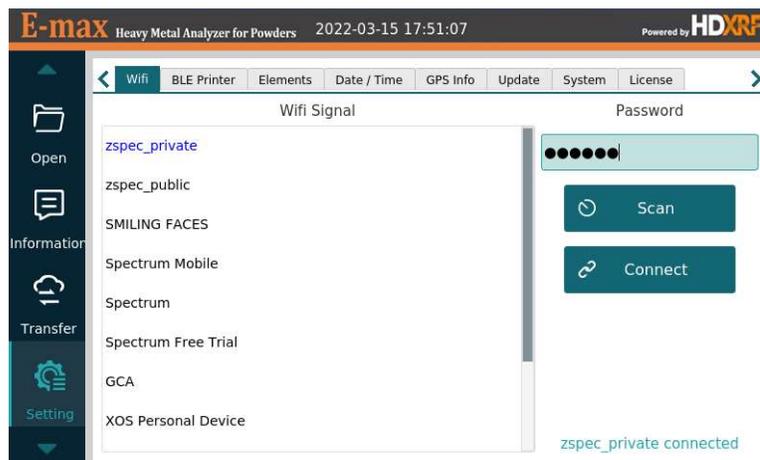
1. Select Scan Button to locate visible wireless networks



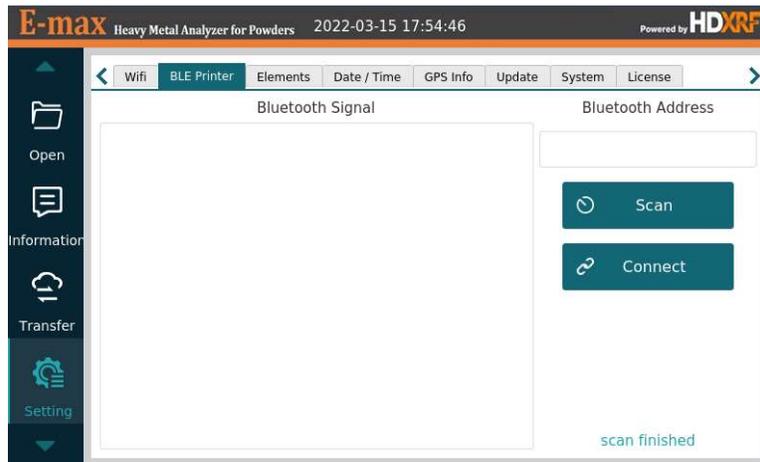
2. Select the wireless network desired, type password in the box



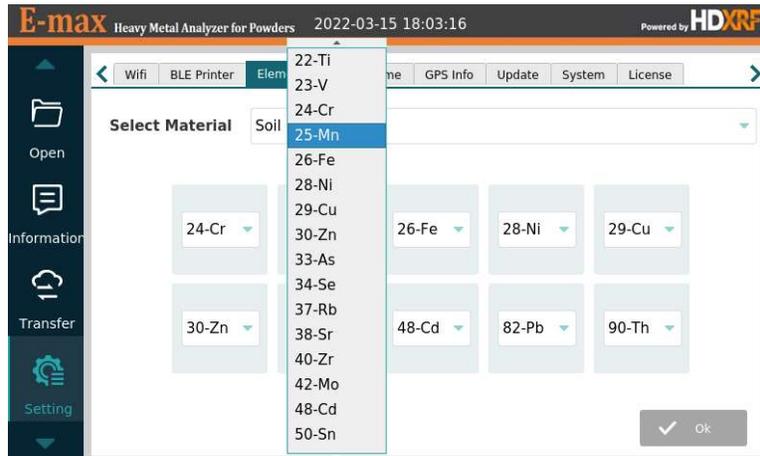
3. Select Connect and it will show network connected if everything works successfully.



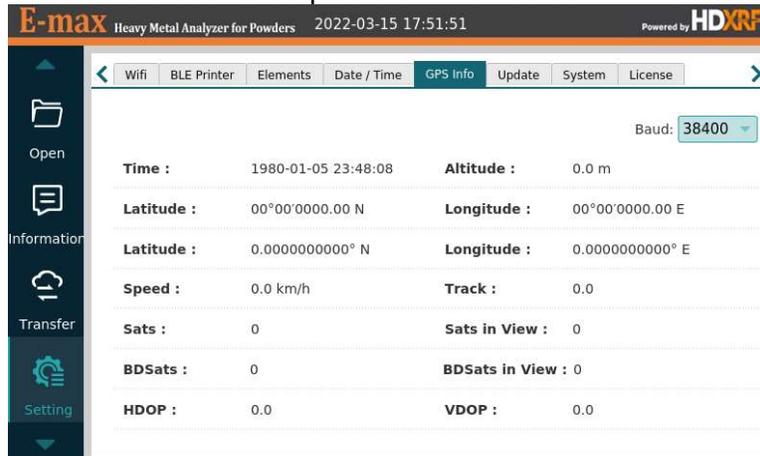
**BLE Printer** – This allows the user to connect the printer to the unit through bluetooth.



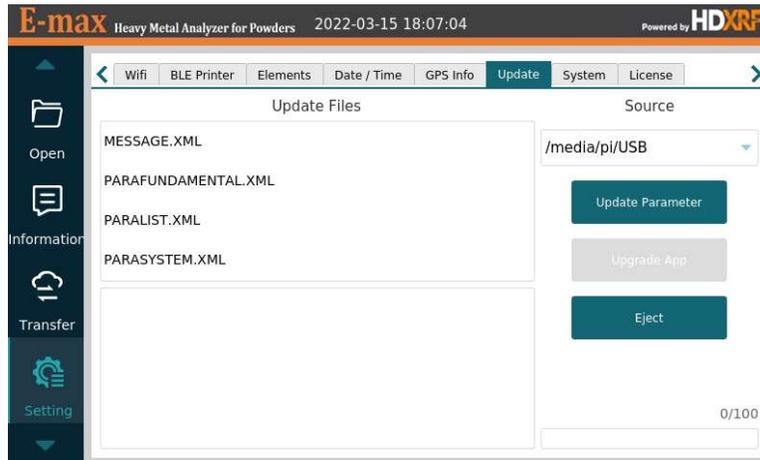
**Elements** – This allows the user to select the elements displayed on the summary screen.



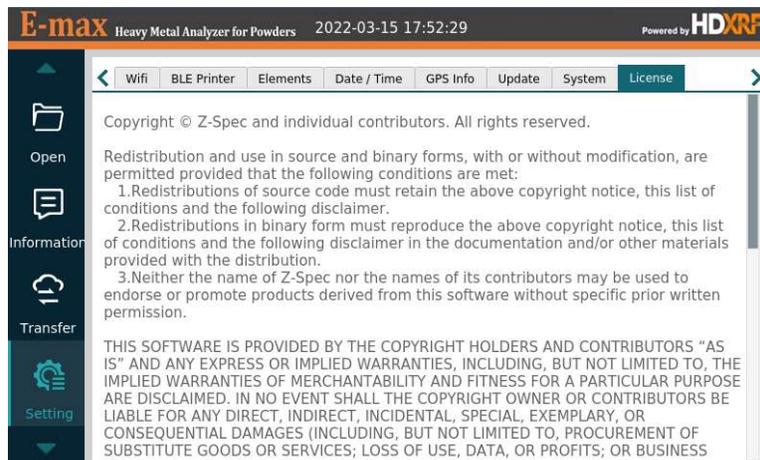
**GPS Position** – This allows the user to acquire the GPS Position where unit locates.



**Update** – This allows the user to update the unit with calibration parameters and update the software to new version provided by Z-Spec.

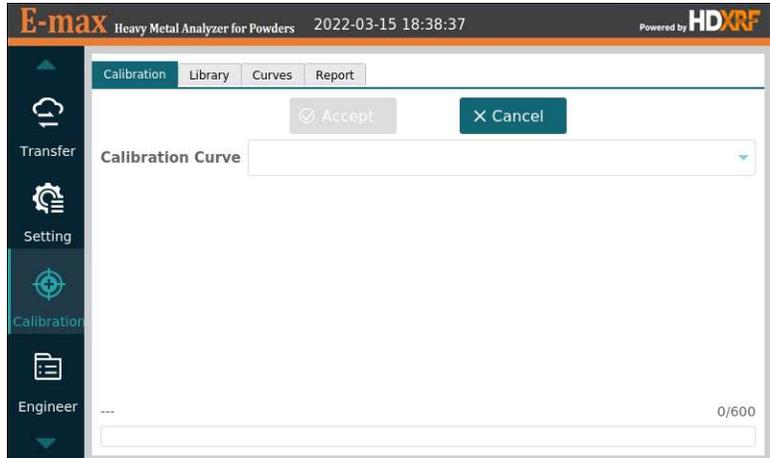


**Licenses** – This is a list of all the software licenses that are used in the unit's software.



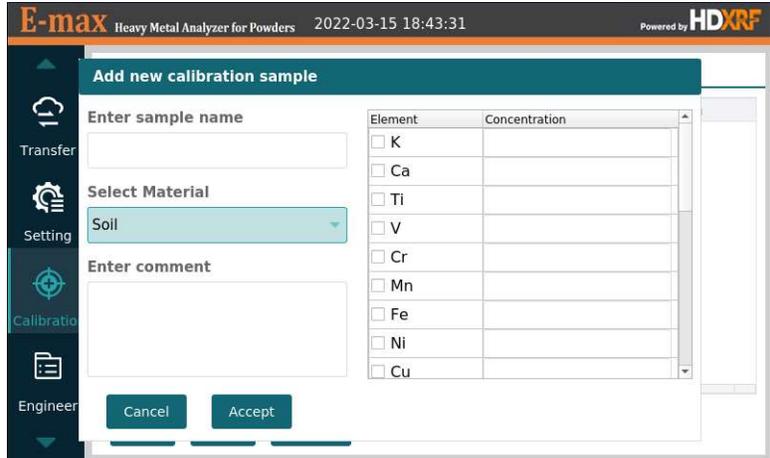
## Calibration

E-MAX allows user to make customer calibration with the standard samples provided by Z-Spec or customers' standards. Select the Scroll Down Arrow on the Home Screen. Select Calibration button.

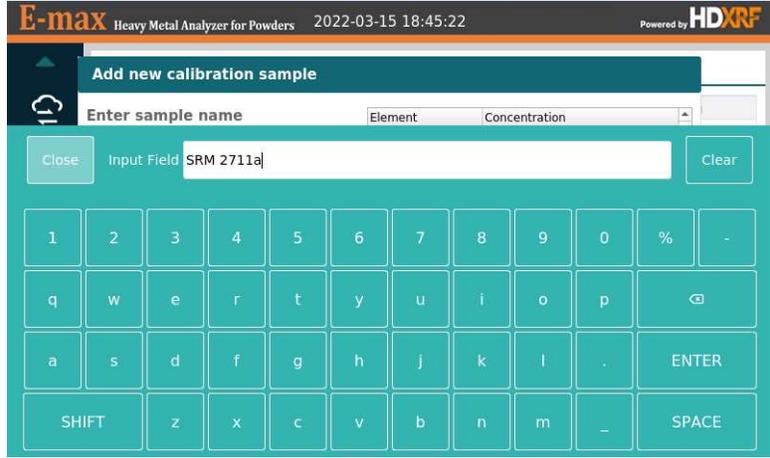


**Library** – This allows the user to view, add, edit, or delete standards on the screen.

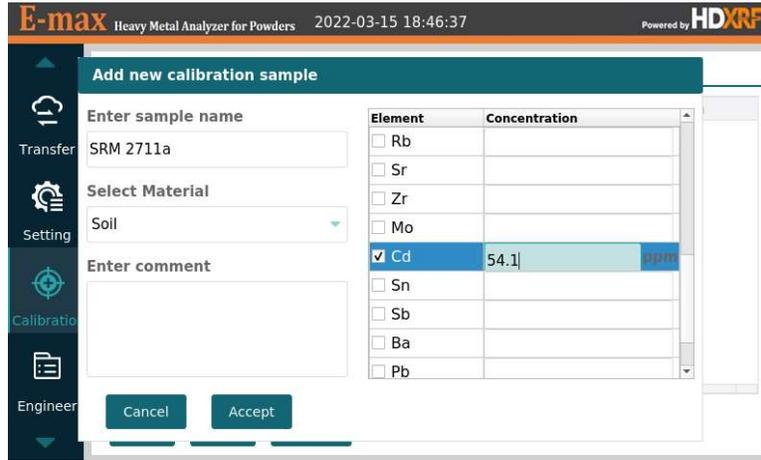
1. Select Add button to add a reference standard



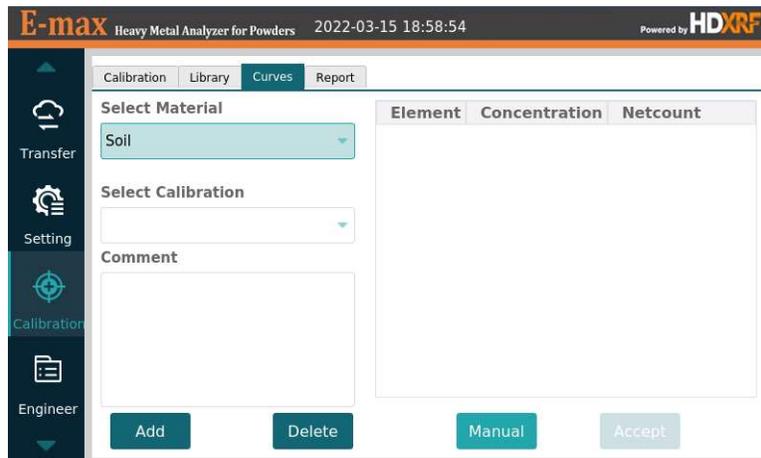
2. Enter the name of the reference standard



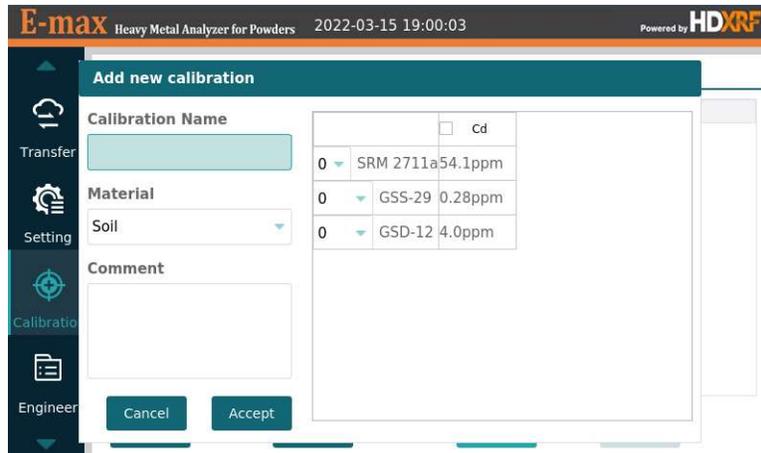
3. Select the element to be calibrated and enter the standard value, unit ppm



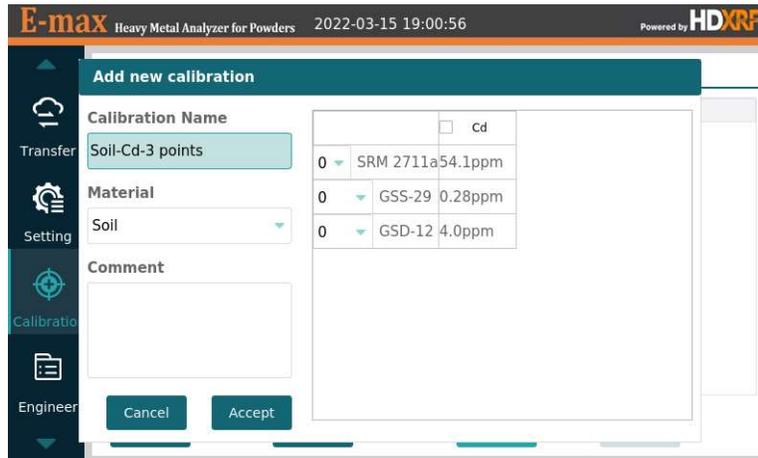
Curves – This allows the user to view, add, or delete customer calibration curve.



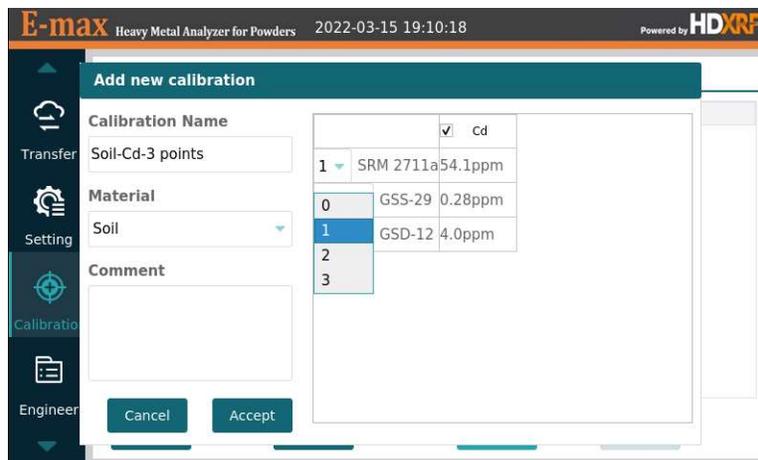
1. Select Add button to create a new calibration curve



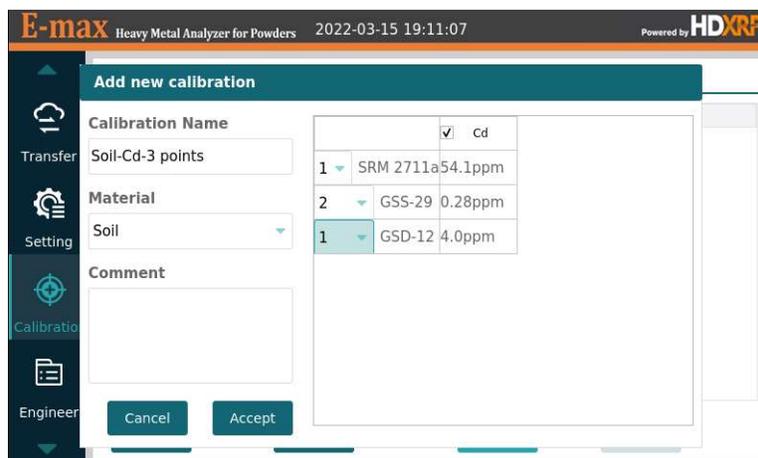
2. Enter the customer-defined Calibration Name



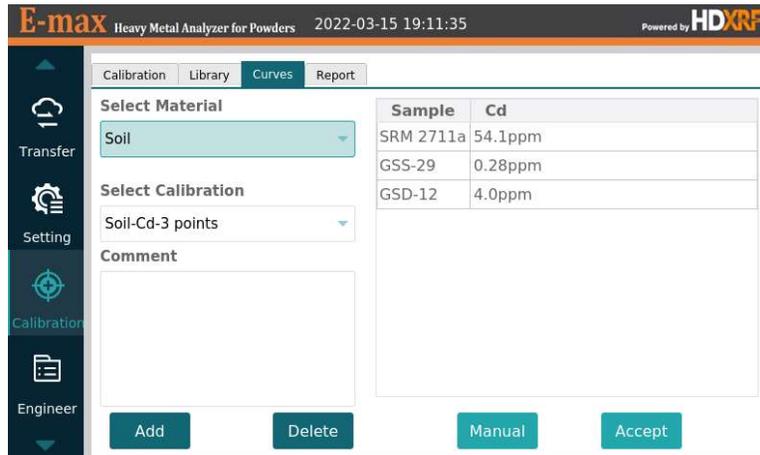
3. Select the standard samples on the list from Library and select the number of measurements for each standard, up to 3 times.



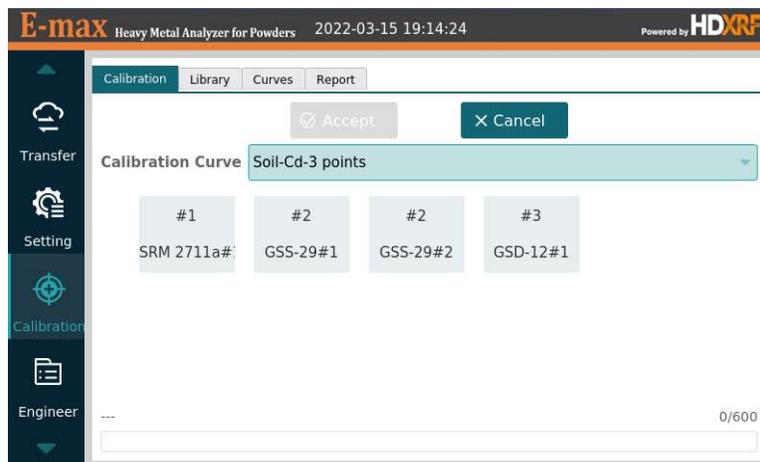
4. Select Accept to finalize new calibration curve setup



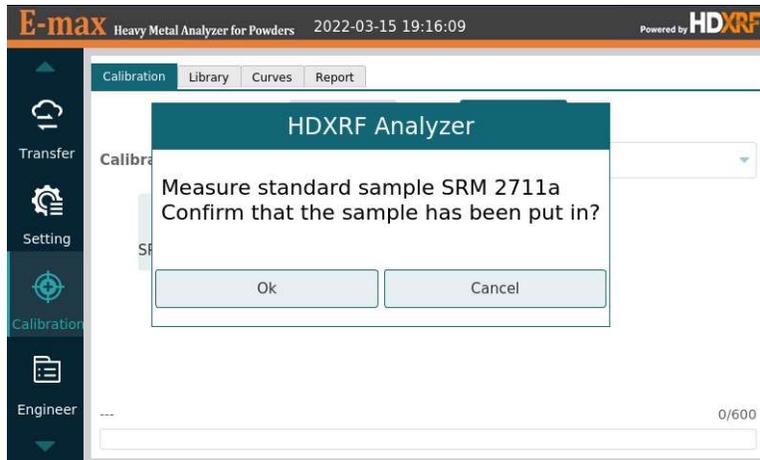
5. Select Accept Button to redirect to Calibration Screen.



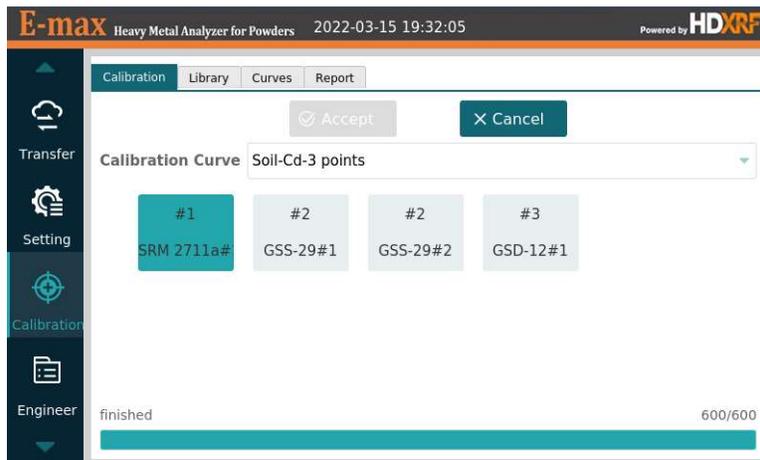
**Calibration** – This allows the user to view and complete the calibration measurements



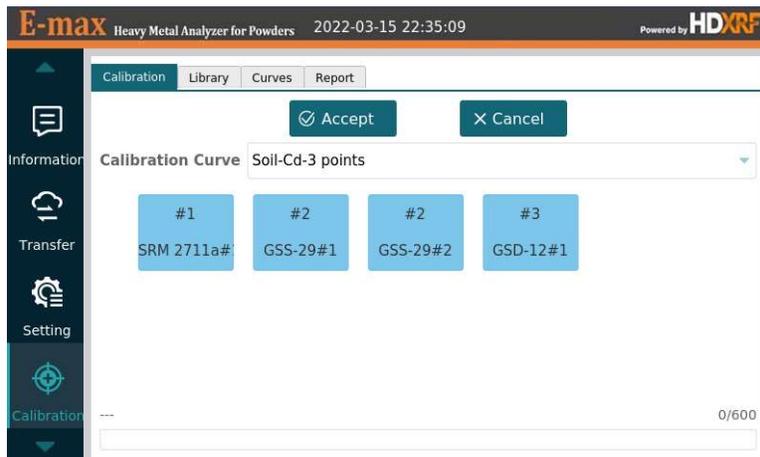
1. Click on the standard sample to be measured, a pop up will ask you to confirm starting measurement. Put the right sample into the sample chamber and click Ok to continue. If loading the wrong standard sample or not satisfying with the measurement value, the user can redo the measurement repeating this step.



- Measurement status is displayed by the progress bar at the bottom of the screen and the block of the standard sample in measurement will blink till measurement finished.



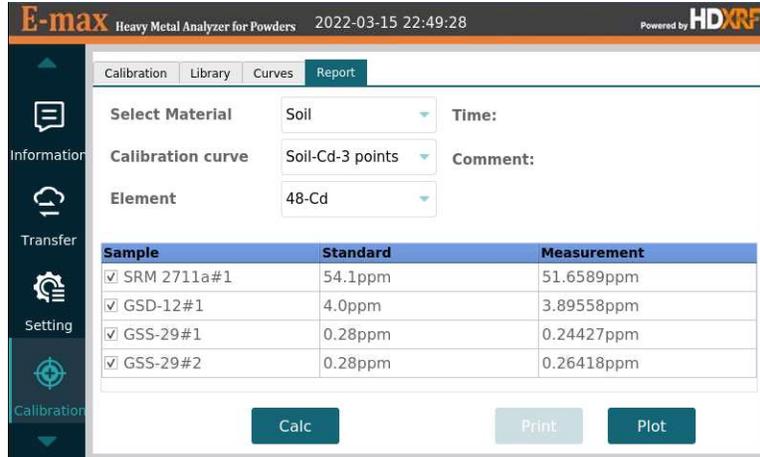
- Repeat for all standard samples



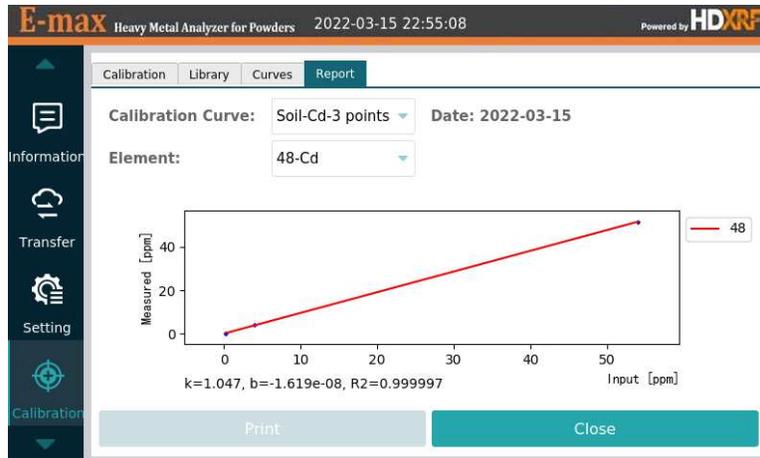
4. After calibration measurement for all samples finished, you will be automatically redirect to the Report Screen to view the results.

**Report** – This allows the user to view, calculate, and plot the calibration reports.

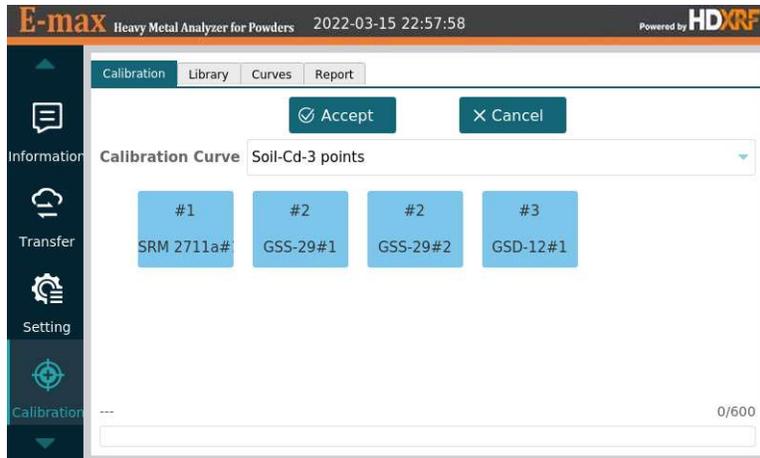
1. Select the material type, the Calibration curve, and the element, the user can view the calibration measurement results in the table. Select the samples and press Calc button to complete the calculation.



2. Select Plot button to view the linear fit and calibration coefficients.



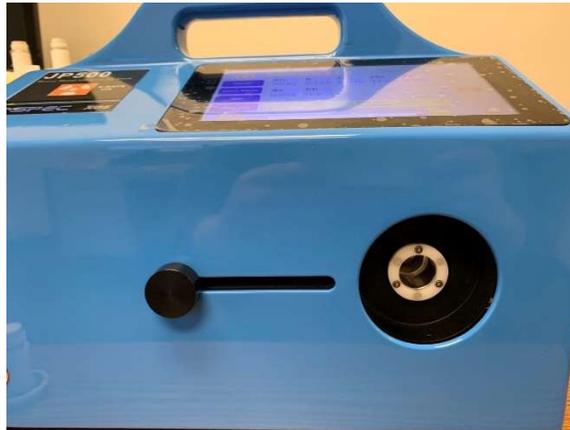
3. If satisfied with the calibration curve, the user should go back to the Calibration screen and select Accept button to activate this calibration.



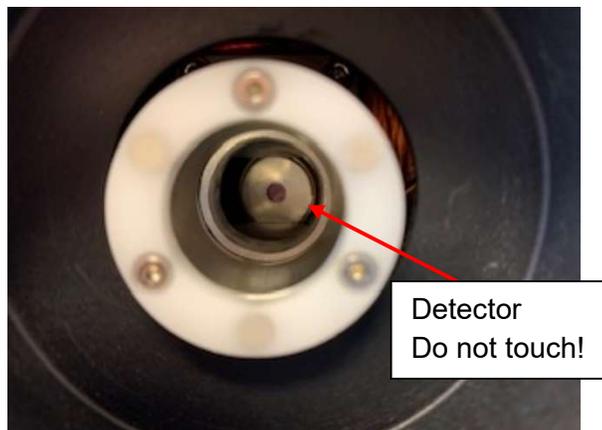
## Maintenance

### Cleaning

Keeping the sample guide clean will provide best results. The figures below show the sample guide without a sample installed,



To avoid damage to detector hardware, only insert sample cups in the sample guide. Do not pour cleaning solution onto the sample guide. Do not insert objects into the sample guide. If the sample guide needs clean, carefully sweep it with cotton swab and isopropyl. Do not touch the detector. (See detector location below).



### Accessories

The table below lists the accessories that are included with the analyzer at purchase and can be reordered from Z-Spec.

Accessories List

Z-Spec P/N	Common Name
204473-01	Fan Filter
309006-01	Sample Cups
309102-01	Sample Plungers
200335-04	Polypropylene Film
204662-01	O-rings
304770-02	Sample Film Rings
204708-01	Spatula
309390-01	Pusher Removal Tool

### Replacement Parts

Before starting any maintenance tasks, turn off E-MAX and unplug the power cable.

For any parts not in this manual, or to order spare parts, please contact your Z-Spec Service Representative.

### Replacing the Inlet Fan Filter

1. Gently pry the fan filter cover off the fan guard.
2. Remove the filter.
3. Lay the new filter flat inside the fan cover.
4. Replace the fan filter cover on the fan guard.



Z-SPEC recommends that the fan filter be replaced at least once a year. If the testing area collects a lot of dust the filter might need to be changed more often.

## Onsite Service

For issues outside of routine maintenance refer to the full user manual, contact Z-Spec Technical Service, or contact your local Z-Spec distributor.

Z-Spec P/N	Common Name
204473-01	Fan Filter

## Troubleshooting

Error Message	Condition	Possible Cause(s)	Solutions
SAFETY ERROR! Please be certain the sample chamber is closed and press OK to continue	Door must be properly closed for analyzer to work correctly	Door was open at the beginning of a measurement. The interlock switch may have detected a problem with the contact.	Close the door and re-measure the sample. If this error recurs, contact Z-Spec Technical Support.
Internal Error Please be certain the door is closed and press OK to try again.	Door must be properly closed for analyzer to work correctly	Door was open at start-up (after power-on).	Close the door and restart E-MAX by pressing the Power button. If this error recurs, contact Z-Spec Technical Support.
Error IOP Temp High	The IOP is monitoring the source temperature, which is too high	Blocked vents, fan failure, or hot ambient temperature	1) Check for 6 inches of clearance around the unit, 2) Check the fan filter; if dirty, clean and replace.