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Handheld Analyzer

1064Defender

User Guide

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Thermo Fisher
S C I E N T I F I C

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Notice on the Proper Use of
Thermo Scientific Intruments

In compliance with international regulations: This instrument must be used in the manner specified by Thermo Fisher Scientific to ensure protections provided by the instrument are not impaired. Deviations from specified instructions on the proper use of the instrument include changes to the system and part replacement. Accordingly, order replacement parts from Thermo Fisher Scientific or one of its authorized representatives.

CAUTION Read and understand the various precautionary notes, signs, and symbols contained inside this manual pertaining to the safe use and operation of this product before using the analyzer. **CAUTION MISE EN GARDE** Avant d'utiliser ce dispositif, il est impératif de lire et de bien comprendre les diverses mises en garde, les signes et les symboles figurant dans ce manuel en ce qui concerne la écurité d'utilisation et de fonctionnement du produit.

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The Thermo Scientific™ 1064Defender™ analyzer is a 1064-nm handheld Raman spectrometer designed for indoor or outdoor use by first responders, homeland security, military, law enforcement, and forensic chemistry personnel. Compact and lightweight, this analyzer is intended for rapid field identification of unknown solid and liquid samples.

Contact us

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Safety considerations

The analyzer is specifically designed to easily, safely, and accurately identify unknown samples in an everyday field environment. However, safe operation relies on the user recognizing and appropriately mitigating the potential hazards associated with the analyzer, the samples that are presented to it, and the environment where it is used.

This user guide contains helpful and important information about safe use specific to the analyzer. Also included are general guidelines regarding hazardous samples and environments that some users may encounter.

The potential hazards that should be considered when operating this analyzer include:

- Eye injury that may result from the laser when used during sample scanning (from both the direct laser beam and any reflections of the beam).

- Potential ignition or detonation of a sample when temperature sensitive energetic materials are analyzed. This can result when heat is generated at the laser focal point in or adjacent to temperature sensitive materials or energetic materials.

- Potential detonation when energetic materials are prepared and handled.

General safety information

Do not use the analyzer unless you have been trained in its safe use.

Follow your organization's training instructions, procedures, and regulations for the safe handling of unknown, hazardous, or energetic substances.

CAUTION! This analyzer is certified as a CLASS IIIB laser product. Exposure to CLASS IIIB levels of laser energy can be hazardous. Avoid exposure to the beam. Avoid exposure to specular (mirror-like) reflections. This analyzer is certified to the requirements of the U.S. Federal Product Performance Standard for Laser Products contained in the regulations of 21 CFR Sub-Chapter "J" except for deviations pursuant to Department of Health and Human Services issued Laser Notices. This instrument complies with IEC 60825-1:2014

DANGER! Scanning an energetic material may cause ignition or detonation of the sample. Operators should not attempt to analyze potentially explosive and/or energetic samples without proper training and experience handling these types of hazardous materials. This analyzer is not designed for this purpose and is not the recommended tool for analyzing these sample types.

DANGER! To avoid the hazards of fire and detonation, you should not analyze an unknown sample unless you can rule out the possibility that it is an energetic and/or thermally sensitive material. Some materials can absorb laser energy and heat up, making them a possible source of ignition. Darker colored solids are most susceptible; however, there are exceptions. Known examples of substances that can serve as a source of ignition include "black" powders, silver azide, match tips, black plastics, latex paint, and cardboard.

CAUTION! Continuous operation of the laser may cause some surfaces on the analyzer to heat up. Avoid contact with these surfaces during operation of the analyzer.

There are no user-serviceable components inside the analyzer. The battery compartment door may be opened, but do not open the protective enclosure or modify the electronics within. All service operations must be performed by Thermo Fisher Scientific or an authorized service agent of Thermo Fisher Scientific. Any attempt by the user to open the analyzer will render the warranty null and void.

The analyzer battery must be removed before shipping.

Laser safety information

Key safety specifications

In the absence of a workplace safety standard or requirements, refer to the American National Standard ANSI Z136.1 for the safe use of lasers or the International Standard IEC 60825-14 user guide for guidance on identifying and controlling hazards associated with laser use.

Specification	Value
Laser output	Settable 480mW, 240mW, 96mW at 1064 nm wavelength
Laser lens	Focal length 15mm, beam diameter at plane of lens 0.105 mm
Nominal Ocular Hazard Distance (NOHD)	63 inches (160 cm) from focal point of lens
Ocular Maximum Permissible Exposure (MPE)	1.95mW/cm^{-2}
1/e Beam Divergence (uniform)	218 mrad

- Never point the laser at yourself or others.

- Never place your hands in the path of the laser.

- Never start the laser unless a sample fully covers the laser aperture.

- Always ensure appropriate deactivation of the laser by terminating a measurement prior to removing the sample from the laser aperture.

- The Nominal Ocular Hazard Distance (NOHD) for the 1064Defender analyzer is 63 inches (160 cm). Ensure that there are no people or reflective surfaces within 48 inches of the laser beam path when analyzing samples in glass or clear containers. Laser radiation may not be completely blocked by these materials.

Laser safety eyewear of OD 3 at 1064 nm must be worn when the laser hazard cannot be controlled by means of the above stated administrative control.

Use administrative controls, engineering controls, and laser safety glasses to avoid exposure to laser radiation within the Nominal Ocular Hazard Distance (NOHD) and Nominal Skin Hazard Distance (NSHD).

Mitigate hazards of energetic or thermally sensitive materials

Energetic Materials are a class of material with a high amount of stored chemical energy that can be released. **Thermally Sensitive Materials** are dark solids that quickly convert laser energy to heat at the focal point of the Raman laser. A scan hazard exists when energetic materials are also thermally sensitive, or if they are analyzed in combination, or in contact with, thermally sensitive materials.

Darker samples tend to be more thermally sensitive. Also, solid samples generally are more thermally sensitive as they trap heat and reach higher temperatures. It can also be hazardous if the material of interest is light-colored with dark-colored specks in it. Such dark-colored components can heat up the rest of the material. Scanning a sample that is on or in contact with a dark surface can also produce hazardous heat. Lastly, papers made of dense cellulose fibers, such as coffee filter papers or paper towels, can trap laser heat and can be hazardous as a surface to scan on. Liquids dissipate the heat energy much faster and are much less thermally sensitive than solids.

In addition to any safety training you may have in handling energetic materials, the following guidelines will help minimize the hazards of scanning such samples with the analyzer.

- **Identify and wear appropriate protective equipment for the situation.** Always wear laser safety glasses and dress appropriately to minimize exposed skin.

- **Carefully evaluate thermal sensitivity.**

- **Use Vial Mode** whenever possible. Vial Mode means the sample is placed in a vial, and the vial is placed in the vial holder compartment. Generally, the smallest possible sample poses the smallest possible risk. Ideally the sample is <300 uL, 5 drops, or less than 300 mg. Do not look into the vial during analysis.

- **ALWAYS remove the cap** when scanning in Vial Mode so that pressure cannot build up in the vial.

- **Use the Scan Delay feature** which allows you time to get to a safe distance before the laser begins scanning the sample. Your safe distance will depend on a number of factors such as the potential energetic type(s), the sample size, your personal protective equipment and your surroundings.

- **Use the Scan Timeout feature to return to a safe area.** The Scan Timeout feature sets a maximum scan time so that you know when the scan is complete and it is safe to return to the analyzer.

- **Reduce the laser power setting to low.** This will minimize heat transfer to the sample.

Battery safety notices

Note The 1064Defender uses a rechargeable Lithium Ion Battery.

Handle and store batteries properly to avoid injury or damage. Most battery safety issues arise from the improper handling of batteries, particularly from the continued use of damaged batteries. Follow the guidelines below for safe storage and use of your battery.

DANGER! Do not disassemble, crush, puncture, shred, or otherwise attempt to change the form of your battery.

WARNING! Always remove the battery when not in use, or when the analyzer is stored in its case.

- Do not use tools or other mechanical means to remove the battery as this can damage the battery.
- Do not let battery terminals come into contact with liquids.
- Do not store spare batteries in a manner that may cause battery contacts to touch other metal items.
- Do not store batteries near a heat source. Do not leave batteries in direct sunlight, and avoid storing spare batteries inside cars in extreme hot weather.
- Do not subject batteries to strong impacts or shocks.
- If you suspect your battery has been damaged, discontinue use of the analyzer and contact Thermo Fisher Scientific.
- If any battery electrolyte is transferred to your skin, WASH thoroughly with soap and water. If in your eyes, do not rub. RINSE thoroughly with water and seek medical assistance.
- Promptly dispose of used batteries in accordance with local regulations.
- Transport batteries only in accordance with Federal, State, and Local regulations.
- Do not install any Lithium Ion batteries other than those provided by Thermo Fisher Scientific.
- Do not throw water on a burning Lithium Ion battery! A class C fire extinguisher must be used.

Get Started

Contents

Analyzer front

Branding Label

LCD

Silicone Boot

Laser Arm/Disarm Button

Cancel/Back Button

Laser Radiation Label and Light

Camera Button

Enter Button

Power Button   Arrow Buttons

Analyzer back

Labels on image:
- Macro Camera
- Silicone Boot
- Service Contact Info
- Serial Number
- Manufacturing Label

Manufacturing label text:
Thermo Scientific Portable Analytical Instruments Inc
2 Radcliff Road
Tewksbury, MA 01876, USA
Model:1064Defender
REF : 580-12911
SN : RDXXXX
MMMYYYY
USA

Class IIIb laser complies with 21 CFR Chapter 1, Subchapter J.
Patents:
www.thermoscientific.com/pm-pai

This Class A digital apparatus complies with Industry Canada Standard ICES-003. Cet appareil numérique de la classe A est conforme à la norme NMB-003 d'Industrie Canada.
Contains IC: 5969A-1003
This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference and (2) This device must accept any interference received, including interference that may cause undesired operation.
FCC ID: TFB-1003
CMIIT ID: 2021DJ14743

R-C-Sbj-1064Defender

Left side view

Right side view

Laser Radiation Warning Label
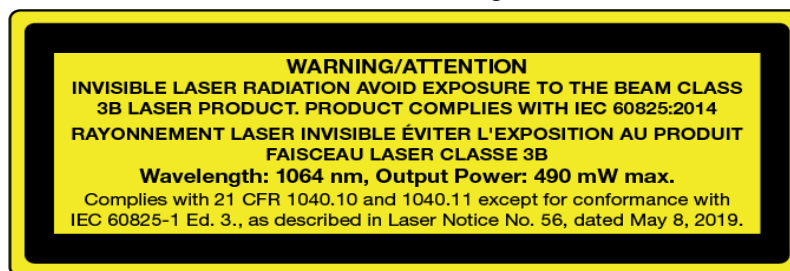
Laser information label. Provides the user with information on the class, wavelength, and output power of the laser contained within the product. The label is located on the right side of the analyzer.

Front face view

Laser Aperture

Accessory Port for Nose Cone or Vial Holder

Battery and battery door

Battery

Battery Door Unlocked

Battery Door Locked

Carrying case contents

The carrying case includes the following items:

Table 1. Contents of the carrying case

Items	Quantity
1064Defender Analyzer	1
Lithium Battery (rechargable)	2
Nose Cone Accessory	2
USB Flash Drive with User Guide	1
USB to USBC cable	1
Wooden Sticks	10
Vials, 4mL	4
Vial Holder Accessory	1
Polystyrene rods for Self Test	2
Power supply, 12V @ 3A output	1
Quick Start Guide	1

Use the wall plug adapters

Your analyzer comes with a set of international wall plug adapters.
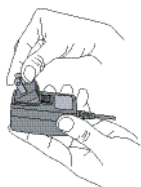
- To install an adapter, press it into the recess in the power cord until the adapter clicks into place.
- To remove an adapter, slide the release latch down and pull the adapter out.

Install the battery

To install the internal battery:

1. To open the battery door, twist the battery door lock counterclockwise.

2. After unlocking the battery, the door should look like the following figure. Peel away the battery door and expose the battery area.
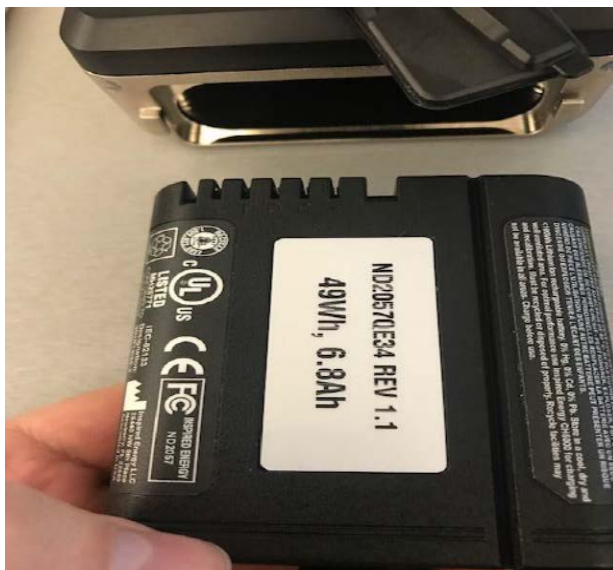
3. To load the battery, the slotted contacts should be oriented so that they are on the upper left, ready to slide into the analyzer as shown below.

4. When installing the battery, be sure that the following conditions are met:

    a. The tab must remain accessible, as shown below. This tab provides ease of removal when charging is required. The level of battery charge is displayed on the indicator bar near the pull-tab.

    b. If the battery tab is torn or missing, it may not be possible to pull the battery out of the analyzer. Instead, turn the analyzer so that it is oriented vertically. The battery can now be removed with the aid of gravity.

5. To ensure that the battery compartment is sealed properly:

a. Be sure that the margins of the battery door seal are clean, and that the battery tab is not resting across the seal before the door is replaced.

b. Fold the tab over the end of the battery and replace the battery door. Twist the bar clockwise to close and secure.

CAUTION It is extremely important that the battery compartment is closed and sealed properly. The battery door provides a physical seal to moisture and chemicals. The analyzer could suffer internal damage if the battery door is not properly closed as described here.

6. Once the battery has been replaced and the door has been securely closed, the analyzer door will appear as shown here.

Note If the battery is not sufficiently charged, follow the charging instructions in the next section.

Charge the battery

The 1064Defender battery can be charged by removing it from the analyzer and using the stand-alone battery charger supplied. Insert and secure your spare charged battery to continue using the analyzer.

The analyzer battery may also be charged while using the analyzer with the 12V power supply, located in the shipping case of your analyzer. Insert the DC power cable into the left side of the analyzer (as shown in Left side view on page 18). Then plug the power supply into your AC wall outlet (as shown in Use the wall plug adapters on page 21). You may continue to operate your analyzer while charging. The lightening bolt icon 〉 that appears on the analyzer screen indicates that the battery is now charging.

Analyzer screen icons indicate the battery power level and status. Some examples are shown below.

Analyzer battery with low indicator

Analyzer battery plugged in and charging

Analyzer battery plugged in and fully charged

Analyzer use and handling

The 1064Defender is a field-use analyzer that is water and chemical resistant. The keypad allows for button actuation while maintaining a physical barrier between the interior and exterior of the analyzer.

IMPORTANT Do not use sharp objects or excessive force to push the keypad buttons. If the keypad surface becomes punctured or damaged, the analyzer functionality could be compromised.

Treat the analyzer touch screen with a similar degree of care to ensure clear and consistent viewing.

Power the analyzer

The 1064Defender analyzer can be powered by:

- The 12V power supply (connect your 12V power supply to the DC power port on your analyzer and plug the AC power plug into the wall outlet)

- A rechargeable battery

The analyzer has three power states: On, Off, and Sleep. Sleep mode occurs after a period of inactivity (approximately 10 minutes) or when you press the **Sleep** key. To come out of sleep mode, touch the screen or press a keypad key.

❖   **To turn on the analyzer**

Press and hold the **Power** button. The backlight behind the power button will illuminate before the display backlight to indicate power up has begun. Release the **Power** button.

❖   **To log off of the analyzer**

Press the log off button (highlighted with the red box) on the Home screen.

Note When you log off the analyzer, the laser is automatically disarmed.

❖   **To put the analyzer in sleep mode**

You can use sleep mode to leave the analyzer powered on while turning off the display, which saves battery usage.
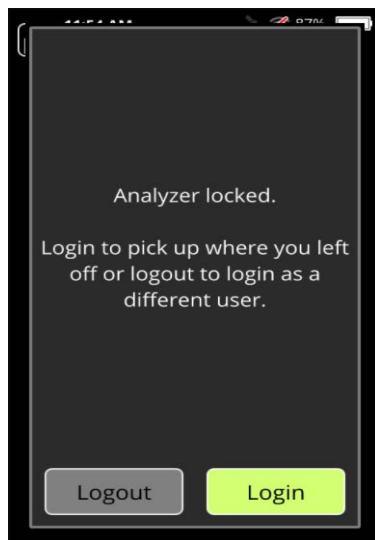 • To put the analyzer in sleep mode, press the sleep button.

- To bring the analyzer out of sleep mode, touch the screen. A message displays saying that the analyzer is locked. Select Login to log back into the analyzer.

❖ **To turn off the analyzer**

You can turn the analyzer off in two ways:

1. **Normal shutdown**, by pressing the **Power** button and holding it for two to three seconds until the shutting down message displays.

2. **Forced shutdown**, which is used when normal shutdown is not effective. Press the **Power** button for 12 to 15 seconds.

Note Forced shutdown should only be used as a last resort because it does not allow the analyzer software to close properly before shutting down, which could cause boot problems in the future.

Log into the analyzer

1. Press and hold the power button on the keypad until the screen lights up. The analyzer takes about 1 minute to boot up. The analyzer has three power states, **On**, **Off**, and **Sleep**.

2. After the initial splash screen, the Invisible Laser Radiation Warning is displayed.

3. Press **OK**. The Password for Admin screen is displayed. Enter the password for **Admin** and press the enter key (arrow at bottom right).
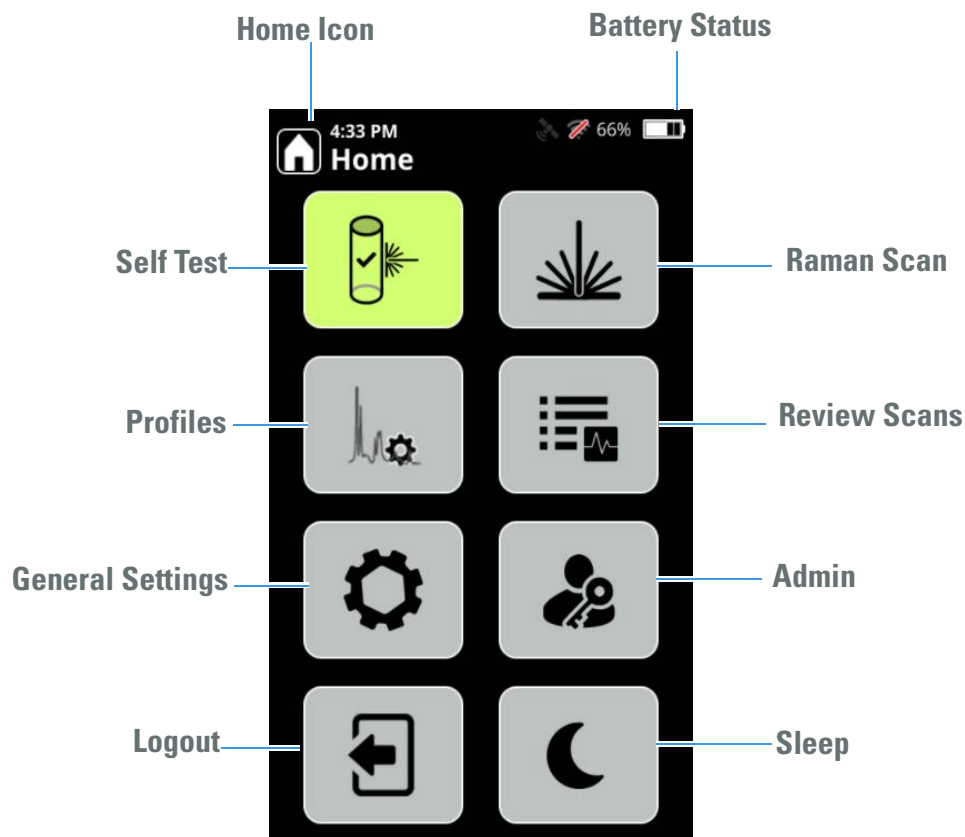

The Home screen is displayed, and is described in the following section, "Navigation."

Navigation

From the Home screen, use the Arrow and Enter buttons to access these analyzer functions.

**Note** You can tap the Home icon from any screen and return to this Home page.

Note Not all users have access to the Admin area of the analyzer. If the icon is grayed-out, you do not have permission to enter the Admin area or edit the analyzer definitions.

It is recommended that you perform a Self Test daily to ensure the analyzer is performing correctly. For information about how to run a Self Test, see "Perform Self Tests" on page 154.

Use the USB flash drive

When you upgrade to a new version of the analyzer software, import data into the analyzer, or export data from the analyzer, you use the USB flash drive that is included with the analyzer.

When the USB flash drive is inserted into the analyzer, the Eject button is displayed in the General screen and in the toolbar.
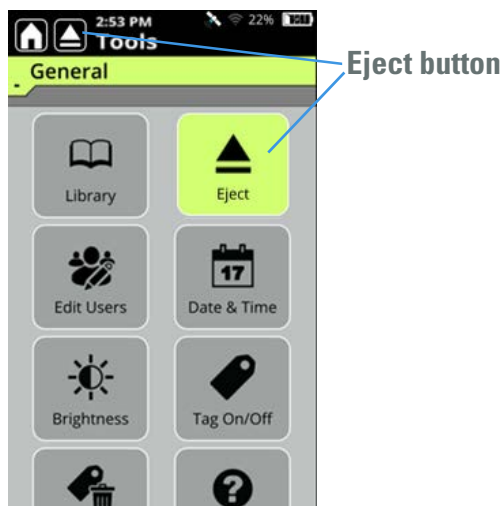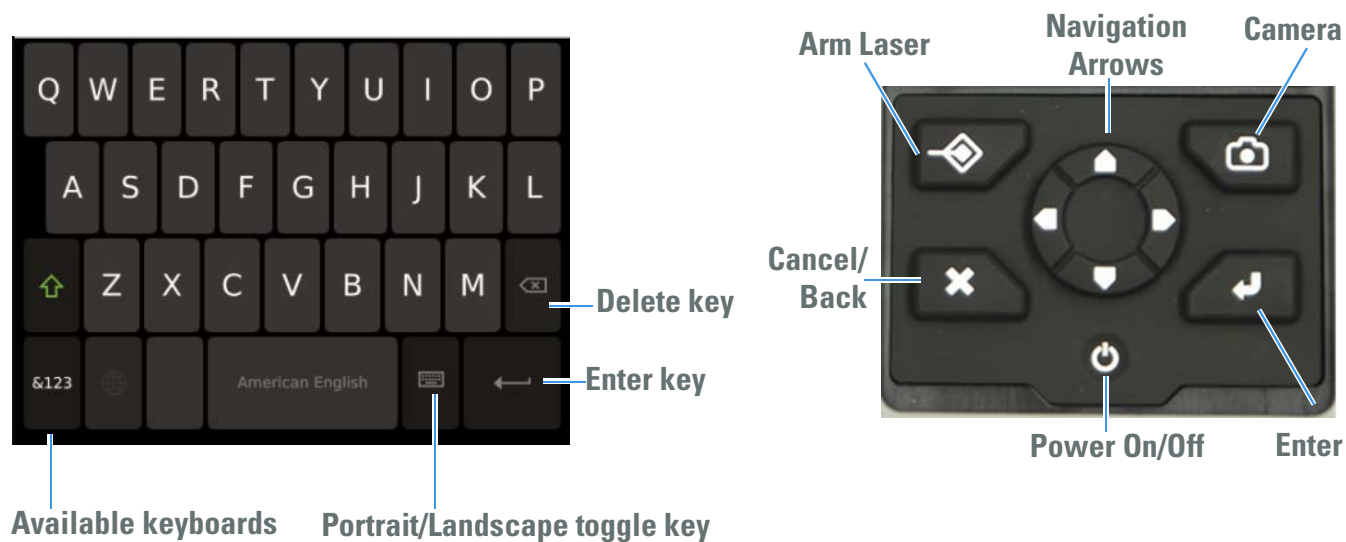

Eject button

The drive needs to be properly ejected, otherwise its content may become corrupted. Before pulling out the flash drive, go the General tools tab and press the Eject button or tap the Eject icon on the toolbar.

Use the touchscreen

The arrows on the keypad can be used to scroll and select items on the touch screen.

The analyzer displays a keyboard when you need to enter data into the analyzer. When finished, press the Enter key on the on-screen keypad.

Note To go back one screen, you can press the X (Back) key shown below.

Arm Laser | Navigation Arrows | Camera

Delete key

Cancel/Back

Enter key

Power On/Off | Enter

Available keyboards | Portrait/Landscape toggle key

Recommendations

The following recommendations help to keep the analyzer in top working condition.

- **Shipping**: Ensure that you follow these directions:

  1. Leave the door that covers the DC power connector open, to eliminate the possibility of pressure build-up inside the analyzer. The door is shown on "Left side view" on page 18.

  2. The analyzer battery must be removed before shipping.

- **Storage**: To prolong battery life, the internal battery should be maintained at a minimum 70% charge. Otherwise the battery life may be shortened.

Connectivity

Contents

You can connect analyzers to enterprise networks to:

- Share or store scan data on your internal network
- Save scan information for Reachback data to send Thermo Fisher Scientific to help with troubleshooting

Prerequisites

Before you can set up Wi-Fi connections, contact your network administrator to find out which networks are available, and the authorization requirements for those networks. Some types of authorization require certificates, which your administrator will be able to provide. For information about importing the certificates, see View, import, and delete Wi-Fi certificates on page 62.

Set up Wi-Fi connections

1. Start the analyzer.

2. From the Home screen, go to General and press the Wi-Fi button.
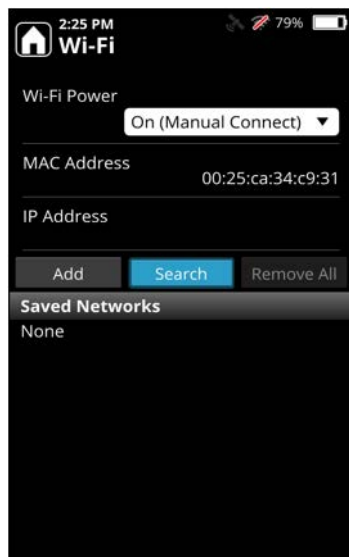

3. In the Wi-Fi screen, select On (Manual Connect).
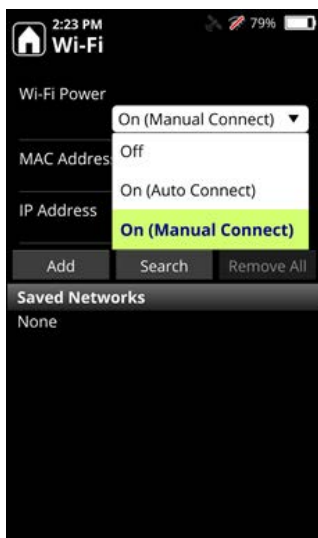
4. Click the Search tab.

5. The available Wi-Fi networks are displayed. Select the network that your administrator provided.

Note Only the 2.4GHz Wi-Fi communications frequency band is supported.

6. The Edit Network screen is displayed.

7. Select the Password field and type a password.

8. Select a Protocol if needed.

9. In Auth Type, select the authorization type for the network you are using (provided by your administrator). Some authorization types require certificates. The Auth Types that require certificates are PEAP, EAP-TLS, EAP-TTLS.
   If the authorization type you selected requires a certificate, the Certificate field is displayed.

10. Select the certificate. If the certificate is not displayed as an option, you must import it using the WebUI. For information about how to import or delete a certificate, see View, import, and delete Wi-Fi certificates on page 62.

11. Select **Allow Auto Connect** to automatically reconnect to the selected network after an analyzer restart. (If **Allow Auto Connect** is not selected, you must manually reconnect after the analyzer has restarted.)

12. Select whether you want to use a static IP address. If you select this option, the following screen is displayed:

13. Select Connect to connect the analyzer to the Wi-Fi network. The credentials are authenticated and the IP address is displayed.

Connect to a hidden network

A hidden wireless network is a wireless network that is not broadcasting its network ID (SSID). Typically, wireless networks broadcast their name, and the analyzer can display the names of networks found during a search.

To connect to a hidden network, you must supply the SSID along with connection information such as authentication protocol, username and password. Your site administrator will supply you with this information.

❖ **To connect to a hidden network**

1. Start the analyzer.

2. From the Home screen, go to **General > Wi-Fi.**

3. Turn on Wi-Fi power, then select the **Add** icon.

4. Enter the Wi-Fi SSID (this is case-sensitive).

5. Select **Connection Information**:

   - Select **Authentication Protocol** used by your network.

   - Select the **Protocol Option** used by your network.

   - Enter **Username** and **Password** (provided by your work site).

   - (Optional) Selecting **Allow Auto Connect** lets the analyzer connect to the Wi-Fi network again when in range.

   Save the connection information.

6. Select **Connect**, to connect the analyzer to the hidden Wi-Fi network.

The following table describes conditions that apply to hidden networks.

Table 2. Hidden networks and signal bar status

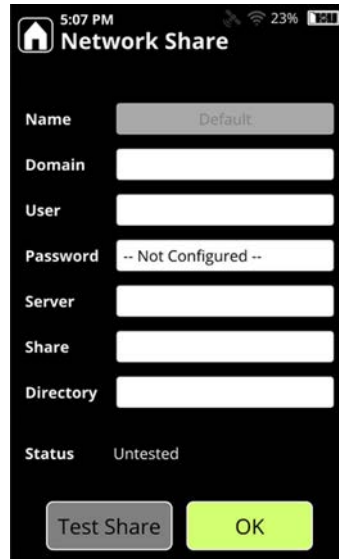| Action	Hidden network status
Add hidden SSID followed by successful Connect	Saved hidden network displays blue signal bars
Analyzer boot up, Wi-Fi power Manual ON	Saved hidden network displays no signal bars.
Analyzer boot up, Wi-Fi power Auto Connect ON to hidden SSID (Allow Auto Connect)	Saved hidden network displays connected hidden SSID with blue signal bars
If network is out of range	Saved hidden network has no signal bars
If network credentials are wrong	Saved hidden network has no signal bars
Disconnect from hidden SSID	Saved hidden network displays blue signal bars

Configure network shares

Configure a shared network storage location to export completed scans to. The examples in this section apply to Windows 10. Check with your network administrator for configuring network shares that are specific to your site.

❖ **To configure a network share**

1. Create a network share on a server that is also connected to your network. This will be used to store scan data.

2. In the network share properties, grant Read/Write permissions to a designated user account. The analyzer will use a designated user account to access the network Share.

3. Start the analyzer.

4. Connect the analyzer to the same Wi-Fi network that the network share is connected to (shown above).

5. Go to **General** > **Network Share** and enter the domain (if applicable), username, and password of the user you granted access to in step 2 (above) for the **Network Share Access Credentials**.

6. Continue adding values for the other fields.

   a. For **Server**, enter the name or IP address of the server that hosts the network share.

   b. For **Share**, enter the network share name (WiFiShare1 in the example above).

   c. For **Directory**, enter the name of the directory on the network share into which exported items will be stored. If omitted, the root of the network share will be used.

7. Select **Test Share** to confirm that the analyzer can successfully connect to the network share.

8. Select **OK**.

Set up GPS

You can capture the location information of where a scan is performed. When the GPS option is enabled and a signal can be acquired, the latitude, longitude, altitude and other location data are captured and stored at the time a scan is performed.

❖ **To enable the GPS feature:**

1. From the Home screen go to **General** > **GPS**.

2. Turn GPS Power on.

3. Select a Datum.

4. You can choose to include UTM Data or not by selecting or deselecting the check box. the UTM fields are **Grid**, **Northing**, **Easting**, and **Error**.

1064Defender WebUI

Contents

Overview

The 1064Defender analyzer has a web-based user interface (WebUI) that you can use to view, rename, delete, and export scan information. You can also add and edit users and profiles.

Note You do not need to connect to the Internet to use the 1064Defender WebUI. Information travels only between the analyzer and your browser over the USB cable or your local WiFi network and is never sent to Thermo Fisher or any third party.

The latest versions of Chrome, Firefox, and Microsoft Edge are supported. However, Microsoft Internet Explorer is not supported.

Note You cannot perform scans using the WebUI. You must use the 1064Defender analyzer to run scans.

Note If you edit information in the WebUI, the information is also updated on the analyzer. If one person is using the WebUI, and another person is using the analyzer, the WebUI goes into read-only mode. You cannot change anything in the WebUI when the analyzer is in use.

Connect to the 1064Defender WebUI

You can connect to the 1064Defender WebUI in the following ways:

- Use the USB cable provided by Thermo Fisher Scientific to connect the analyzer to a computer capable of running a browser. Plug one end of the USB cable into the analyzer, and the other end into a USB port on your computer. You can connect one analyzer to one computer at a time.

- Use Wi-Fi to connect the analyzer to your network. You can connect to one or more 1064Defender analyzers simultaneously from a single computer.

Note For Wi-Fi, you must set up the Wi-Fi connection on the analyzer itself.
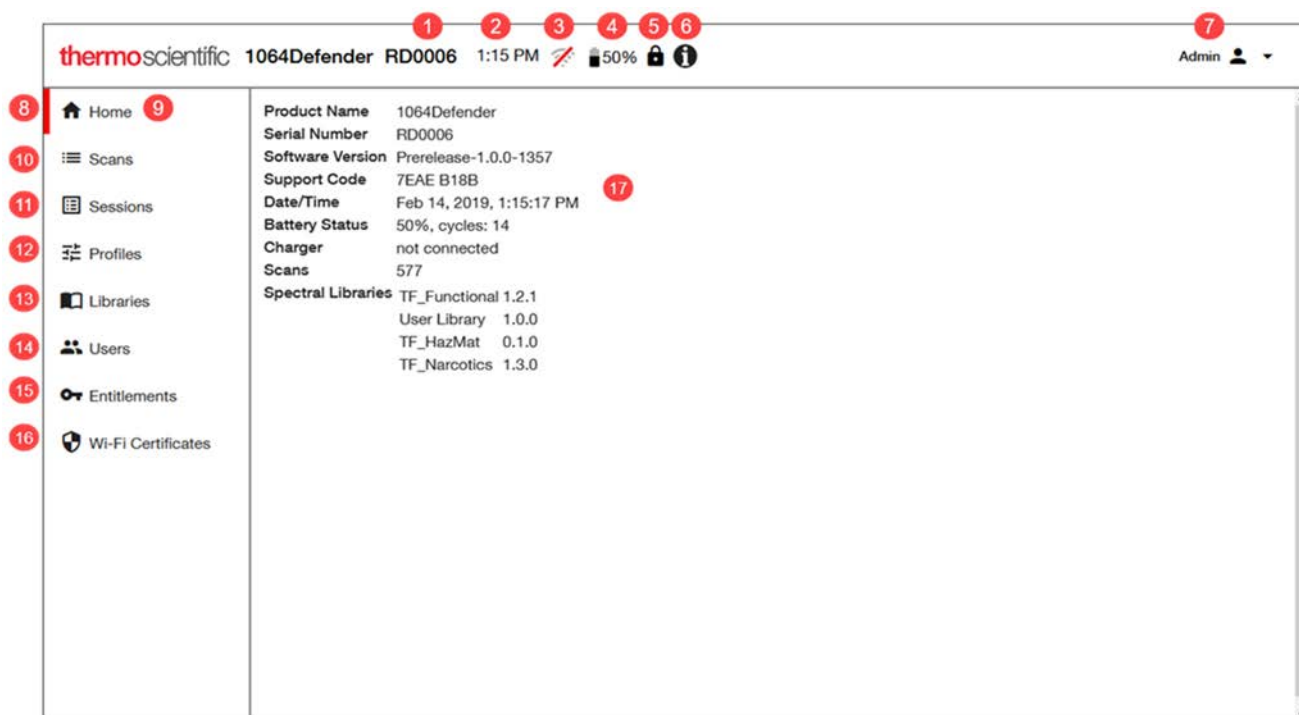
❖ **To set up the 1064Defender WebUI:**

1. Connect the 1064Defender analyzer to a computer resource using either the USB cable or Wi-Fi.

    a. If you are using the USB cable, open a browser and type **192.168.0.2**. This will connect your browser to the analyzer.

       Note After connecting the USB cable, it may take 10-15 seconds for the connection to become active

    b. If you are using Wi-Fi, open a browser and type the IP address of the analyzer.

       Note Later versions of Microsoft Windows 10 and Apple products allow connecting to the analyzer by using the URL **https://RDnnnn.local**, where **RDnnnn** is the serial number of the analyzer.

2. Log in with any of the usernames configured on the analyzer, using the password specified for the user.

3. To use the WebUI to make updates, log out of the analyzer. This will enable editing in the WebUI.

1064Defender WebUI pages

This is the home page of the 1064Defender WebUI that opens when you establish the connection between the analyzer and the network device:

Table 1. 1064Defender WebUI Home Page Description

Item	Description
1. Serial Number	Analyzer serial number (RD and 4 digits)
2. Time	Time on the 1064Defender analyzer (note that this is *not* the time on the system running the WebUI).
3. Wi-Fi	Shows Wi-Fi status (On or Off) and five strength-level icons. Hovering over the icon opens a tool tip giving the SSID of the connected Access Point, the signal strength in dBm, the IP address of the analyzer on the network, and the security mode (e.g. W2PSK) in use. This icon is not present if the hardware option for Wi-Fi is not installed.
4. Battery Charge	Battery charge indicator on the 1064Defender analyzer showing the percentage of charge remaining. If the battery is currently charging, a lightning bolt image is overlaid over the battery image.

Table 1. 1064Defender WebUI Home Page Description, continued

Item	Description
5. Edit Mode	Edit mode indicator, unlocked if no one else is logged in to either the analyzer or the WebUI. If one user is working in the WebUI and another person is working on the analyzer, the edit mode indicator appears locked to show the WebUI is read-only and cannot make any changes to the analyzer.
6. Information Icon	Click to display 1064Defender product information, such as the End-User License Agreement (EULA) and Third Party Licenses.
7. User Information	Name of the user that is logged in, and user menu with these options: About (product information), Change Password, and Logout.
8. Selected Pane Indicator	A red bar appears to the left of the icon whose content is displayed in the center pane.
9. Home	The Home display pane shows information about the analyzer.
10. Scans	Displays a list of the scans i regardless of the session that they were taken in. See View and edit scans on page 45.
11. Sessions	Displays scan data, organized by session. You can filter, modify, or delete sessions. See View and edit sessions on page 48.
12. Profiles	Displays profile information from the analyzer. A profile is a saved set of scan parameters. See View and edit profiles on page 50.
13. Libraries	Displays installed libraries and enables you to install or update libraries. See View and install libraries on page 54.
14. Users	Displays a list of analyzer users and enables you to create, edit or delete users. See Manage users on page 58.
15. Entitlements	Displays current entitlements and enables you to install new ones. See View and install entitlements on page 60
16. Wi-Fi Certificates	Displays a list of Wi-Fi certificates and enables you to view, install, and delete them. **Note** You must use the 1064Defender WebUI to install Wi-Fi certificates. You cannot do this on an analyzer. See View, import, and delete Wi-Fi certificates on page 62.
17. Center Pane	The content shown is specific to the selected icon in the navigation bar (indicated by the red bar described in item 8).

Note Depending on the role permissions for the logged-in user, certain features or operations may be restricted. In general, there is no visual indicator that a feature is restricted. All options appear regardless of your role and the required permission. However, if you select a restricted option, a message box displays with the text "You do not have access to this feature."

View and edit scans

You can review, rename, export, and delete scans. This view lists all the scans that are stored on the analyzer. The following image and table describe the features of the Scans List view.

Table 2. Scans List View Description

Item	Desscription
1. Filter button	Filters the entire list of scans. When filtering on more than one criteria, only scans that meet all the criteria are displayed. For example, if you filter for Result type 'Unknown Substance' and User Name 'Mark', only scans that match both criteria are displayed.
2. Export button	Opens the Export dialog to export the selected scans. You can export scans in four export formats: Report (PDF), Reachback, Text, or SPC. If you export one scan in one of these formats, the export is downloaded as the file type requested. However, if you choose two or scans or formats, a single zip file is downloaded that contains the exported files.
3. Delete button	Deletes the selected scans.

Table 2. Scans List View Description

Item	Desscription
4. Select column	Selects all the scans listed in the view from the checkbox in the column header. You can also select one or more scans individually.
5. Result column	Displays icons that indicate the status of the scan results.
6. Session column	Lists the name of the session that contains the scan shown in the Name column.
7. Name column	The name of the scan.
8. Date/Time column	The date and time that the scan was taken.
9. User Name column	The name of the user who performed the scan.
10. Location column	If GPS was enabled at the time the scan was taken, the latitude and longitude of the location.
11. Camera	If a picture was taken by the analyzer, an icon is displayed in this column. Click the icon to see the picture.
12. More ⋮	Menu that contains these options for the selected scan: Rename, Export, and Delete.

If you click on a scan entry in the view, the Scan Detail view is displayed for the selected scan. For information about the contents of the Scan Detail views, see Understand Scan Results on page 137.

The first tab of the Scan Detail view shows the scan results, as shown in the following figure.

The second tab of the Scan Detail view shows the scan spectrum, as shown in the following figure.
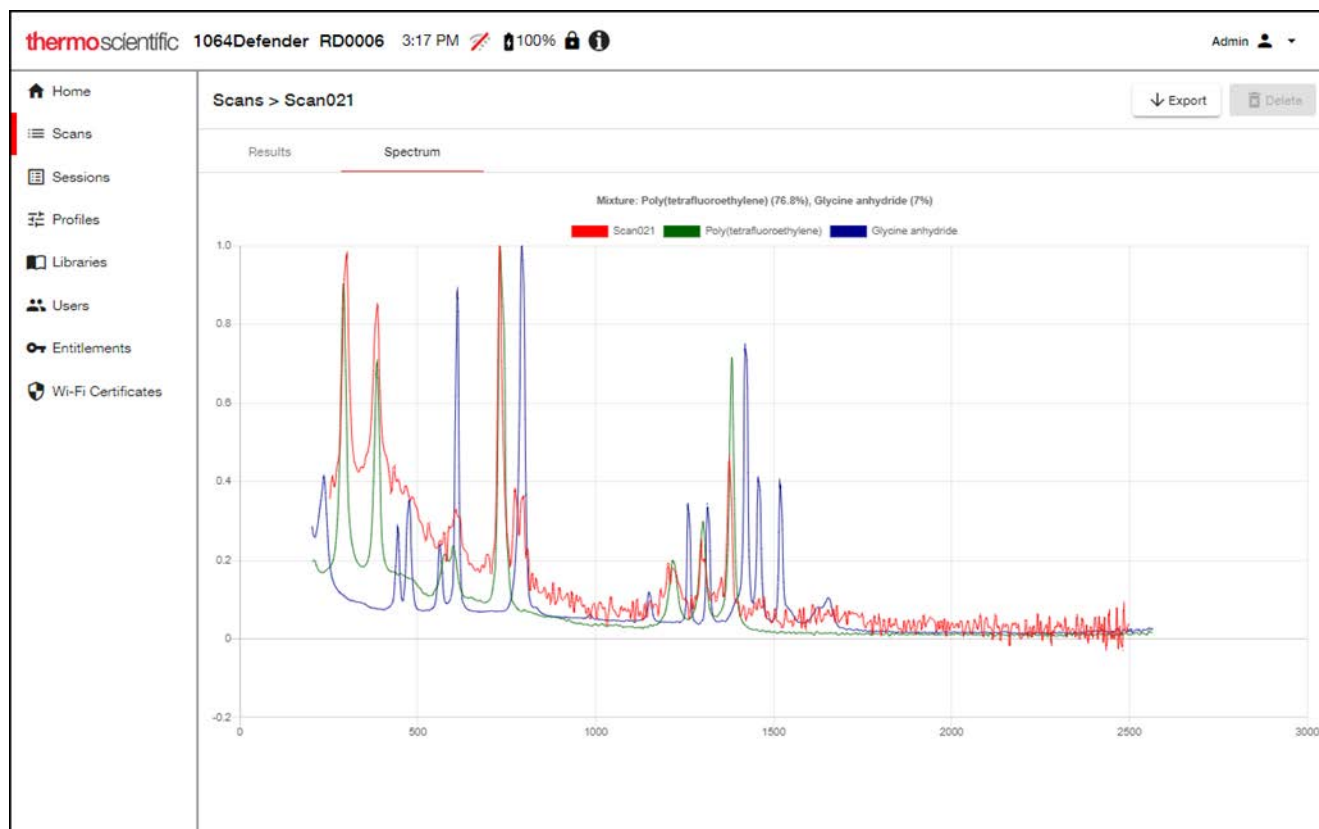
View and edit sessions

This view enables you to filter scans based on sessions. Sessions are collections of scans. You can create new sessions into which future scans may be stored. You can also rename and delete sessions.

The following image and table describe the features of the Sessions List view.

Table 3. Sessions List View Description

Item	Desscription
1. Filter button	Enables the ability to filter the list based on the columns.
2. Create button	Opens the Create dialog to create a new session.
3. Delete button	Deletes the selected sessions and all the scans in the sessions. This option is only available for users with Admin or Manager role permissions.
4. Type column	Indicates the type of session; Library or User.
5. Name column	Displays the name of each session.
6. Scans column	Shows the number of scans in each session.
7. Earliest Scan Time column	Date and time of earliest scan in each session.
8. Latest Scan Time column	Date and time of the latest scan in each session.
9. More ⋮	Menu that contains these options for the selected session: Rename, Export, and Delete.

The Session Detail view has the same features as the Scans List view, except that it only lists scans for a given session.

View and edit profiles

You can edit profiles in the WebUI. The edits that you make in this view are also made on the analyzer. For detailed information about profiles, see Profile Settings on page 89.

The following image and table describe the features of the Profile List view.

Table 4. Profiles List View Description

Item	Description
1. Import	Imports user profiles from a directory on your local system.
2. Export	Downloads user profiles as zip files from the Web UI to your local downloads directory.
3. Delete button	Deletes the selected profiles. Default factory profiles cannot be deleted.
4. Name column	The name of the profile.
5. Type column	The profile type (Factory or User).
6. Analysis Type column	The Analysis Type (ID or Screener).

Table 4. Profiles List View Description

Item	Description
7. Libraries column	Comma-separated list of libraries (alphabetical), with an ellipsis indicating additional libraries that are not displayed.
8. More ⋮	Click on the three dots to see the menu that contains Clone and Delete options for the selected profile.

You can select a profile and then click it to open the Edit Profile view. The following image and table describe how you can edit profiles in the web UI.

Table 5. Edit Profiles View Description

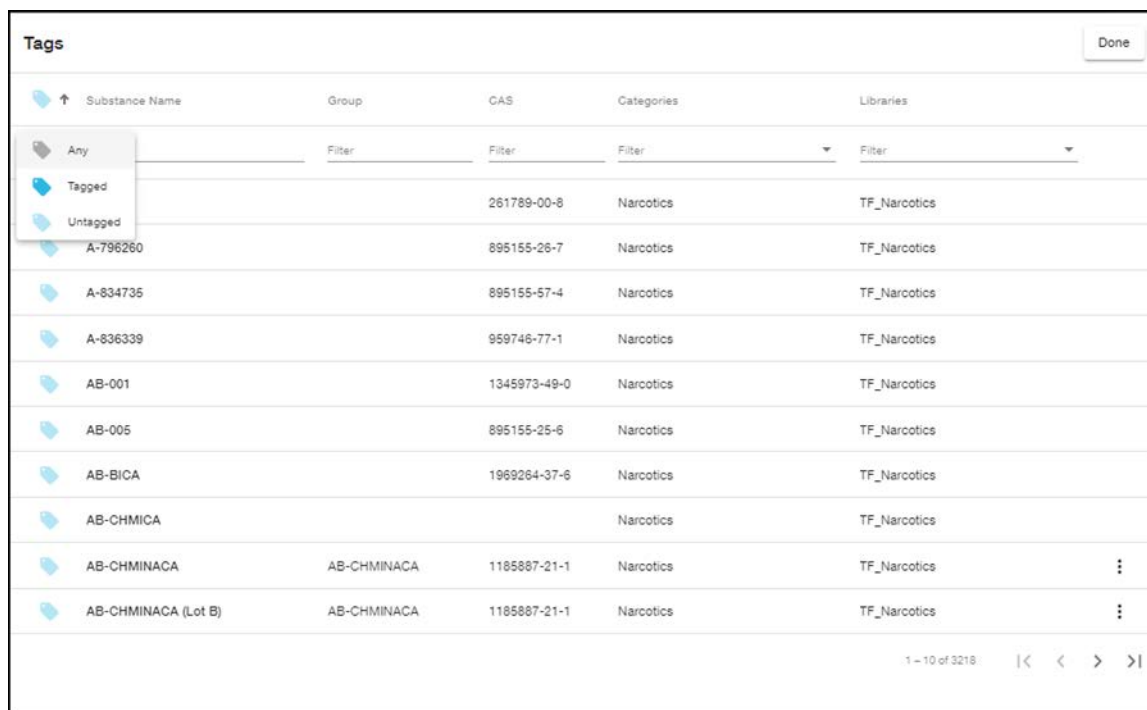| Item	Description
1. Name	Edit the name of the profile
2. Scan Delay	Click the down arrow to change the scan delay. The options (in seconds) are 0, 15, 30, 45, 60, 75, 90, 105, 120.
3. Scan Timeout	Click the down arrow to change the scan timeout. The options (in minutes) are 1, 2, 3, 5, 10, and 20.
4. Laser Power	Click the down arrow to change the laser power intensity. The options are Low, Medium, and High.
5. Analysis Type	Click the down arrow to change the Analysis Type. The options are ID and Screener.
6. Libraries	Click the down arrow to change the profile libraries. You can select more than one option. The options are TF_Functional, TF_HazMat, and TF_Narcotics.

Edit tag lists for profiles with ID analysis type

For profiles that use the ID analysis type, you can click the **Tags** button to see a list of tags associated with the profile. Items that have not been tagged are displayed with a pale blue tag icon 🏷 . Items that are tagged are displayed with a dark blue tag icon 🏷 .

Note The number of tagged items in a profile is limited to 100.

❖ **To tag items in the libraries:**

1. Ensure that you are logged off of the analyzer instrument.

2. In the Edit Profile view, click **Tags**.

3. In the Filter dropdown menu above the tag icons, ensure that **Any** is selected. Items that are not already tagged are displayed with a light blue tag icon.

4. Select the items to tag. The tag icon turns from light blue to dark blue to indicate that the item is tagged.

5. Click **Done** in the upper right corner.

6. In the Edit Profile view, click **OK**. A message is displayed saying that the profile has been updated.

Edit alert values for profiles with Screener analysis type

You can view a list of alerts in a profile, and change the alert level of items as needed.

❖ **To view an alert list and change alert levels:**

1. Select a profile that use the Screener analysis type.

2. In the Edit Profile view, click Alerts.
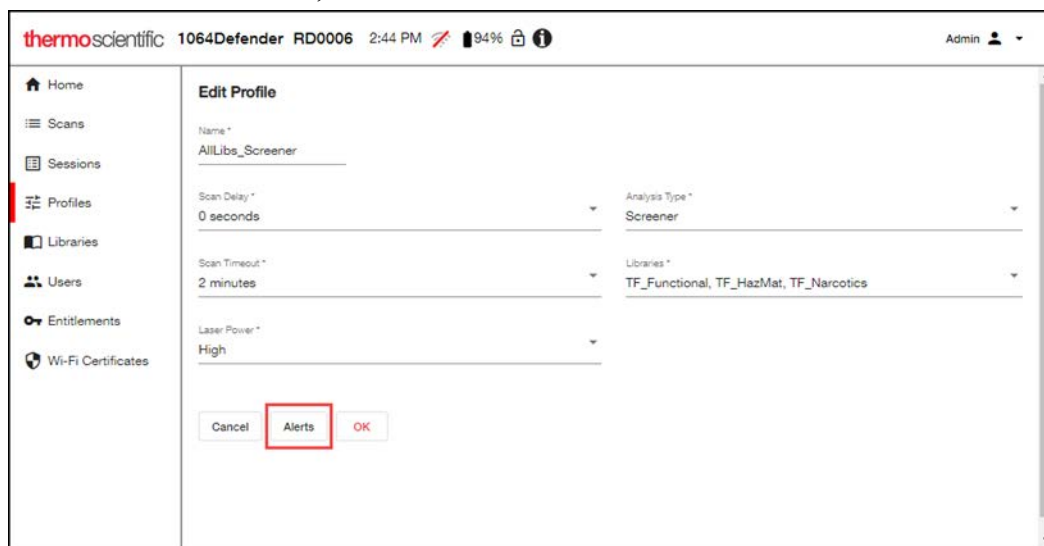
3. The Alerts view is displayed.

4. To change the alert level of an item, select the item, and then select the desired alert level.

	Substance Name	Group	CAS	Categories	Libraries
🔔 Alarm					
⚠ Warning	yde		123-11-5	EPA-HPV 1990, ITF-40	TF_HazMat, TF_Narcotics
✅ Clear			90-04-0	EPA-HPV 1990, NIOSH, UN	TF_HazMat, TF_Narcotics
Ignore	methyl bromide		80-50-2	Pharmaceuticals	TF_Narcotics
🔔 ▾	4-ANPP		21409-26-7	Narcotics	TF_Narcotics
🔔 ▾	Antazoline hydrochloride		2508-72-7	Pharmaceuticals	TF_Narcotics
🔔 ▾	Anthracene		120-12-7	ITF-40, White Powders	TF_HazMat, TF_Narcotics
⚠ ▾	Anthranilic acid		118-92-3	Narcotics	TF_HazMat, TF_Narcotics
🔔 ▾	Antimony(III) oxide powder		1309-64-4	ITF-40, UN, White Powders	TF_HazMat, TF_Narcotics
✅ ▾	Antipyrine		60-80-0	Pharmaceuticals	TF_HazMat, TF_Narcotics
🔔 ▾	AP-237 hydrochloride		17730-82-4	Narcotics	TF_Narcotics

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View and install libraries

You can view the contents of the libraries installed on the analyzer, and install new or updated libraries. These updates are visible in the WebUI and on the analyzer. For more information about libraries, see Using the Library on page 81.

Before you can install a new library, you must first ensure that the entitlements required by the library are installed. For more information, see "View and install entitlements" on page 60.

Note Updates to previously-installed libraries do not require an additional entitlement.

The following image and table describe the features of the Libraries view.
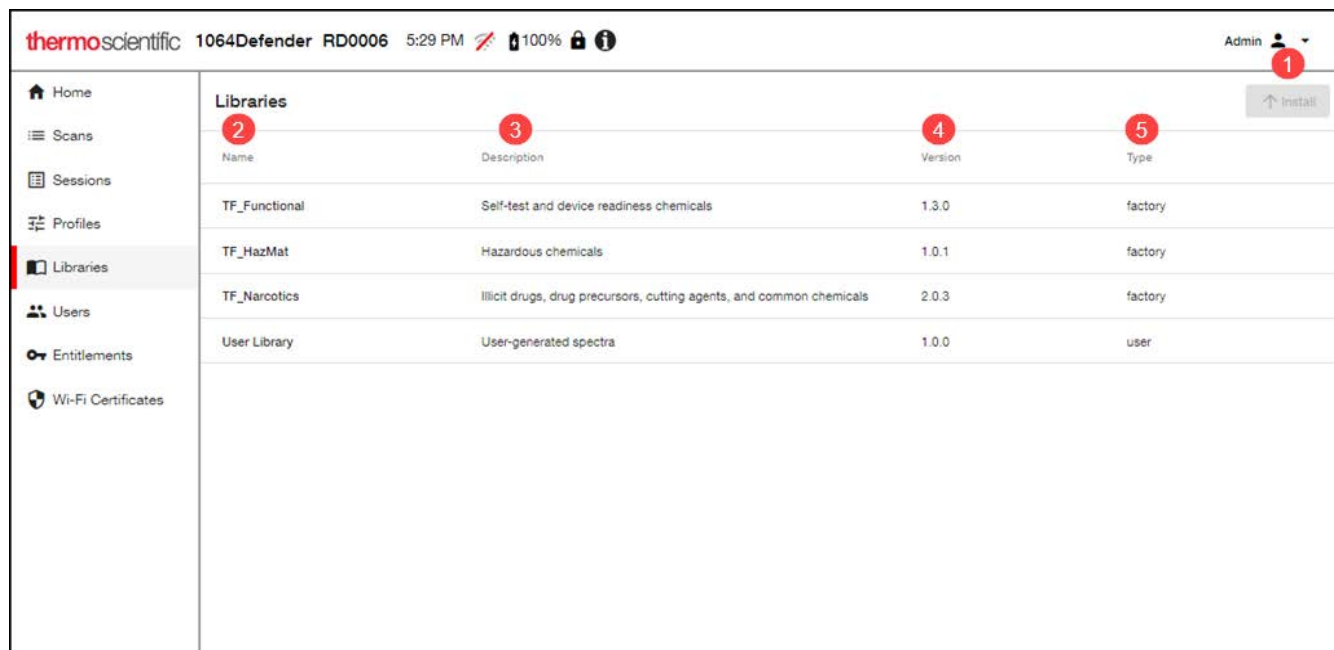
Table 6. Libraries View Description

Item	Description
1. Install button	Installs a new or updated library
2. Name	Short display name for the library
3. Description	Description of library
4. Version	The version number of the library. You can import and export libraries using the analyzer. This view shows you which versions of each library is installed.
5. Type	Library type: Factory or User

Factory library view

When you select a factory library from the main Libraries view, the Factory Library view is displayed. It displays the substance list of the selected library, as shown in the following example.

Table 7. Factory Library View Description

Item	Description
1. Substance Name	Chemical name, language-sensitive
2. CAS	Chemical Abstracts Service number
3. Group	Chemical group name
4. Categories	Chemical categories in alphabetical order

When you select a library substance in the library view, the Library Substance View is displayed with details about the selected chemical.
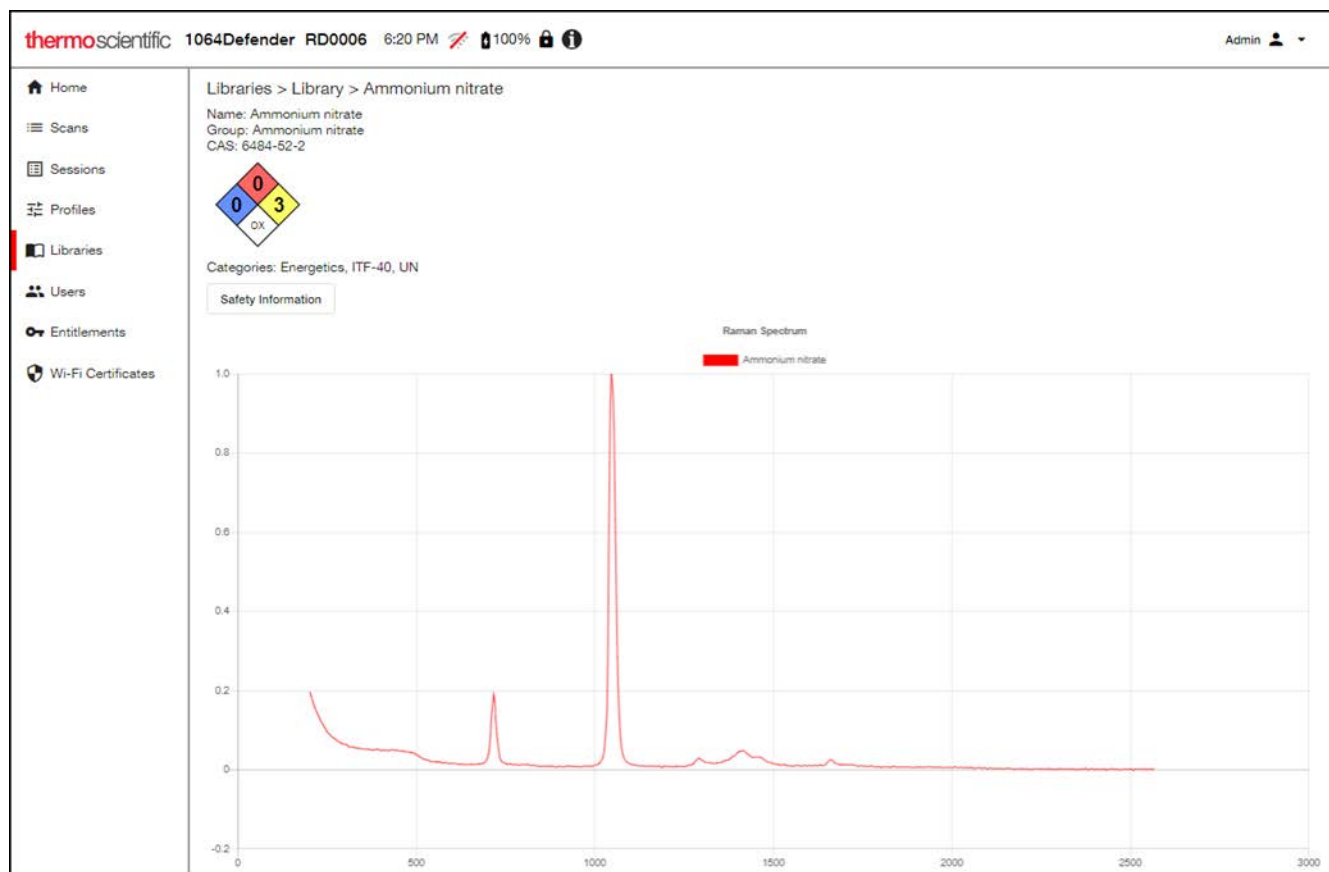
The Library Substance view displays the details of the chemical selected from the library, including the chemical name, the CAS number, chemical group name, categories, and spectral graph. You can click the **safety information** button to display Chemwatch safety information.

User library view

When you select a user library from the main Libraries view, the User Library view is displayed. You can use this view to add information from library scans, so that you can identify those substances in future scans. You can also import library items that were previously exported, export library items, and delete library items.

The following image and table describe the features of the User Library view.
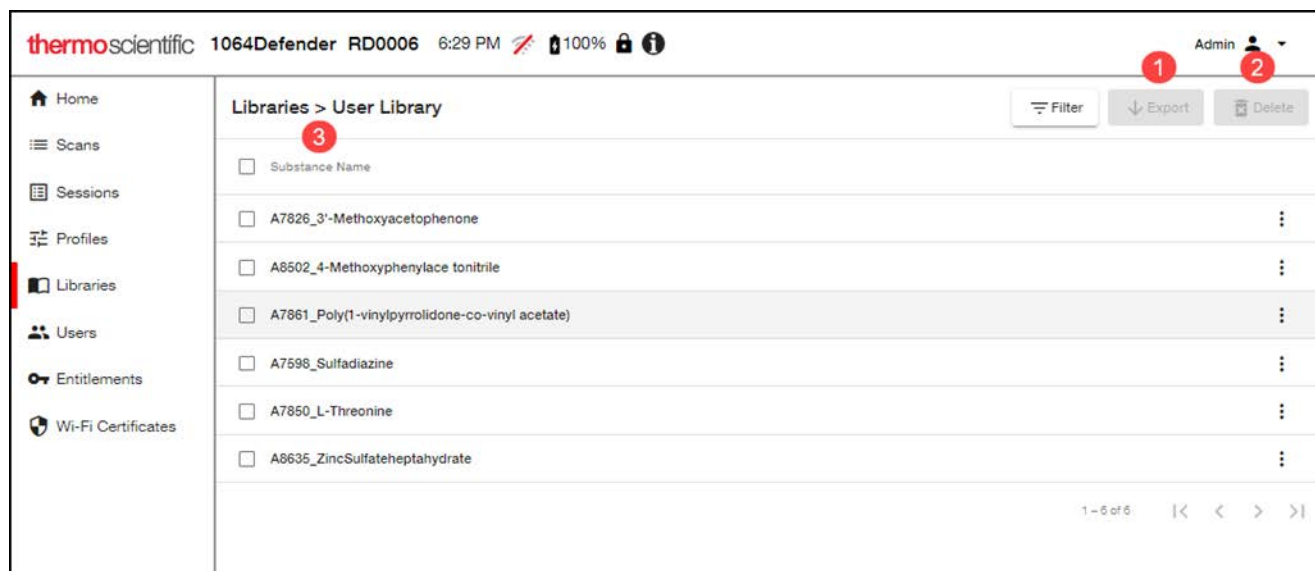
Table 8. User Library View Description

Item	Description
1. Export	Exports the library item to your Downloads folder as an .lrd file. You can then import this item into a library on the analyzer.
2. Delete	Deletes the library item.
3. Substance Name	Names of substances in the library. Click on a substance name to open the Library Substance view. For information about the Library Substance view, see Factory library view on page 56.

Manage users

You can see a list of users and their roles. You can also create new users, edit user settings, and delete users. These updates are made on the analyzer and in the WebUI.

Note There is a 32 character limit for user passwords. For more information about passwords, see Add a new user on page 78.

The following image and table describe the features of the Users view.
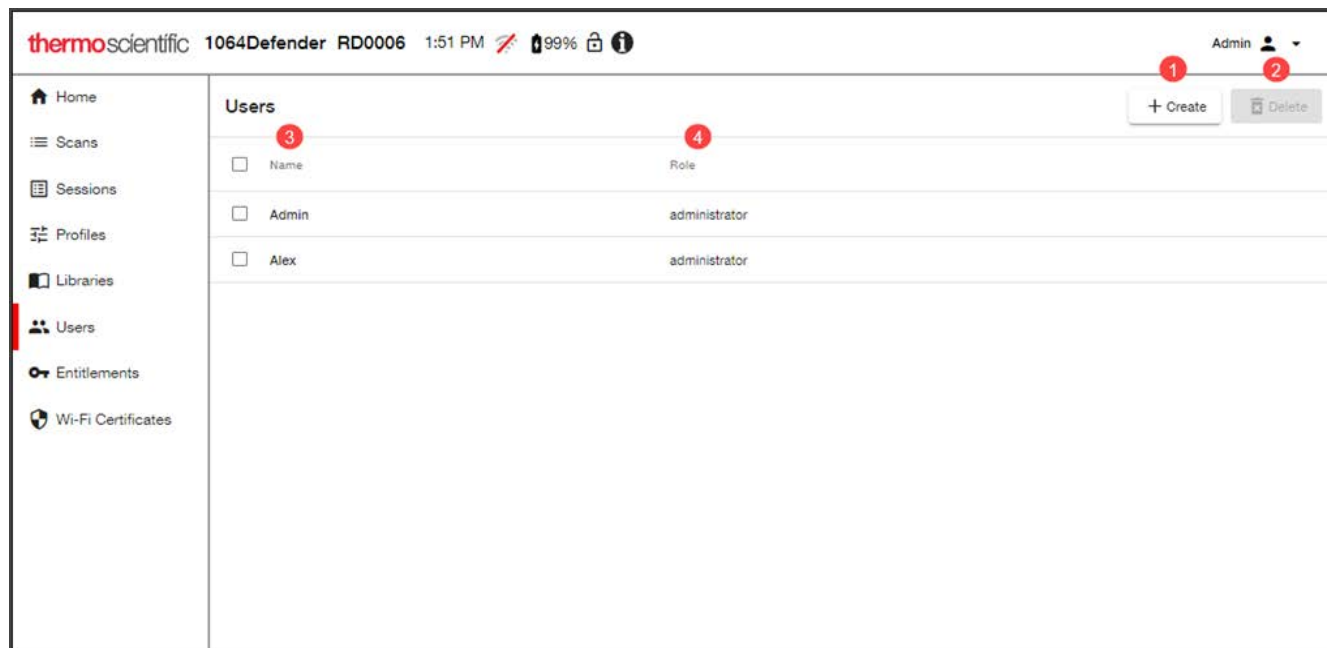
Table 9. Users View Description

Item	Description
1. Create button	Opens the Create User view.
2. Delete button	Deletes the selected users.
3. Name column	User name.
4. Role column	User role: administrator, manager, operator.

Create and edit user accounts

You can create and edit user accounts in the WebUI. These updates are applied to the WebUI and the analyzer.

❖ **To create and edit user accounts:**

1. In the Users view, click **Create**. The Create User page opens.

2. Type a name in the Name field.

3. Assign a role to the user. The available roles are administrator, manager, or operator. For information about the permissions for each of these roles, see Understand role-based accounts on page 73.

4. Enter a password for the user, confirm the password, and click OK.
    The updated user information is displayed in the Users view.

Note Passwords must be no less than four characters and no longer than 32 characters.

❖ **To delete user accounts:**

1. In the Users view, select one or more user accounts to delete.

2. Click **Delete**. The user accounts are deleted in the WebUI and on the analyzer.

View and install entitlements

Entitlements enable the use of optional product features or allow the installation of optional spectral libraries. Some entitlements may have been pre-installed at the factory. If you purchase additional options after the analyzer has been shipped to you, an entitlement key will be provided to you.

The Entitlements View shows entitlements which have already been installed.
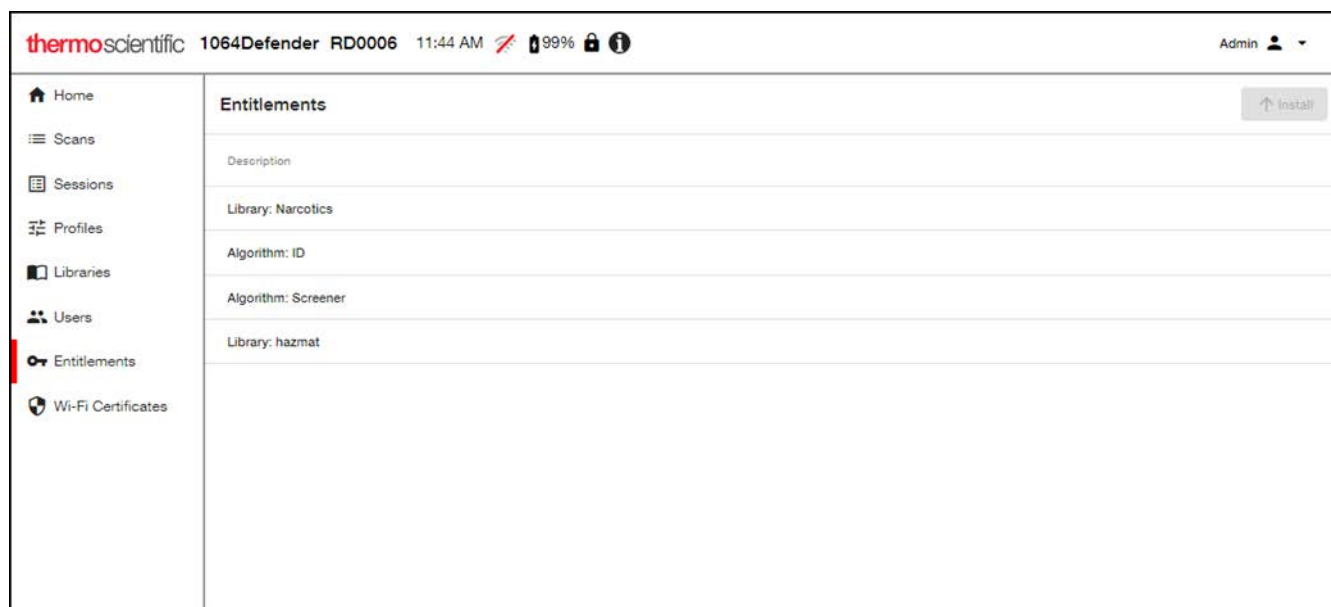
❖ **To install a new entitlement:**

1. In the Entitlements view, click the **Install** button to open the file chooser.

2. Locate the .key file provided with your purchase. The .key file name prefix must match the serial number of the analyzer.

3. Click **OK** to install the entitlement.

To install a new library, you must first install the entitlements that the library requires. If you buy a library after your analyzer is shipped to you, you will either receive a flash drive that contains the library or instructions for downloading it, and access to the entitlements, which enable the license keys.

View, import, and delete Wi-Fi certificates

You can view, import, and delete Wi-Fi certificates in this view. The following image and table describe the features of the Wi-Fi Certificates view.
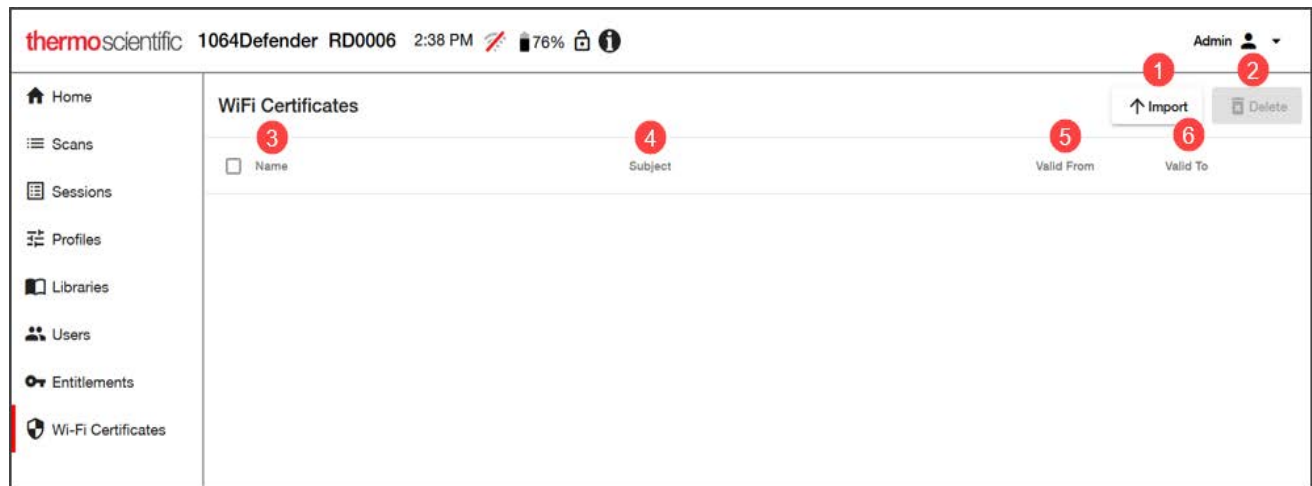
Table 10. Wi-Fi Certificates View Description

Item	Description
1. Import button	Imports Public Key Infrastructure (PKI) certificates. The certificate must be a valid certificate in binary (DER) format (for example, with filename extensions of .cer, .crt, or .der).
2. Delete button	Deletes the certificate that is selected.
3. Name column	The certificate filename.
4. Subject column	The certificate subject common name.
5. Valid From column	The validity start date.
6. Valid To column	The date the certificate expires.

Import Wi-Fi certificates

WiFi certificates are used to identity the analyzer when connecting to WiFi networks using certain types of authentication.

WiFi certificates are files that must be provided to you by the administrator of a network you wish to join.

The WiFi Certificates List View shows certificate files that have been imported to the analyzer and are available for use in WiFi network configuration.

You can only set up Wi-Fi certificates using the WebUI. However, you must set up your analyzer connection to Wi-Fi on the analyzer. For information about setting up your Wi-Fi connections on the analyzer, see Connectivity on page 31.

Prerequisites

Your administrator must provide you with the location (and access to the location) of the authorization certificates for the Wi-Fi networks that will be used by analyzers.

❖ **To import Wi-Fi certificates:**

1. Click the Wi-Fi Certificates icon in the left pane to open the Wi-Fi Certificates window.

Note If someone is logged into the analyzer, the Import button is unavailable (greyed out).

2. Click the Import button. A file explorer window opens. Browse to the location of the certificate and click Open. The certificate is displayed in the Wi-Fi Certificates window.
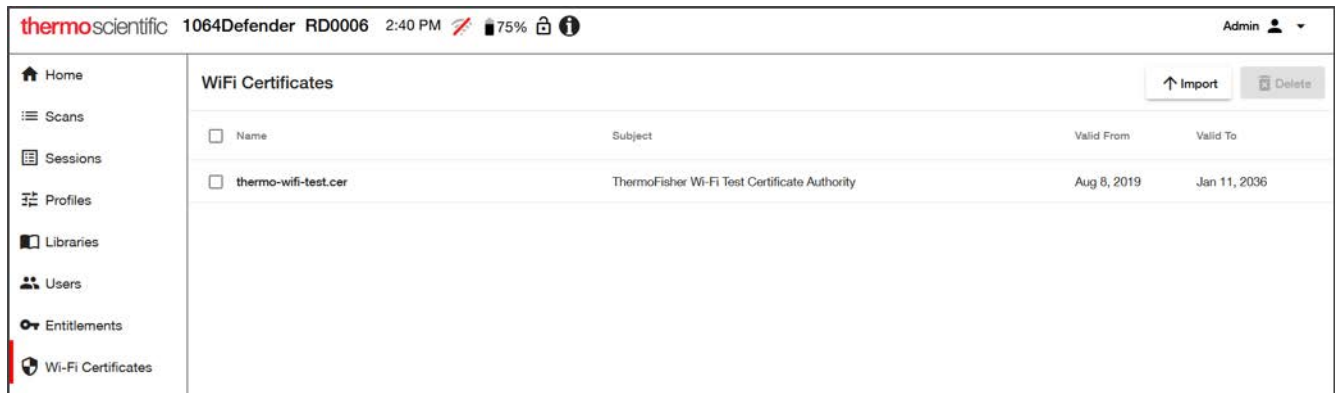
The certificate can now be selected on the analyzer during Wi-Fi configuration.

Delete Wi-Fi certificates

You must have Administrator role permissions to delete Wi-Fi certificates.

1. In the Wi-Fi Certificates view, select the certificates to delete.

2. Click the **Delete** button. The certificates will be removed from all WiFi network configurations and the files will be deleted from the analyzer.

General Tools

General tools apply to the entire analyzer, not just a specific profile. To get to the General section of the Tools screen, click the General icon on the Home page.

General ———

The buttons shown below allow you to change parameters (except **About**, which is read-only, and Eject, which is only available when a USB flash drive is connected to the analyzer).
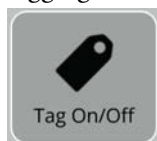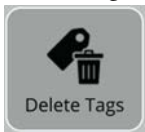
Note You can only change parameters in the General menu if your role has permissions. For more information about user roles, see Understand role-based accounts on page 73.

The information below explains how General settings work.

Table 11. General Settings

General Screen	How it Works
Library	Displays those libraries that are selected in the active Profile. (To see all items on the analyzer, navigate to a profile that has all the libraries selected.) You can view information and spectra, select Search and use a keyboard to search library contents, and select the drop-down list and filter by categories like narcotics, pesticides, or plastics.
Brightness	Controls lighting on the keypad and display screen. Settings are **Low**, **Medium**, and **High**.

Table 11. General Settings

General Screen	How it Works
Date & Time	Resets date and time, and changes their display formats. See Date and time on page 68.
Edit Users	Edit or delete the configured user accounts, or add new users. See Edit or delete a user account on page 79.
Tagging On/Off	Turns tagging On or Off. Changing the setting configures tagging on or off for all subsequent scans. See Tagging on page 105.
Delete Tags	Deletes tags from tag lists. Use this option to select one tag list from the current profile or tag lists from all profiles, and then delete ALL the tagged items in that profile or all profiles. See Tagging on page 105.
About	Displays analyzer and software information. To upgrade software, you need to know the support code and serial number for your analyzer. About screen information is useful for any customer support issue.
Wi-Fi	Connects the analyzer to public and private wireless networks through wireless access points (WAPs) such as Wi-Fi routers and other hotspot devices. (Unsecured networks are not supported.) You can also click this icon to view and configure network shares. See Connectivity on page 31.
GPS	Turns GPS on or off, which associates coordinates received from the GPS to a scan. See Connectivity on page 31.

Table 11. General Settings

General Screen	How it Works
Network Share 	Displays and configures analyzer network shares. A network share can be selected as a destination for an export operation. You can also use network shares to perform configuration tests.
Eject 	Ejects a USB drive from the analyzer. The Eject button is displayed in the General tools when a USB drive is inserted, and is disabled when the USB drive is pulled out. **Note** The USB drive must be properly ejected, otherwise its content may be corrupted.

Date and time

The date and time are factory preset prior to shipping. **Time** can be set to AM/PM or 24 hour format. **Date** has 3 formats: DD MMM YYYY, DD / MM/ YYYY, MM/DD/YYYY. The Enter key is used to cycle through the options when either the time or date format button has the focus.

❖   **To change date or time**

1. From the Home screen, select **General** > **Date & Time**.
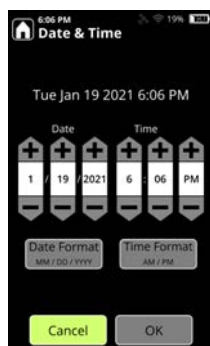
2. Select the item that you wish to change: Month, Day, Year, Hour, Minute, AM or PM. Then, use the minus or plus sign to set the correct value. You can also use the up and down arrows to adjust the value and the left and right arrows to move focus to the next field.

3. Select **OK** to save your changes.

Admin Tools

Contents

Admin tools

You can perform the following administrative functions for the 1064Defender analyzer:
- Delete scans
- Manage user libraries
- Import and export cloned profiles using a USB flash drive
- Reset EULA to display when the analyzer is turned on

Note Access to Admin settings requires administrator role credentials.

You perform these actions in the Admin screen (Home page Tools icon > Admin).
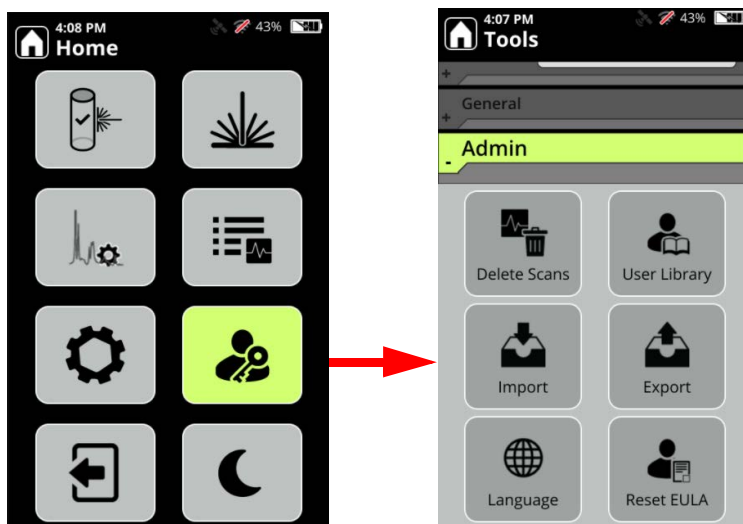
The information below describes how Admin settings work.

Table 12. Admin Settings

Admin Screen	How it Works
Delete Scans	This screen deletes scans and sessions. • **Library Scans** deletes just the scans and sessions for the User library. This does not delete the actual library item, it only deletes the scan used to create the library item. • **Scans** deletes the scans found in Review. • **All Scans** deletes library scans and regular scans.
User Library	The user library is separate from the factory libraries, and contains only the items you add. **Acquire** lets you scan an item and add it to the user library. See Add user library items on page 85 for more information. **Spectra** lets you view the spectrum data of a user library scan. **Manage** lets you see all user library items.
Import	This screen imports user profiles that were exported from another analyzer and saved to a USB flash drive. **Note** If you select a named profile, and then you select a profile from the USB flash drive and import it, the file from the USB flash drive will overwrite the named profile that you selected. Tag lists and Alert lists are imported along with user-created profiles. This method is faster and more accurate than manual configuration. You can import a profile as a new profile or you can have it overwrite an existing profile.

Table 12. Admin Settings

Admin Screen	How it Works
Export 	This screen exports user profiles from your analyzer to a USB flash drive. Tag lists and Alert Configurations are exported along with user-created profiles. This lets you clone the same profiles into multiple 1064Defender analyzers.
Language 	This screen changes the language of the user interface on the analyzer.
Reset EULA 	This screen resets the EULA (End User License Agreement) so that it displays the next time the analyzer starts up.

About the analyzer

The **About** screen provides important information about your analyzer, which may be needed while talking to Customer Service, such as Product Name, Software Version, Serial Number, and Support Code.

❖ **To open the About screen:**

1. Go to General Tools and press the **About** button.

2. The About screen is displayed:
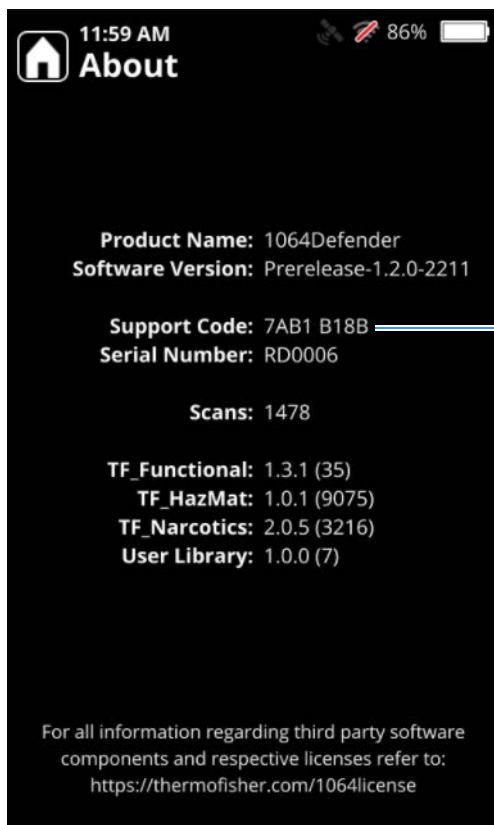
Your Support Code and Serial Number will be different from the ones shown here.

Understand role-based accounts

The analyzer and the WebUI both support role-based user access control. In the following table, the green columns specify access control for both interfaces.

This means that a user's role defines their ability to access functions. Users are assigned one of three roles: Administrator, Manager, or Operator. Role-based access to features and function is shown below.

Function	WebUI	Analyzer	End-Users		
			Admin	Manager	Operator
1064Defender Function					
• **Login**	yes	yes	yes	yes	yes
• **Logout**	yes	yes	yes	yes	yes
Laser Arm & Disarm					
• **Arm Laser**	**no**	yes	yes	yes	yes
• **Disarm Laser**	**no**	yes	yes	yes	yes
About					
• **View**	yes	yes	yes	yes	yes
Scan (see individual **Profile/ Self-Test** & **User Library Builds Folder** scans below)					
• **View** (both result & spectrum)	yes	yes	yes	yes	yes
• **Rename**	yes	yes	yes	yes	yes
• **Delete**	yes	yes	yes	yes	**no**

Function	WebUI	Analyzer	End-Users		
			Admin	Manager	Operator
Profile Scan					
• **Temporary Edit Active Profile for Profile Scan to be Taken** (Laser Power, Scan Delay and Timeout)	**no**	yes	yes	yes	yes
• **Modify Values of Data Fields for Scan to be Taken**	**no**	yes	yes	yes	yes
• **Take Camera Image for Scan to be Taken** (Take, Retake, and Remove prior to Take/Initiate Scan)	**no**	yes	yes	yes	yes
• **Take/Initiate Profile Scan** (with active profile settings)	**no**	yes	yes	yes	yes
• **Select Active** (part of Take/Initiate Profile Scan workflow)	**no**	yes	yes	yes	yes
• **Change Tagging On or Off**	**no**	yes	yes	yes	**no**
Self-Test Scan					
• **Take/Initiate Self-Test Scan**	**no**	yes	yes	yes	yes
User Library Scan (scan as added to the (one) User Library Builds folder)					
• **Take/Initiate User Library Scan**	**no**	yes	yes	**no**	**no**
Profile					
• **View** (scan delay, scan timeout, laser power, tag list, name, libraries, and algorithm)	yes	yes	yes	yes	yes
• **Clone**	yes	yes	yes	yes	**no**
• **Delete** (only applies to user profiles)	yes	yes	yes	yes	**no**

Function	WebUI	Analyzer	End-Users		
			Admin	Manager	Operator
Profile (cont.)					
• **Edit** (scan delay, scan timeout, laser power, tag list, name, libraries, and algorithm, only applies to user profiles)	yes	yes	yes	yes	**no**
• **Select Active** (part of Take/Initiate Profile Scan workflow)	yes	yes	yes	yes	yes
Library					
• **Add Item to a User Library** (add a scan from the (one) user library builds folder to a user library (as a named chemical item)	yes	yes	yes	**no**	**no**
• **Delete Items from a User Library**	yes	yes	yes	**no**	**no**
• **Install Factory Library**	yes	yes	yes	yes	**no**
Software Installation					
• **Install**	yes	yes	yes	yes	**no**
Session					
• **Create**	yes	yes	yes	yes	yes
• **Rename**	yes	yes	yes	yes	yes
• **Delete**	yes	yes	yes	yes	**no**
• **Select Active** (part of Take/Initiate Profile Scan workflow)	yes	yes	yes	yes	yes

Function	WebUI	Analyzer	End-Users		
			Admin	Manager	Operator
Users					
• **Create** (username, password, role)	yes	yes	yes	**no**	**no**
• **View Details (of Other Users)** (username, password edit field, role)	yes	yes	yes	**no**	**no**
• **Edit Details (of Other Users)** (password edit field, role)	yes	yes	yes	**no**	**no**
• **Delete (Other Users)**	yes	yes	yes	**no**	**no**
• **Change Own Password** * Non end-users logged in can change any user password, including the user they chose when they logged in; the password they are changing is the user password.	yes	yes	yes	yes	yes
Network Shares					
• **View**	yes	yes	yes	yes	yes
• **Edit**	yes	yes	yes	**no**	**no**
Settings					
• **All Profiles Settings** (see WebUI Functionality > Settings > All Profiles above)					
– View	yes	yes	yes	yes	yes
– Edit	yes	yes	yes	yes	**no**
• **Date & Time**					
– View	yes	yes	yes	yes	yes
– Edit	yes	yes	yes	**no**	**no**

Function	WebUI	Analyzer	End-Users		
			Admin	Manager	Operator
Settings (cont.)					
• **Device Brightness**					
– View	**no**	yes	yes	yes	yes
– Edit	**no**	yes	yes	yes	yes
• **Tagging**					
– **View** (tagging on or off)	yes	yes	yes	yes	yes
– **Edit** (tagging globally on or off)	yes	yes	yes	yes	**no**
– **Delete** (all tags, opposed to tags in a profile)	yes	yes	yes	yes	**no**
• **Wi-Fi**					
– View	yes	yes	yes	yes	yes
– Edit	yes	yes	yes	yes	yes
– Create Connection	yes	yes	yes	yes	yes
– Edit Connection	yes	yes	yes	yes	yes
– Delete Connection	yes	yes	yes	**no**	**no**
• **Wi-Fi Certificates**					
– View	yes	**no**	yes	yes	yes
– Add	yes	**no**	yes	yes	yes
– Delete	yes	**no**	yes	**no**	**no**

Function	WebUI	Analyzer	End-Users		
			Admin	Manager	Operator
Settings (cont.)					
• GPS					
– View	yes	yes	yes	yes	yes
– Edit	yes	yes	yes	**no**	**no**

Add, edit, and delete users

Administrators can add new accounts, and edit or delete existing accounts from the **General > Edit Users** screen.

Note Administrators can edit their own password, but cannot change their role.

Operators and Managers can view only their own accounts, and edit only their own passwords. This is done from the **General > Edit Users** screen.

Add a new user

❖ **To add a new user account**

1. From the Home screen go to **General > Edit Users**.
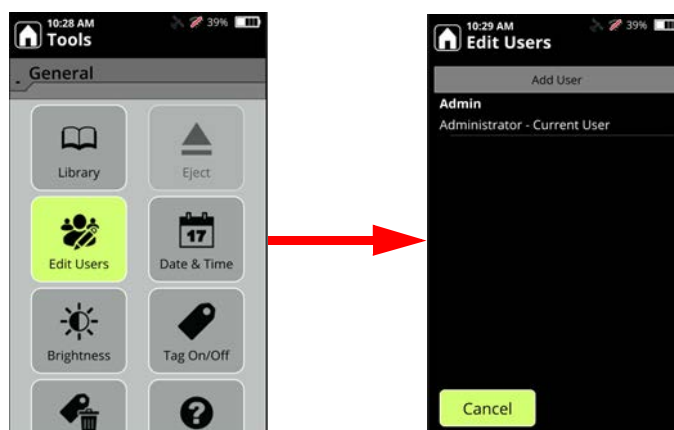
2. Select **Add User**.

3. Enter a **User Name** based on the following restrictions:

    - 1 to 32 characters

    - Case insensitive

    - Allowed special characters include , . - = ! @ # $ % ^ & * ( ) _ + < > : ; / ? [ ] { } \ | ' " ` ~

    - Spaces are allowed but leading and trailing spaces are trimmed

4. Enter a **Password** based on the following restrictions:

    - 4 to 32 characters

    - Case sensitive

    - Allowed special characters include , . - = ! @ # $ % ^ & * ( ) _ + < > : ; / ? [ ] { } \ | ' " ` ~

    - Spaces are allowed

5. Select a **Role;** choose Administrator, Manager, or Operator.

6. Save your changes.

Edit or delete a user account

❖ **To edit or delete a user account**

1. From the Home screen go to **Admin > Edit Users**.

2. Select a user account, and then select **Edit** to change the Password, the Role, or select **Delete** to delete the user. You cannot edit the User Name.

3. Save your changes.

Using the Library

Contents

-
-
-
-

The library contains detailed information about all the chemicals that your analyzer can identify. To help you locate items, the library is organized alphabetically.
Note Libraries are filtered by options selected in the active profile. For information about profiles, see Profile Settings on page 89.

You can choose to view either All items or the items in a single Category, or filter the list by a user provided search. You can also click on a letter on the left of the list to quickly find the items you are interested in by viewing all the items that start with that letter.
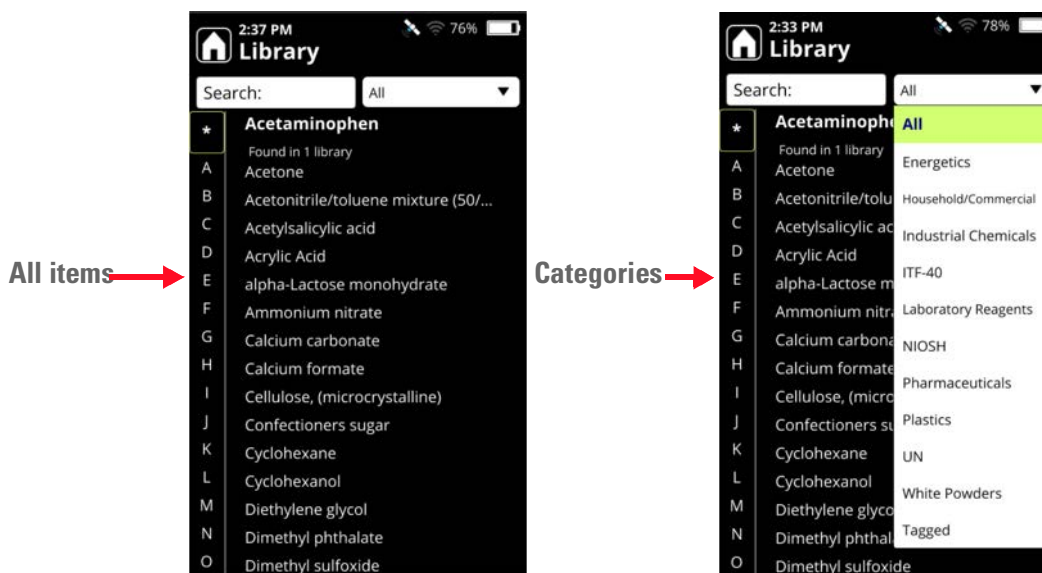
❖   **To view a category**

1. In the **General** Settings menu, select **Library**.
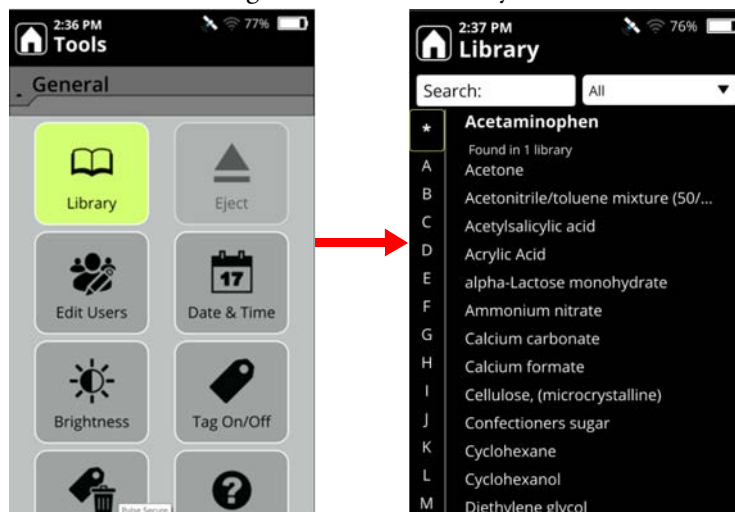
2. Select the drop down list showing "All".

3. Make a selection from the categories listed, then select **OK**.

Search for library items

You can search for items by any part of their name. For example, "ace" finds anything that contains that sequence of letters (such as "acetone" or "acetaminophen" and any other items containing "ace"). You can also search by CAS number.

❖   **To search for library items:**

1. In the library, select **Search**.
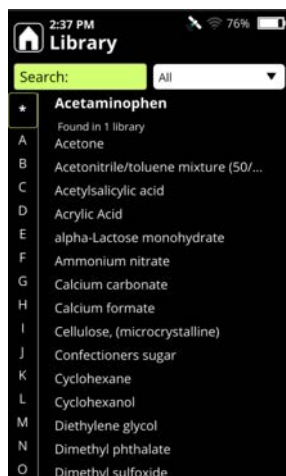
2. Enter a search term and press the Enter key.

3. Select a search result, press the Enter key, and select **View Info**.

You can also view library information in the WebUI (see View and install libraries on page 54) and from the Home screen, select **Admin** > **User Library** > **Manage**.

Export and import user library items

Use a USB flash drive to transfer user-added library items between analyzers.

Note On the USB flash drive, during export, a folder called **UserAddedLib** is created on the flash drive if it does not already exist.

❖ **To export a single user library item:**

1. Insert a USB flash drive into the analyzer (see Use the USB flash drive on page 28). From the Home screen, select **Admin** > **User Library > Manage**.

2. Select an item in the user library.

3. Select Export Item, and export the item to the UserAddedLib folder on the USB flash drive.

❖ **To export all items in a user library:**

1. Insert a USB flash drive into the analyzer (see Use the USB flash drive on page 28). From the Home screen, select **Admin** > **User Library > Manage**.

2. Select **Manage** > **All Items**.

3. Select **Export All Items** and press the Enter key. An export confirmation message displays.

❖ **To import user library items:**

1. Insert a USB flash drive into the analyzer (see Use the USB flash drive on page 28). From the Home screen, select **Admin** > **User Library > Manage**.

2. Select **All Items**, and then select **Import Items** and press the Enter key. The analyzer loads all the library items that are on the USB flash drive.

Add user library items

Adding a custom library item involves performing a library scan. A library scan is collected just like an analysis scan, but it takes more time to complete because it collects more data for use in the library.

The words Low, Medium and High below the green scan progress bar indicates the quality level that the scan has reached at a given point in time.

For the highest quality data, let the scan run until it completes or the green bar reaches the end of the progress bar. If a scan is taking a very long time to run, you may press **Accept** or the Enter key to halt the scan at a lower level of scan quality.

❖ **To add scan data to the user library:**

1. Place a vial containing the sample substance into the vial holder. Vial scans yield the best results.

2. From the Home screen, select **Admin**, and then **User Library**.

3. Select **Acquire**, and then **Scan**.

4. Either allow the scan to complete or press the Enter key when the progress bar reaches the desired quality level. A summary of scan data appears on the screen.

5. Select **Add to Library**, and then use the touchscreen to name the new item.

You can also add spectra from scans that have been run previously.

❖ **To add spectra from scans to libraries:**

1. From the Home screen, go to Admin > User Library, and select Spectra.
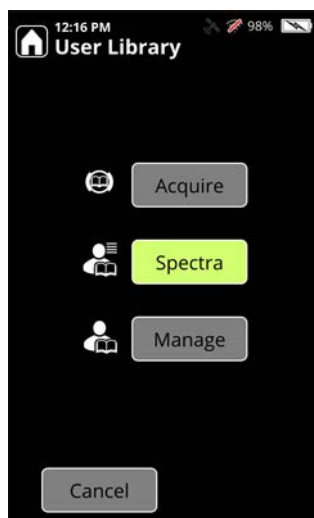
2. Select a scan result and then select **Add to Library**.
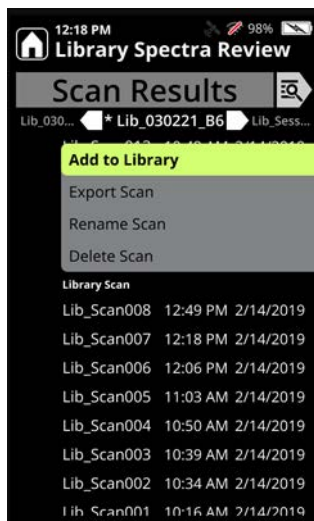
Delete user library items

This procedure shows how to delete items from user libraries.

1. From the Home screen, select **Admin** > **User Library**.

2. Select **Manage** > **All Items**.

3. Select the items to delete, and then select **Delete Item** and then press the Enter key. To delete all the items, select **Delete All Items** and press the Enter key.

4. In the confirmation screen, select **Delete**.

Profile Settings

Contents

Overview

When you take scans with the 1064Defender analyzer, you always work within a *profile*. A profile is a collection of configurable scan parameters that lets you customize your scans.

There are three factory libraries that come with 1064Defender:
- TF_Functional
- TF_Narcotics
- TF_HazMat

Each of these libraries comes with a factory-default user profile with the same name. Factory-default profiles are not editable. However, you can create customized user profiles by cloning a factory-default profile and editing the cloned version. You can then clone any factory or user profile and edit it to create as many user profiles as you need.

You can set up different profiles based on the type of analysis you perform, as well as priorities such as laser power, libraries, or different alert lists.

The analysis types provided with 1064Defender are:
- ID mode
- Screener mode

ID mode analyzes all chemicals present and provides a list of all the chemicals that are found. You can tag items in libraries to ensure that those items are included in the analysis.

Screener mode prioritizes what is found and reported by alert level. The alert levels are:

Table 13. Screener Alert Levels

Alert Level	Icon
Alarm	Red bell:
Warning	Yellow triangle:
Clear	Green shield:
Inconclusive	Gray question mark:

For example, if you have a mixture of cellulose and fentanyl, with cellulose labeled with an alert level of Clear and fentanyl labeled with an alert level of Alarm, the analyzer would only report the fentanyl and not the cellulose when both are detected in the mixture. The alert level of chemicals can be modified.

Each factory profile has a default analysis type as described in the following table.

Table 14. Default Profiles and Analysis Types

Factory Profile	Default Analysis Type
TF_Functional	ID
TF_Narcotics	Screener
TF_HazMat	ID

Profile settings

The following settings are part of the default factory profiles. When you clone a factory profile, you can edit the following parameters in the cloned version:
- Raman settings (Scan Delay, Timeout, Laser Power)
- Analysis Type and Libraries
- Tag List (for ID analysis only)
- Alert List (for Screener analysis only)

Note The Alert list is required for Screener analysis. However, the Tag list is optional for ID analysis.

You can edit settings in user profiles. However, you cannot edit settings in factory profiles.

Values that you define for profiles remain set for all scans using the profile. If you edit these values on the Scan page, those edits will apply to individual scans, but they will not change the values that were defined in user profiles.

❖ **To define profile settings:**

1. From the Home screen, click the Profiles icon (highlighted in the following image).

2. The Profiles section of the Tools screen is displayed. The images below show user profiles using ID and Screener analysis types. The following sections explain how to define the settings shown here.
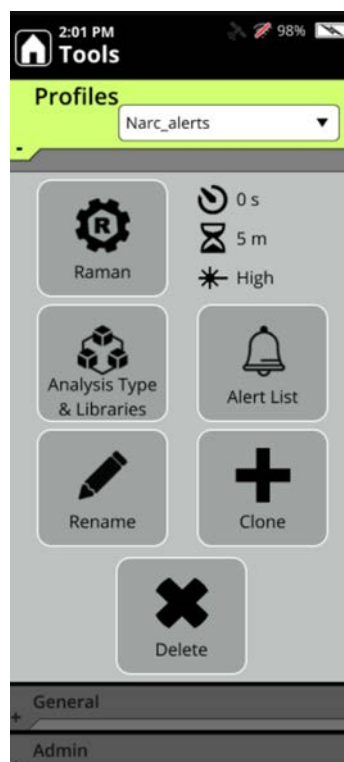
Raman settings

The following figure shows the Raman Settings of Scan Delay, Timeout, and Laser Power.

The following table describes the Raman settings that you can edit in a user profile.

Table 15. Raman Settings

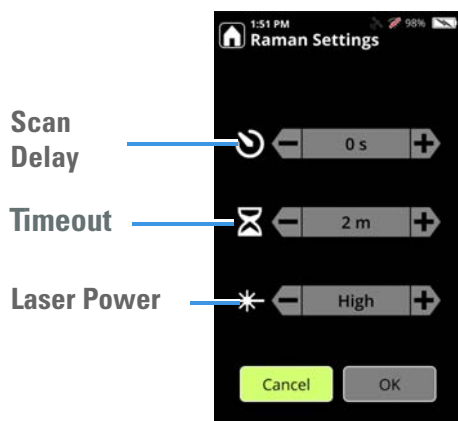| Setting	Values	How it Works	How to Set Up
Scan Delay	0 to 120 **seconds** Increments of 15 seconds.	Scan delay causes the analyzer to display a count-down screen before it begins a scan. Use this setting to ensure that you can conduct scans from a safe distance.	In the Raman Settings screen, in the Scan Delay row, click the + (plus) and - (minus) keys to set the number of seconds that scans are delayed before they begin.
Timeout	1, 2, 3, 5, 10 and 20 minutes.	Timeout limits how long the analyzer tries to attain an acceptable scan result before stopping the scan. Use this setting to control the maximum duration of a scan. When the scan delay and timeout periods end, you can safely return to the analyzer.	In the Raman Settings screen, in the Timeout row, click the + (plus) and - (minus) keys to set the number of minutes that scans can run before they time out.
Laser Power	Low, Medium, and High.	Laser power is expressed in percentage of the Max power of 480 mW. The values are: **Low**, **Medium**, **High**.Use this setting to reduce possible heat generation in or near the sample.	In the Raman Settings screen, in the Laser Power row, click the + (plus) and - (minus) keys to set the maximum laser power to Low, Medium, or High.

Analysis type and libraries

Select a profile on the Profiles page and click Analysis Type & Libraries to display the analysis type for the profile and a list of libraries to use for analysis.
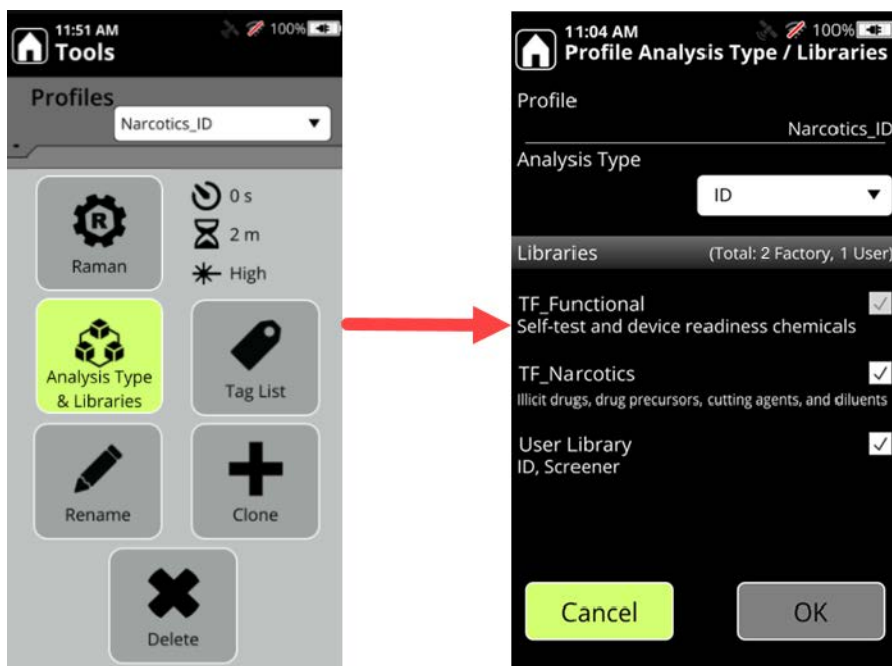
Use the Screener analysis type to determine whether a substance of interest is present.

Use the ID analysis type to determine the substances that are present in a sample.

Tag list

The tag list applies only to profiles using the ID analysis type. You can ensure the inclusion of specific chemicals in the analysis by tagging them.
Note The number of tags you can add to a profile is limited to 100.

❖ **To tag items for profiles:**

1. Select **Tag List** from the Profiles screen.

2. Select **Add Tags** in the tag list.

3. Select an item from the Library.

4. Select **Tag Item**.

The following images show the results of selecting the highlighted items described in these steps.
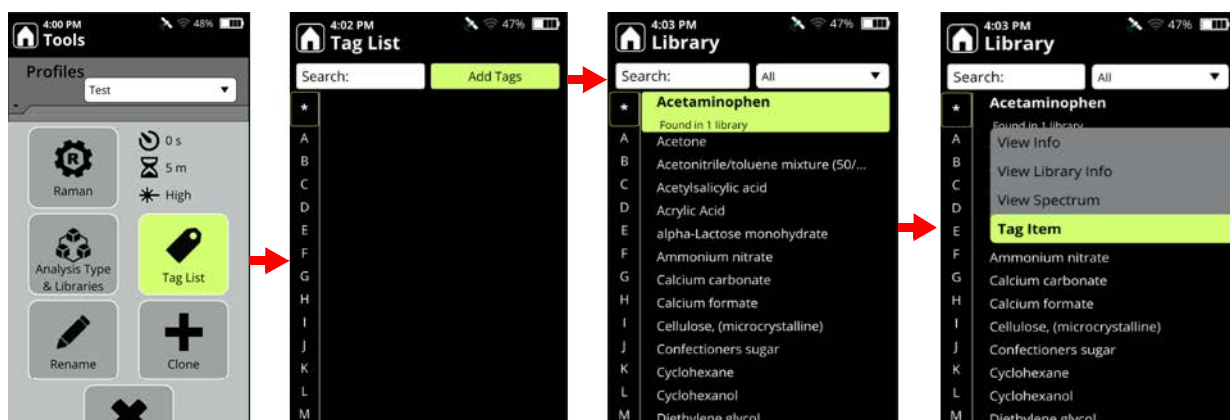
The item that you added is now displayed in the tag list as shown here.

For more information, see Tagging on page 105.

Alert list

The Alert List applies only to profiles using the Screener analysis type. You can assign the following types of alerts to items in libraries.

- Alarm
- Warning
- Clear

If a substance is not clearly identified, it will be displayed as "Inconclusive" in the analysis results.

The Alert List displays a list of items that are labeled with one of these levels of severity.

Note If an item is not included in the alert list, it will not be included in the analysis..
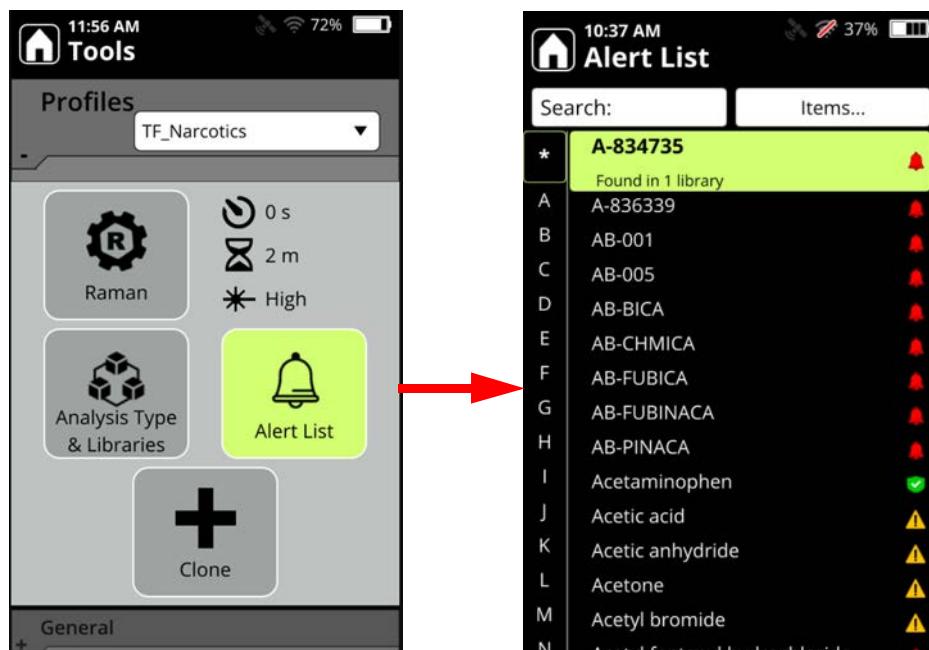
For more information about alerts, see Alert Configuration on page 111.

Create and edit user profiles

The only way to create a new user profile is to clone an existing profile and then edit the copy.

❖ **To clone a profile:**

1. From the Home page, select the Profiles icon.

The Profiles page is displayed.
The following image shows the factory profile TF_Narcotics.

2. Select the **Clone** (plus sign) icon. and in the Clone Active Profile page, enter a name for the profile and click **OK**. In the following image, the cloned version is named "NarcLocal".

Note Using "TF_" as a prefix for a profile name is prohibited.
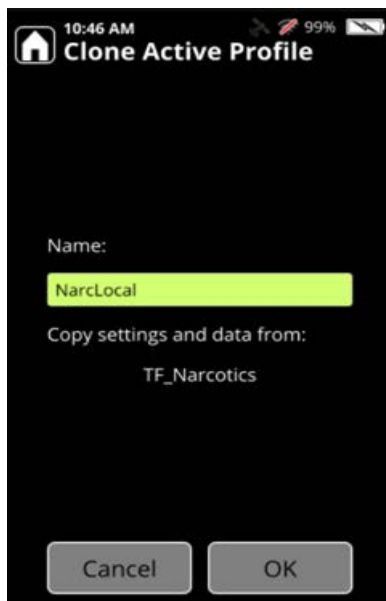
The profile name must be unique on the analyzer.

3. After you click OK, the new user profile is created.

❖ **To edit, rename, or delete a user profile:**

Note You *cannot* edit a factory profile.

1. From the Home page, select the Profiles icon.

The Profiles section of the Tools screen is displayed.

2. Select a user profile. The options vary depending on the profile analysis type. For profiles using the ID analysis type, the options are displayed as shown in the following image:

Define Raman Settings — Raman Settings

Define analysis type and select libraries — Mark items in libraries to be included in analysis.

Rename profile — Clone profile

Delete profile
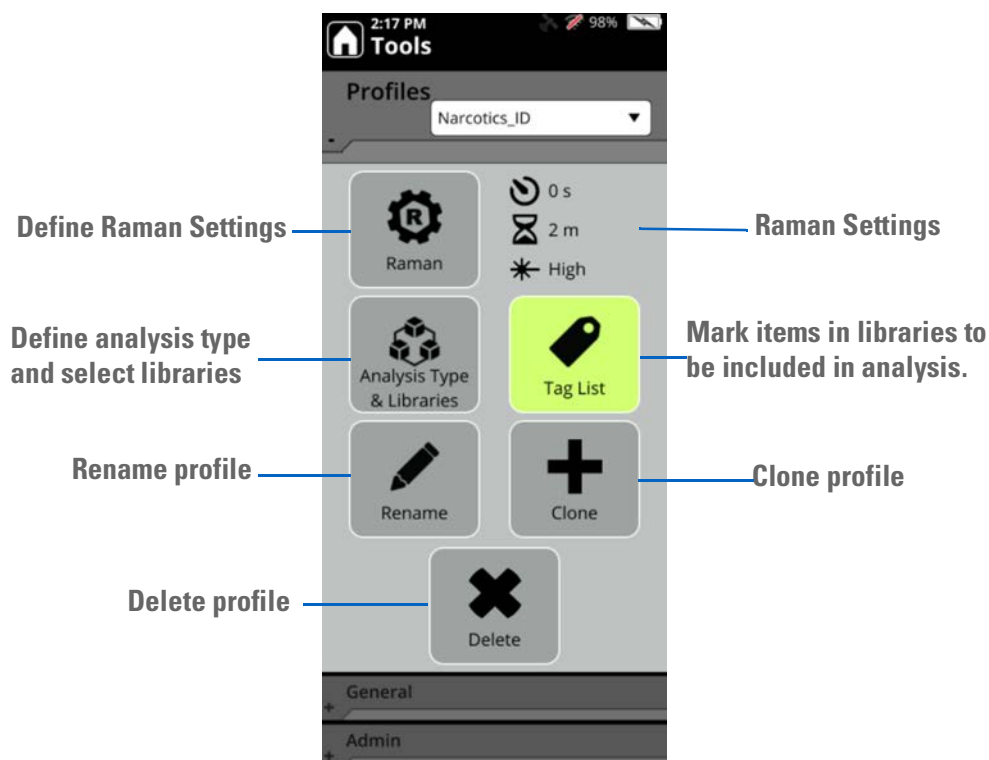
For profiles using the Screener analysis type, the options are the same except that the Alert List icon replaces the Tag List icon:

Alert List icon
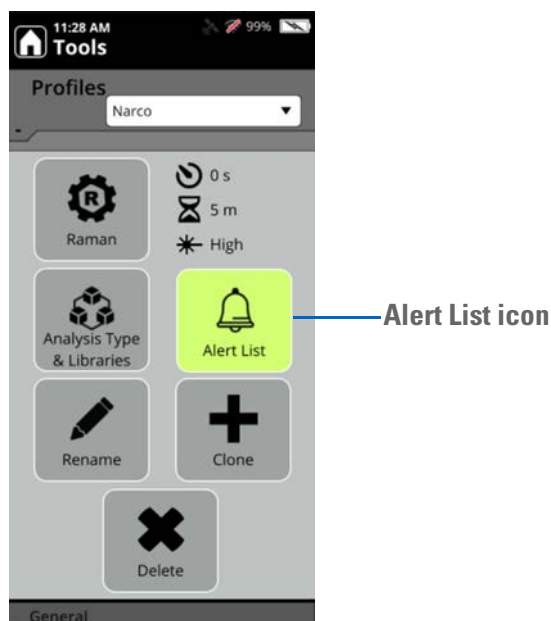
Note Only users with appropriate role permissions can edit profiles.

You can copy a user profile or a factory profile; either creates a new user profile. User profiles can be edited, factory profiles cannot be edited.

Select profiles for scans

You can select a profile to use for scanning directly from the scan page.

1. From the Home page, select the Scan icon.

2. The Scan page is displayed. Select the down arrow next to the profile to see a list of profiles to select from.

3. Press **Scan**. The profile that you selected is used in the scan.

Import and export user profiles

This section describes how to import and export user profiles using the 1064Defender analyzer.
Note Only users with appropriate role permissions can import and export profiles.

You can only import or export user profiles from the analyzer to the USB flash drive (see Use the USB flash drive on page 28). You cannot import or export user profiles by using the network share of the analyzer.

Import user profiles

User profiles can only be imported from a USB flash drive. You can only import one profile at a time. A profile can be imported in one of the two ways:
- Import the profile as a new profile. If the name of the imported profile conflicts with an existing one, a unique name is generated by appending a number to the name. For example, if the conflicting name is **myProfile**, the new name will be **myProfile_1**.
- Import the profile to overwrite an existing one. In this case, the imported profile replaces the existing one. If the names are different, the name of the existing profile is used.

❖ **To import user profiles using the 1064Defender analyzer:**
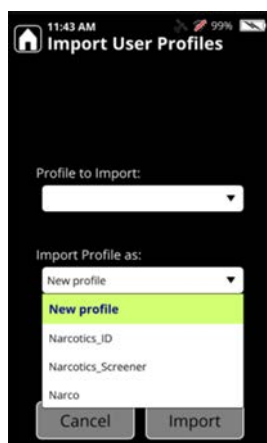
1. From the Admin section of the Tools screen, click **Import**.

The profile files that are available on the USB flash drive are displayed in the drop-down list in the Import User Profiles page:
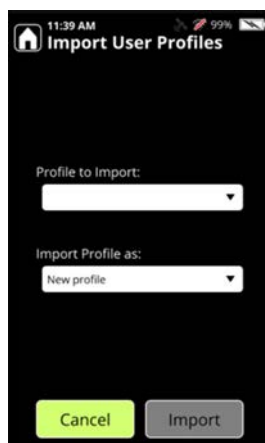

2. In **Profiles to import**, select the profile. In **Import profile as**, the list of the existing profiles on the analyzer are displayed, with an additional option for **New profile**.

a. To create a new profile based on the imported one, select **New profile**.

b. To replace an existing profile with the one you are importing, select the existing profile.

Note The default option is **New profile**.

3. If the profile is successfully imported, a message is displayed that says the profile was imported successfully, and the list of the existing profiles on the analyzer is updated with the newly imported profile.

4. You can verify that the profile was successfully imported by going to the Profiles section of the Tools page. In this example, the newly imported profile is MyScreener_1:
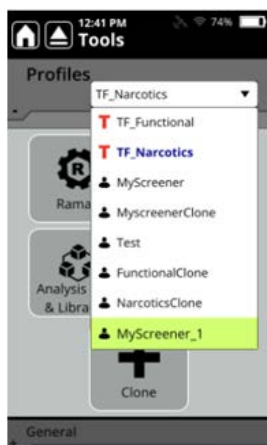
A report file is created on the USB flash drive named **importProfileReport.txt**. The progress and issues (if any) of the import action are sent to this file.

If there are any issues during the import that caused the import to fail, a message is displayed with either a description of the exact failure or a generic message that directs you to the report file to get more information.

Export user profiles

You can export user profiles to a USB flash drive.

When a profile is exported all its content is exported including:
- Name
- Analysis type
- Library configuration
- Scan configuration (for example, delay, timeout, laser power)
- Tag list
- Alert list
- Associated library files for the user items included in the Alert or Tag lists

Each profile is exported to a folder created on root on the USB flash drive. The folder name is created with the following format: **DeviceSerialNumber_profileName_lpf** , for example: **RD9999_MyScreener_134_lpf.** Multiple exports of the same profile will be included in the folder with a different **ttt** value.

Note Factory profiles cannot be exported.

❖ **To export user profiles using the 1064Defender analyzer:**
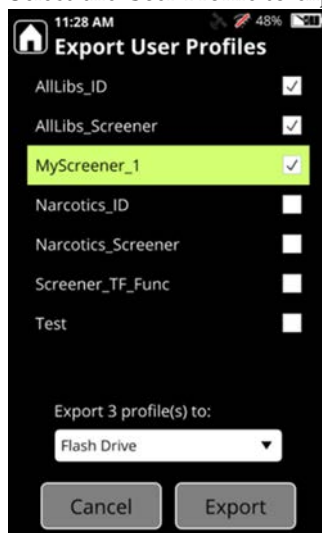
1. From the **Admin Tools** menu, click **Export**.
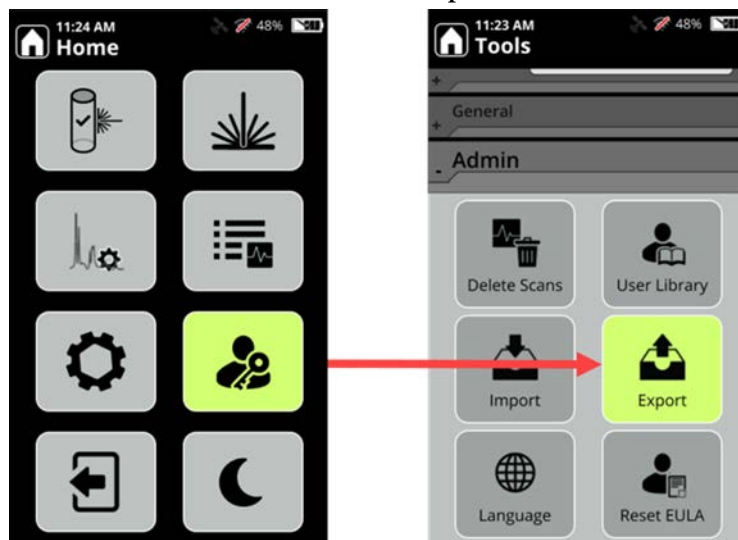
The Export User Profiles screen is displayed.

2. Select the User Profile to export and click **Export**.

You can export more than one user profile at a time by selecting all the desired profiles and clicking **Export**.

After the export completes, a folder for each profile is created on the USB flash drive.

Tagging

Contents

Overview

The tagging feature is designed for users who wish to prioritize the identification of specific chemicals, and *only* applies when the Analysis type of an active profile is ID. For example, you may suspect that certain chemicals pose an imminent chemical threat. The Tagging feature enables users to "tag" these chemicals for more sensitive analysis.

The Tagging feature provides these benefits:

- Capability of detecting lower concentrations of chemicals.

- Real-time customization for each user.

- Priority for tagged items in a mixture so they appear at the top of the result list.

Tag icons ✎ clearly indicate tagged items.

Note In the following procedures, there are steps where you select an item to display a context menu. If the menu does not display after you select the item, press the Enter key to launch the menu.

How tagging can be used

Tagging can improve detection capabilities. For example:

- First responders at airports can tag explosives, precursor chemicals, or other prohibited materials.

- Narcotics officers can tag clandestine lab chemicals and narcotics when taking an analyzer to a crime scene.

- Soldiers can tag chemical warfare agents and military-grade explosives and precursors, before taking an analyzer down range.

Turn tagging on or off

Before you begin working with the Tagging feature, make sure that Tagging is turned "On". If you scan with Tagging off:

- The Tagging feature is not used in data analysis.

- All Tag Icons in the Library and the tagged category in the list of filters remain visible.

❖ **To turn tagging on/off**

1. From the Home screen select **General**.

2. In General settings, select the **Tag On/Off** button.

3. Change the setting as needed for your work environment.

You can also turn tagging on or off from the Raman Scan screen, as shown below.

❖ **To change tagging from the scan page**

1. Navigate to the Raman Scan screen.

2. Select the Tag icon (outlined below) to toggle Tagging on or off.

Tagging
on

Tagging
off
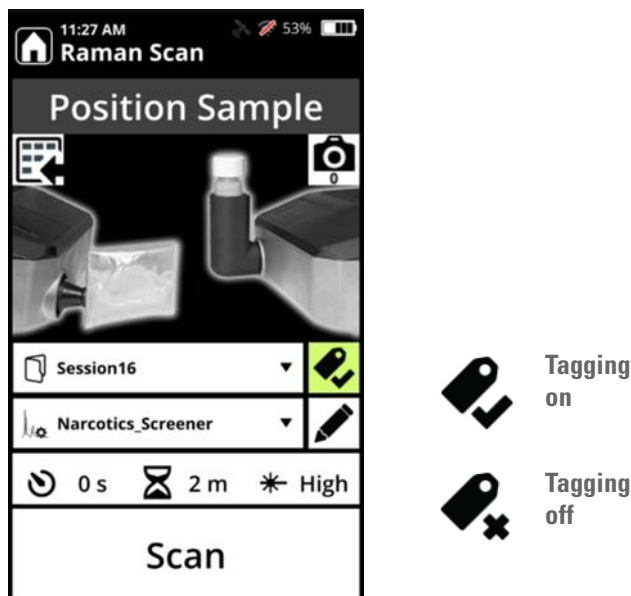
Create a tag list

A tag list of tagged items is associated with a profile. Tag lists can include up to 100 items, and the same item can appear in tag lists in multiple profiles.

You can export or import a profile, and the profile's tag and alert lists are part of the profile. See . Or you can add single items to a Tag List, as shown below.

❖ **To add single items to a tag list**

1. From the Home screen, select **Profiles.**

2. From the Profiles menu, select **Tag List**. The Tag List button is present only when the profile is configured for Analysis Type: ID.

   If the profile contains tagged items they are shown.

3. Select **Add Tags**.

4. Select a category (for example, **Pharmaceuticals**) or select **All** to view the entire library.

5. Use the keypad to move up and down the list, or select **Search** and use the keyboard to enter search text or the CAS number. This works best when searching the entire library.

6. Select the specific library item. Press enter to open the submenu and then select **Tag Item**.
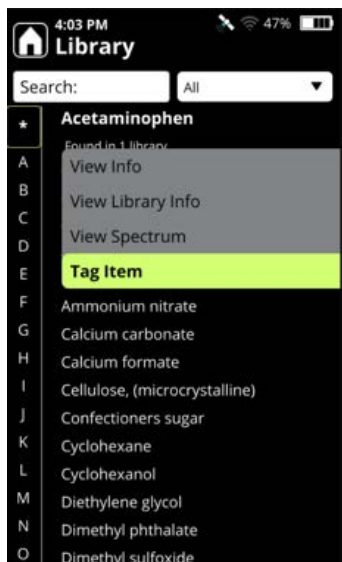
7. The Library screen displays a Tag Icon [icon] next to the item.

8. Repeat for each additional library item that you want to add to the Tag List.

View tag lists

You only see the tag list for the profile you are currently using.

❖ **To view tag lists**

1. From the Home screen, select **Profiles**.

2. From the profiles menu, select **Tag List**.

3. All the items shown have the tag icons [icon] next to them.

Remove tags

You can remove tags one-by-one or delete entire tag lists.

❖ **To remove tags one-by-one**

1. From the Home screen, select **Profiles**.

2. From the profiles menu, select **Tag List**.

3. Select the specific tagged item then select **Remove Tag**.

❖ **To delete all tags from a profile**

1. From the Home screen, select **General**.

2. From the General menu, select **Delete Tags**.

3. Select **Current Profile** or **All Profiles**. **All Profiles** means user-created profiles (factory profile tag lists will not be affected).

Transfer tag lists

To transfer a tag list you *must* transfer the profile it belongs to. You cannot transfer *just* a tag list. There are three ways to transfer profiles (and their tag lists), described below.

*   **Clone** - Works within the same analyzer. You can clone the active profile into a user profile. For instructions, see Create and edit user profiles on page 95.

*   **Import** - Uses a USB flash drive to work between multiple analyzers. For instructions, see Import and export user profiles on page 100.

*   **Export** - Uses a USB flash drive to work between multiple analyzers. You can only export User Profiles. For instructions, see Import and export user profiles on page 100.

Scan with tagging off

If you turn Tagging off when you have a Tag List, the following occurs:

*   The Tagging feature is not used in data analysis.

*   All Tag icons in the library remain visible.

*   When you perform a scan, a Tagging off icon appears in the Raman Scan page.

 Tagging off

Alert Configuration

Contents

Overview

The Alert feature is designed for users who wish to prioritize specific substances of interest, and *only* applies when the Analysis Type of an active profile is Screener. For example, you may want to screen for specific narcotics, such as fentanyl or cocaine. The Alert feature enables users to set different alert levels for what is being screened. Based on this, the scan result shows the alert level if an item in the configuration is detected. Alert items are displayed in order of importance. For example, if an item labeled as "Alarm" and an item labeled as "Clear" are identified, only the item labeled "Alarm" will be displayed.

The alert levels are displayed differently on the analyzer and in the WebUI.

The following table shows how the alert levels are displayed in both places, in order of priority.

Table 16. Alert Levels

Alert Level	Analyzer Icon	WebUI Icon
Alarm	Red bell:	Red bell:
Warning	Yellow triangle:	Yellow bell:
Clear	Green shield:	Green bell:
Inconclusive	Gray question mark:	Gray bell:

Note Results can be labeled as Inconclusive when no alert items are found.

Create alert lists

The factory default TF_Narcotics profile has alert levels preset for each item in the default TF_Narcotics library. You cannot modify the default TF_Narcotics library. To modify alert levels for components of the TF_Narcotics library or to create your own alert list, you must clone the TF_Narcotics profile and then add or modify alert items. To clone the TF_Narcotics profile, follow the instructions described in

Note When you clone the default TF_Narcotics profile, the entire Alert configuration list for that library is copied into the cloned version. Also, you can clone a profile that was created as a clone.

After you clone the TF_Narcotics profile, you can rename the cloned profile and edit alerts in the following ways:

- Change alert levels for existing alert list items
- Add items to the alert list and assign alert levels to the new items
- Remove items from the alert list

Note In the following procedures, there are steps where you select an item to display a context menu. If the menu does not display after you select the item, press the Enter key to launch the menu.

Change alert levels

You can change alert levels for existing items in alert lists in user-created profiles.

1. From the Home screen, select **Profiles.**

2. From the Profiles menu, select a profile with the Screener Analysis Type. The Profiles page contains the Alert List icon.
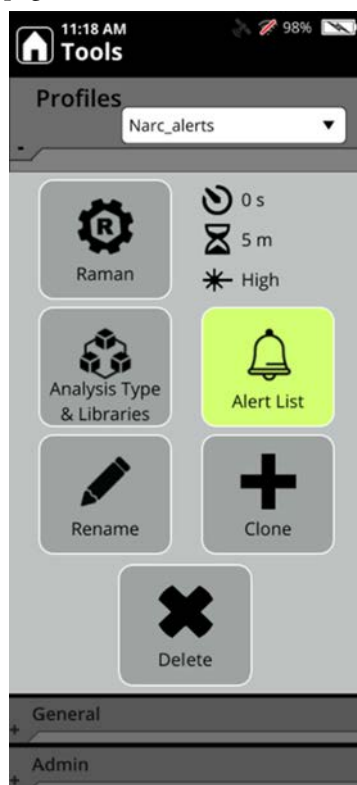
3. Tap the Alert List icon. The Alert List is displayed.
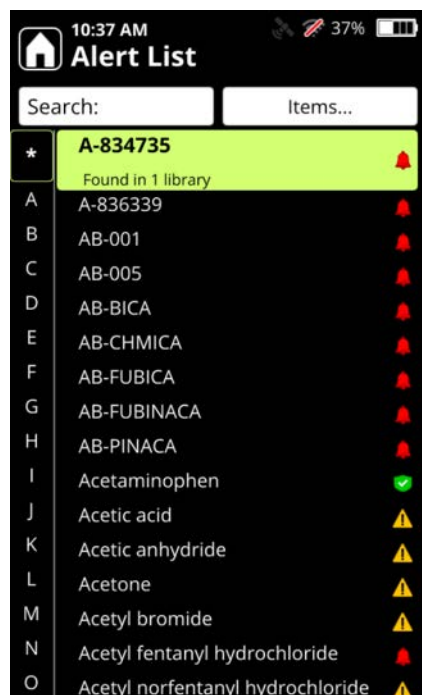
4. Select an item from the list to display a menu of options. In the following example, because the A-834735 item is configured with an Alarm alert level, the available alert level options are Warning and Clear. You can also remove the alert from an item, as described in Remove items from alert lists on page 117.

5. When you select the new alert level, a confirmation screen is displayed.

6. Press **OK**. The item is displayed in the Alert List with the new alert level.
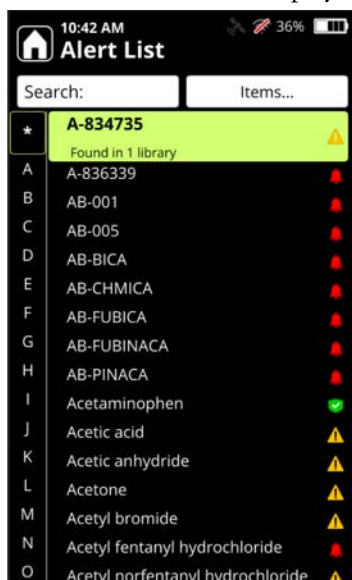
Add items to alert lists

You can add alerts to items in the profile's configured library or libraries from the Alert List screen.

1. From the Home screen, select **Profiles.**

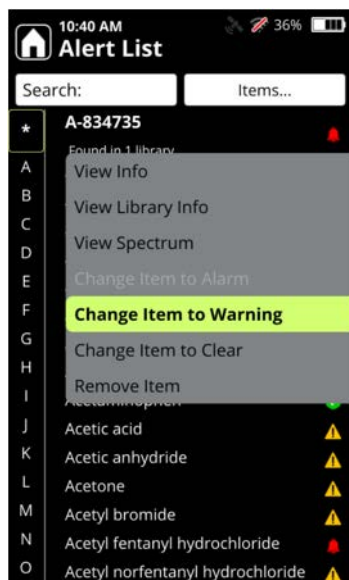2. From the Profiles menu, select a profile with the Screener Analysis Type. The Profiles page will contain the Alert List icon. When you tap Alert List, the list is displayed.
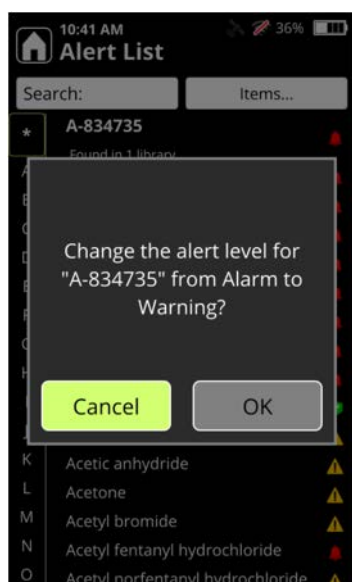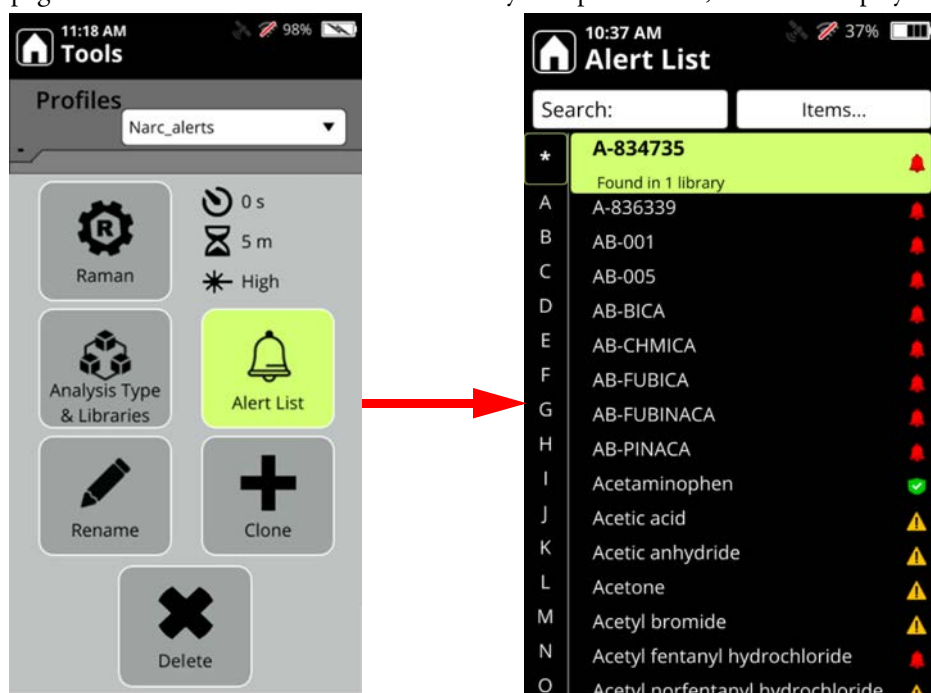
3. Tap the **Items** drop-down list and select **Add Items**.
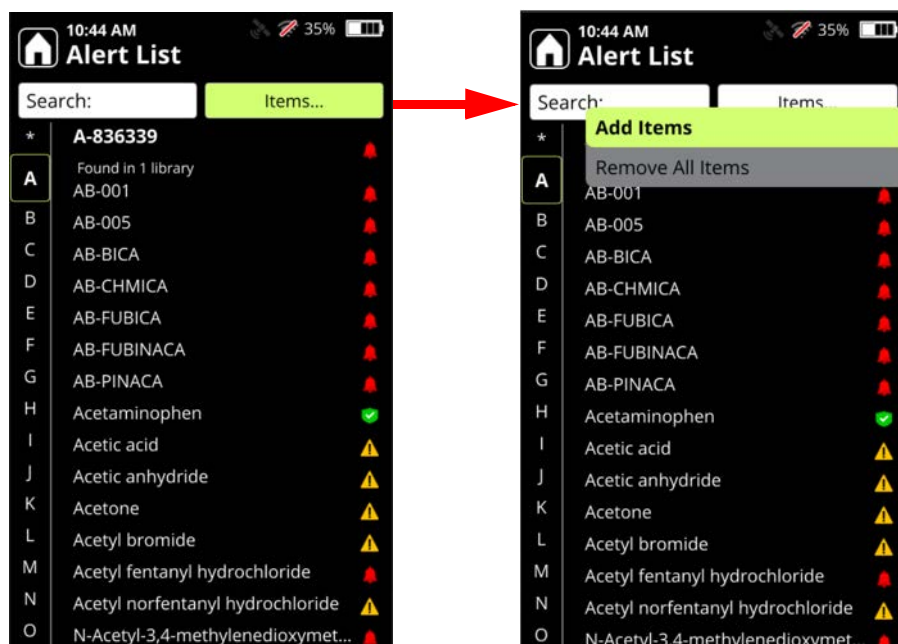
4. The Add Library Item screen is displayed.

   Note The Add library item screen only displays those items that are not already included in the alert list. When an item is added to the alert list, it no longer displays on the Add Library Item page.

   Select an item to add to the Alert list. When you select an item, a menu is displayed with options to assign alert levels to the item, as well as options to view more details about the item.
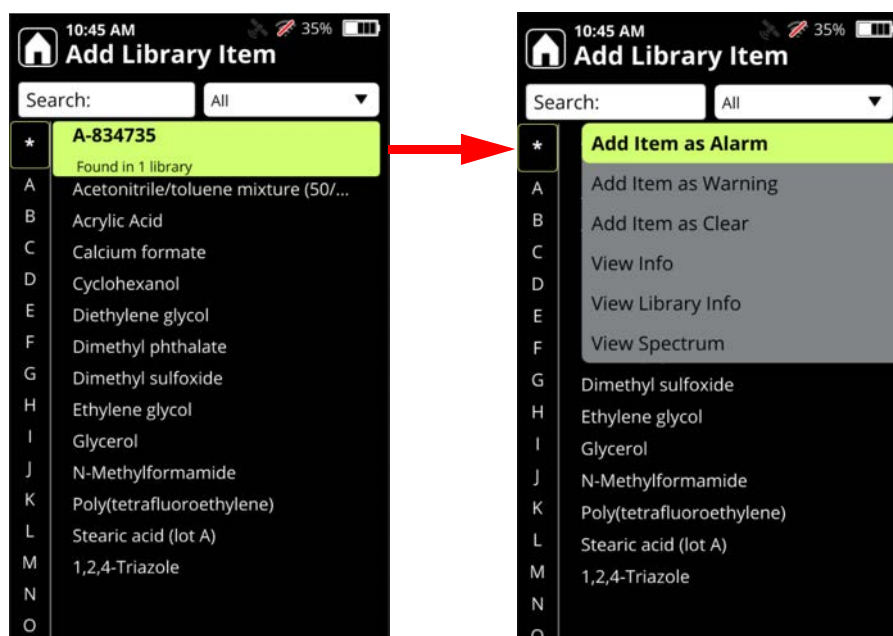
5. Select the appropriate alert level. The item is removed from this list and added to the Alert list with the alert level that you assigned.

6. After you have added all the items to the alert list, press the X button to display the updated Alert List.

Remove items from alert lists

You can remove items from alert lists one at a time, or all items except for persistent items. Persistent items cannot be removed because they identify common substances that are pre-configured as Clear, for example, container types and the Self Test materials that are provided with the 1064Defender Analyzer.

The following image shows the list of the persistent alerts (assigned with the alert level of Clear):
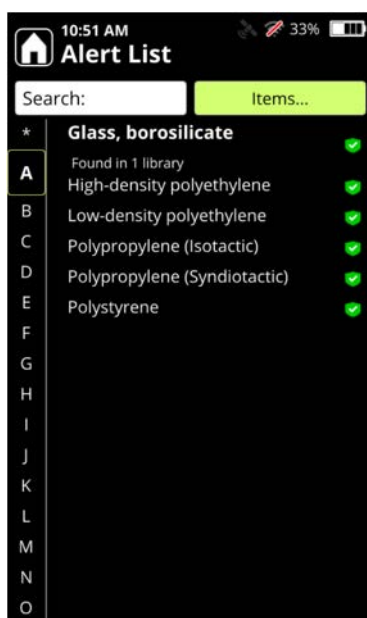
❖ **To remove an item from the Alert list:**

1. From the Home screen, select **Profiles.**

2. From the Profiles menu, select a profile with the Screener Analysis Type. The Profiles page will contain the Alert List icon. When you tap Alert List, the list is displayed.
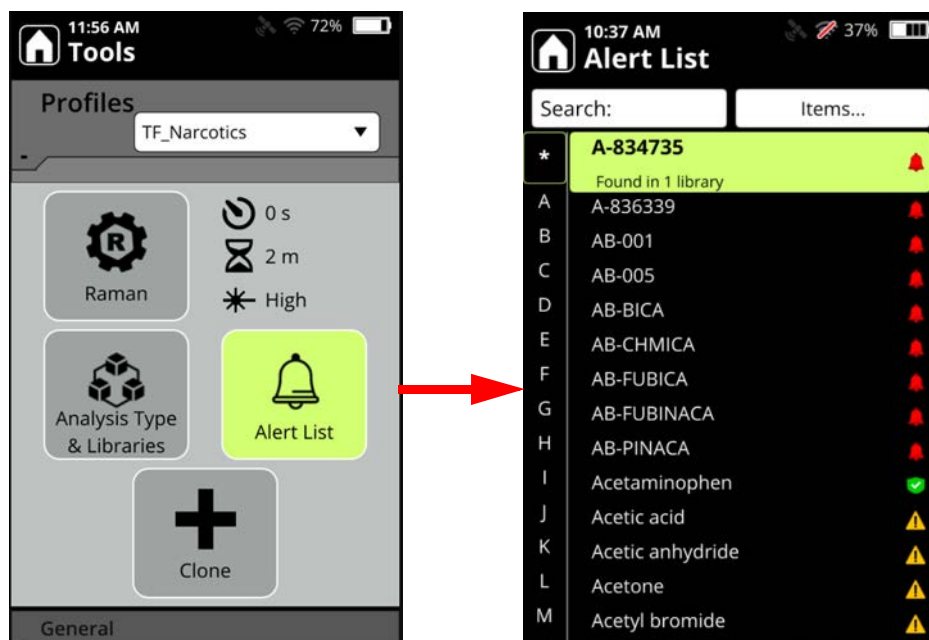

3. Select the item to remove. The following options are displayed.
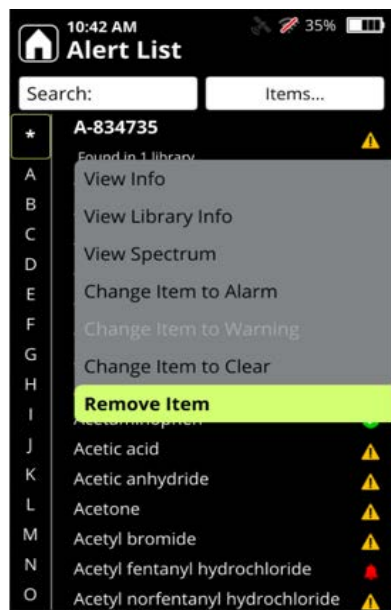
4. Select **Remove Item** to remove the item from the list.

❖ **To remove all except persistent items from the Alert list:**

1. From the Home screen, select **Profiles.**

2. From the Profiles menu, select a profile with the Screener Analysis Type. The Profiles page will contain the Alert List icon. When you tap Alert List, the list is displayed.
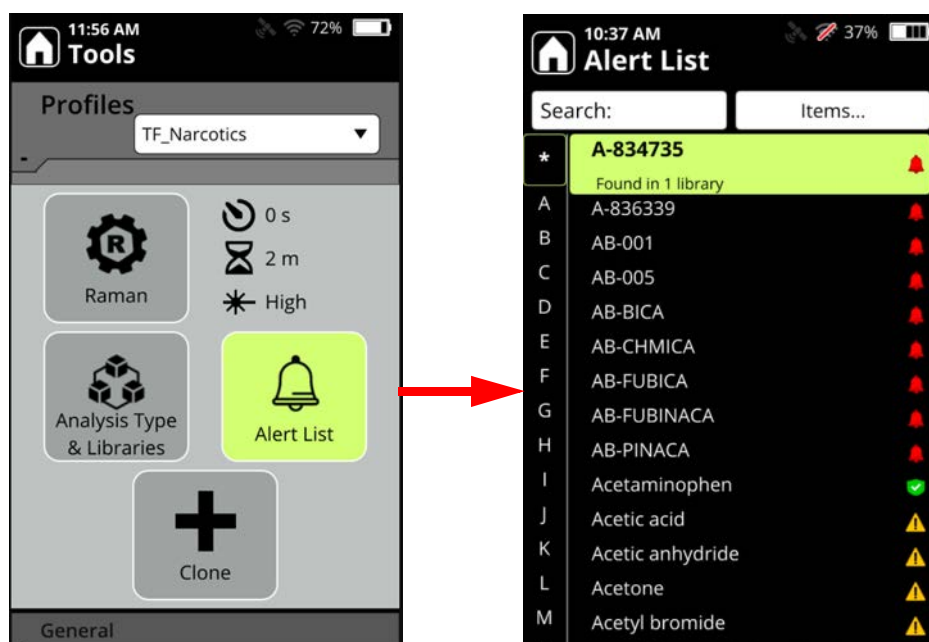
3. Select **Items > Remove All Items**.
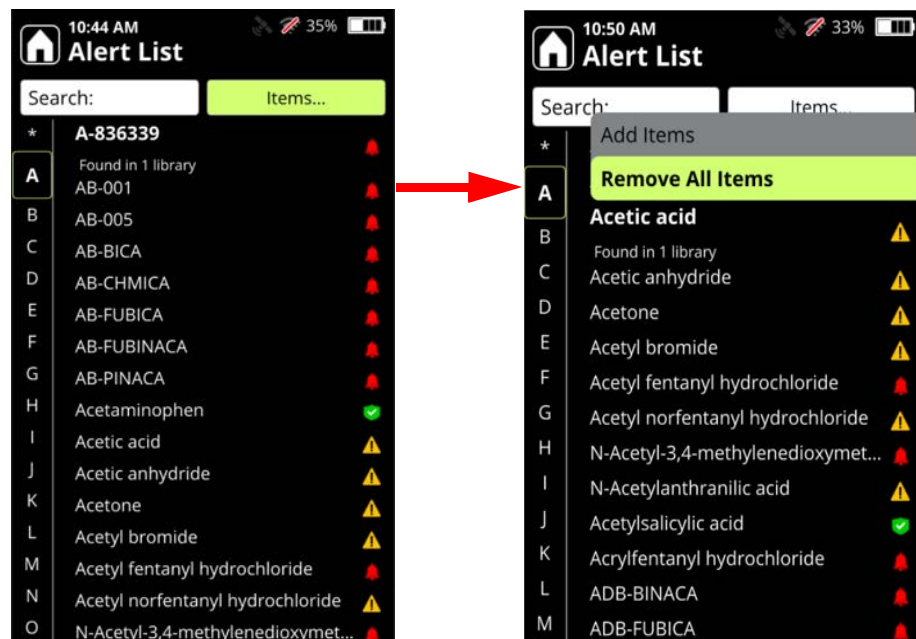
4. All items are removed from the Alert list except the persistent items.
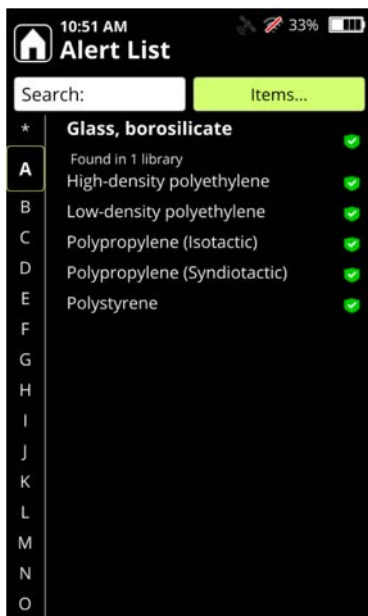
Raman Scanning

Contents

Follow safe scanning practices

⚠ **CAUTION:** Do not use the analyzer if you have not received training on safe use of the product. The analyzer uses a Class 3B laser for Raman scanning. Failure to follow recommended safety procedures can cause damage to the eyes, hazard of fire, or hazard of detonation or explosion.

⚠ **CAUTION:** Refer to the safety section of this user guide for detailed information regarding product safety. See "Safety" on page 9.

Performing an analyzer Self Test

It is highly recommended that a Self Test is performed at least daily to verify that the analyzer is operating properly. The Self Test will require the use of the standard polystyrene rod (included) and vial holder accessory.

1. Locate the vial holder accessory in the 1064Defender carrying case, and carefully place the slotted opening over the laser exit aperture. Rotate the vial holder so that the large opening is vertically oriented.
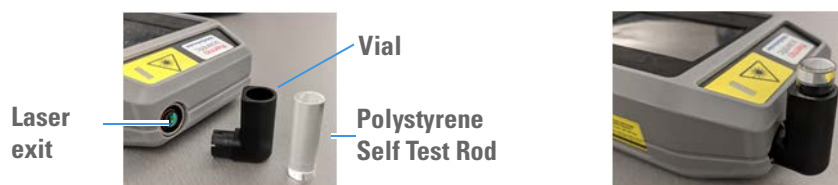
2. Place the polystyrene rod into the vial holder, as shown above. Press the rod firmly down into the holder so that the laser will enter the sample.

3. Ensure that any label on the polystyrene rod is rotated away from the incoming laser, otherwise the Self Test may fail.

4. Press the Self Test button on the Home Screen.

5. Press the Arm Laser button on the keypad.

6. The Raman Self Test Scan screen is displayed. Press Scan at the bottom of the screen.

7. After scanning has completed, the result will either be a PASS or a FAIL.
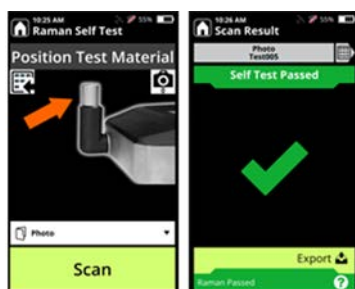
Self Test PASS: Analyzer correctly identified the polystyrene rod, indicating proper functionality.

Self Test FAIL: Analyzer could not properly identify polystyrene and should not be used until the problems are corrected. Wipe the polystyrene rod with a damp cloth, place in vial holder and perform a second Self Test. If the result is FAIL, contact Customer Support.

Sample scanning and scan results

If your sample is in a closed transparent plastic bag, the analyzer will be able to analyze the substance directly through the bag.

1. Remove the vial holder from the laser exit aperture.

2. Locate the nose cone in the carrying case, and carefully place the slotted end over the laser exit aperture, as shown below.
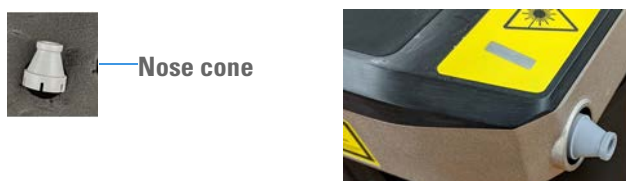
3. On the Home screen, press the Scan button.

4. Press the Arm Laser button on the keypad.

5. Position your bag of drug sample against the nose cone, shown below.

Note Be sure to keep you fingers away from the end of the nose, out of the laser path.

6. Select the TF_Narcotics profile, as shown below.

7. On the Raman Scan screen, press Scan to acquire a Raman spectrum. The Scan in progress screen is displayed.
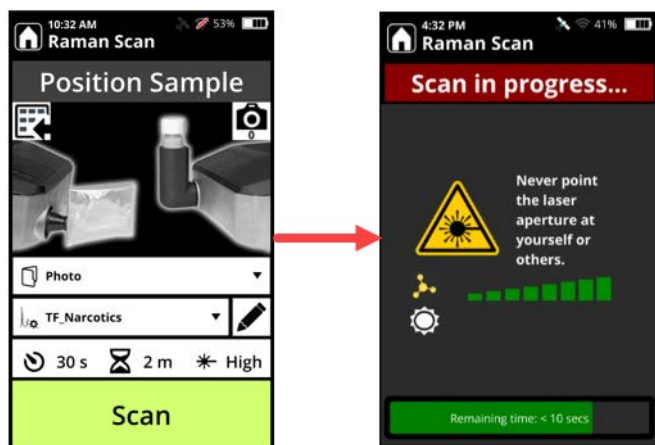
8. If the chemicals in your sample are not in the Narcotics library, then the Scan Result will display a gray "Inconclusive."
If a chemical that has been defined as Clear is identified, the scan result will display a green "Clear."

If a narcotic chemical is detected, then the Scan Result will display a red "Alarm," with the name of the chemical indicated on the screen.
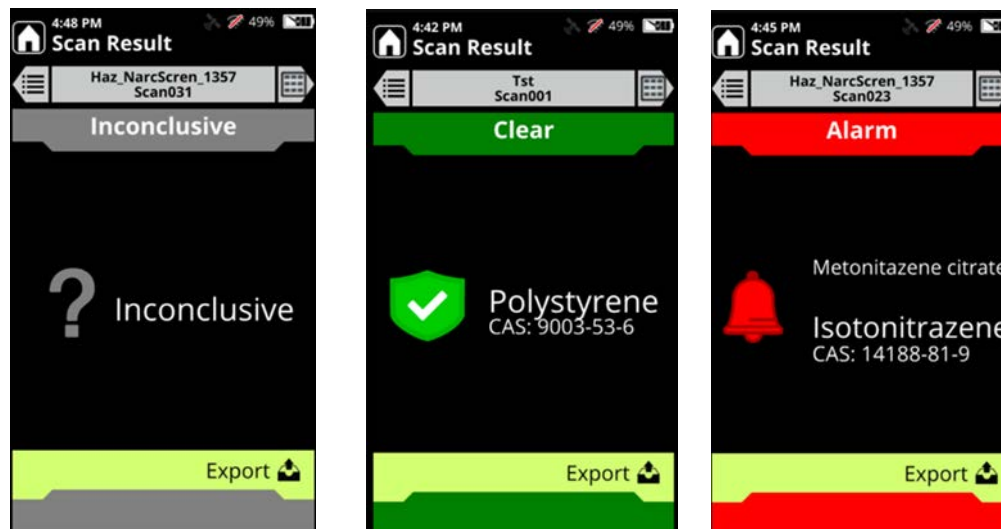
Best practices for scanning sample vials

Use appropriate caution and practices for the sample types that are analyzed by the 1064Defender analyzer.

IMPORTANT Read this section thoroughly before performing sample analysis.

Use the Scan Delay feature if suspected explosive or energetic materials are analyzed in any form: liquids, powders or solids (see Set a scan delay on page 127 for instructions). This feature provides you with a configurable amount of time to walk away from the analyzer prior to the start of the Raman scan, thereby minimizing any potential injury. You can also set a maximum scan time so that you know when the scan is complete and it is safe to return to the analyzer. If there is any question about the general category of substance to be analyzed, use the Scan Delay option to maximize your safety.

Note For the best analytical results when using vials, avoid scanning dark, amber glass or ceramic if possible.

Liquid samples may be volatile and prone to evaporation, reducing the amount of sample available for analysis. During Raman scanning, the laser imparts energy to the sample which may also cause heating. It is recommended to leave vials containing liquid samples loosely capped during Raman scanning to minimize evaporation and to provide relief for any pressure buildup.

To scan a **Liquid** sample:

1. Vial should be loosely capped before scanning.

2. After scanning, remember to tightly cap the vial to avoid spills.

Minimum of 0.3 mL

liquid sample

Powder samples that are suspected to be explosives should be placed into the Vial Holder without the cap in place during Raman scanning. Use the Scan Delay option. This allows the material to eject out of the vial and minimize damage to the analyzer in case the material provides an energetic response to the laser. This practice also applies to dark colored powder samples, which will absorb more laser energy during Raman scanning than white or colorless samples.

To scan a **Powder** sample:

1. Fill the vial with at least 0.3 mL of powder.

2. Angle the vial and tap gently to move powder to one side of vial, and place this side in the Vial Holder facing the Accessory Port window.

3. Remove the vial cap before scanning the sample.

4. Use the Scan Delay option if deemed necessary.

Minimum of 0.3 mL
Powder angled towards Accessory Port

powder sample

5. After scanning, remember to tightly cap the vial to avoid spills.

Solid samples should also be treated with caution, using the Scan Delay option with open vials if explosives or dark solids are analyzed.

To scan a **Solid** sample:

1. Fill the vial with at least 1-2mg of solid sample - approximate volume.

2. Remove the vial cap before scanning the sample.

3. Use the Scan Delay option if deemed necessary.

Minimum of 1-2mg

solid sample

Note If a vial has a label, rotate the vial in the Vial Holder so that the label does not block the laser during scanning.

After scanning, remember to tightly cap the vial to avoid spills.

Best practices for scanning bagged samples

This section describes best practices for safely scanning bagged samples such as transparent bags or glass containers other than vials.

- Gather as much sample as possible into a corner of the bag, and then hold the bag directly against the nose cone. This ensures that the focal point of the laser is at the correct location in the sample for analysis.

- Keep fingers out of the laser path.

- **DO NOT** scan black plastic bags or opaque containers. Dark materials will absorb laser light and heat rapidly, which may cause burning. Chemical identification may also be negatively impacted.

Set a scan delay

You can set a scan delay via the Raman Scan screen on the Position Sample screen for a single scan, or for a profile, which would apply to all scans performed using that profile.

❖ **To set a scan delay for a single scan,**

1. On the Home page, press the Scan button.

2. In the Raman Scan screen, click the Raman settings bar to open the Raman Settings screen.
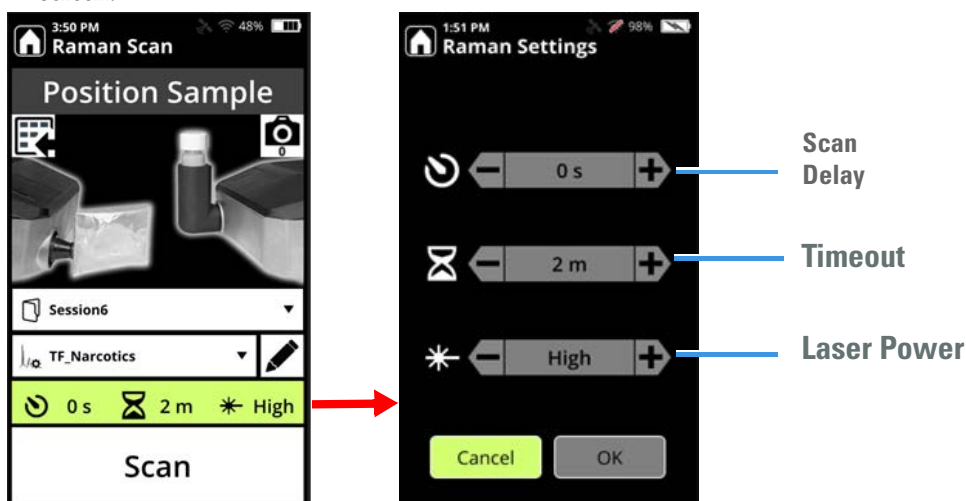
3. In the Scan Delay row, click the + (plus) and - (minus) keys to set the number of seconds that the scan is delayed before it begins.

Perform a scan

1. Select **Scan** from the Home screen.

Raman
Scan
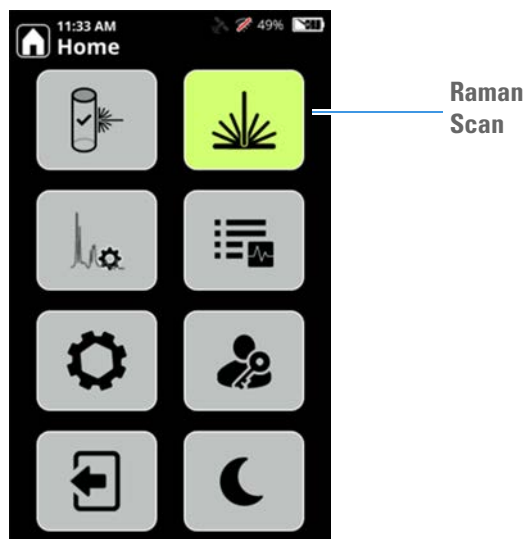
If prompted, press the Arm Laser button on the keyboard.

2. The Position Sample screen appears. Change settings as needed:

3. If the Scan Delay is set to zero, the following warning is displayed, and provides the option of setting a scan delay.
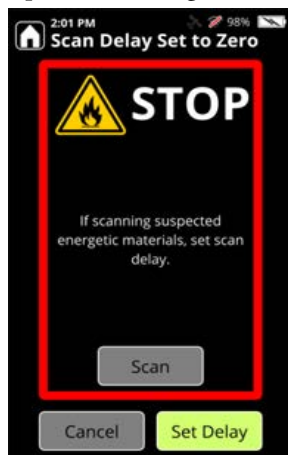
4. Position your sample and select **Scan**.

5. The signal strength and fluorescence meters are displayed when the analyzer begins to collect data.
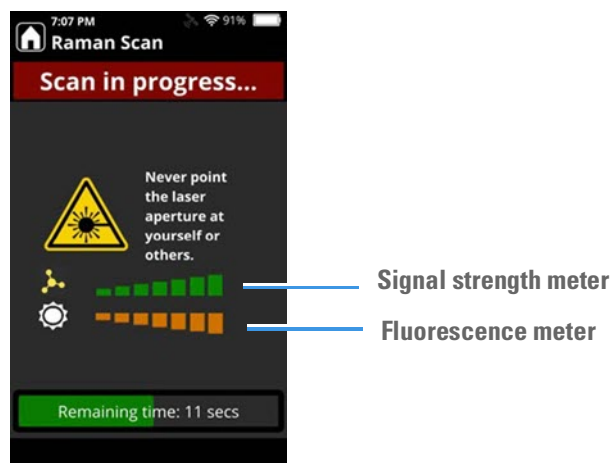
6. When the scan finishes, the analyzer begins analyzing the data according to the analysis type set in the profile used for the scan.

7. When the analysis step finishes, the analyzer displays a result. For more information, see Understand Scan Results on page 137.

Use the signal strength meter

The signal strength meter provides a scan of the relative strength of the Raman molecular signal and the fluorescence signal that the analyzer receives from a sample during a scan.

The signal strength meter is useful when:

- A scan is progressing slowly.

  – You can use the meter to help the analyzer collect more Raman signal. To do this, observe the signal meter as you adjust the position of the analyzer to bring the nose cone closer to or farther from the sample. If the number of green bars increases, the analyzer is receiving more signal, and the scan time may shorten.

  – If repositioning does not increase the number of green bars, perform a vial scan of the substance.

  – If the nose cone is damaged in some way, scans acquired using this accessory may result in slow scan acquisitions or lack of chemical identification. Be sure to check the condition of the laser aperture window, and ensure that it is clean and free of scratches.

 – If the amount of fluorescence is large and the molecular signal is much smaller, then acquiring a good Raman spectrum for analysis may be difficult or impossible.

- You are having trouble performing a point-and-shoot scan of a tiny sample. It is difficult to position the laser beam on a very small sample. Use the signal strength meter to help you reposition the analyzer and align the laser to the sample, or use a larger volume of sample if possible.

Add metadata to scans

You can add metadata about a sample before or after scanning it. For example, for samples that are straightforward, you can enter metadata about it before you complete the scan, but for samples that require several scans for identification, you can enter metadata about the sample after you have made a clear identification. This enables you to associate evidence in the form of data and pictures to the scans you intend to report.

❖ **To add metadata before a scan**

1. In the Position Sample screen select the Data Field Values icon.
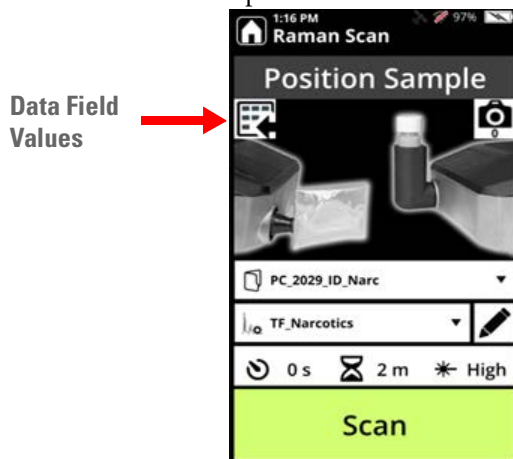
2. The Data Field Values screen opens. Select a Data Field and use the keyboard to add a value.

3. Click OK. When you run the scan, the metadata that you entered is displayed in the Data Fields screen as shown in the following example.
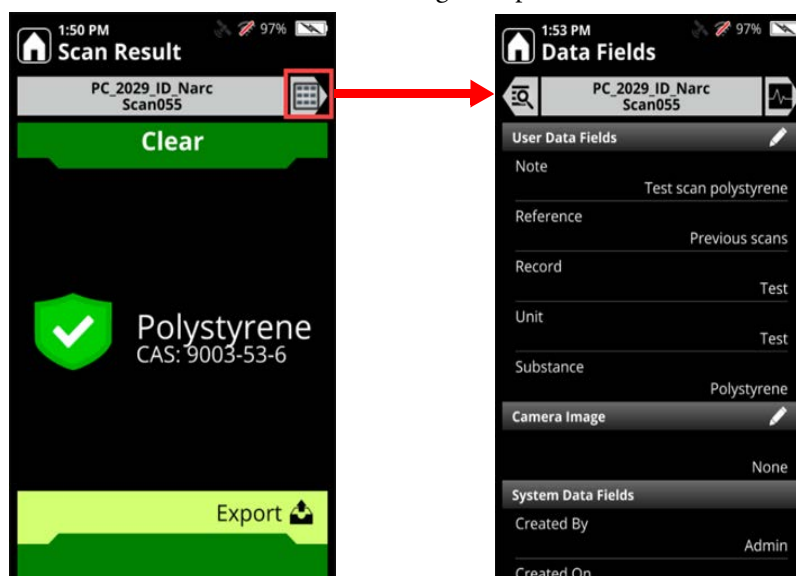
You can update the metadata information in the Data Fields screen at any time after a scan is taken.

Add pictures to scans

The analyzer has an embedded camera that you can use to take pictures while you are scanning samples. For example, you might want to take a picture of a sample or the environment from which it was acquired. You can take pictures before or after you scan a sample. You can also replace an existing image.

Note You can only have one image associated with a scan.

You can add or edit data fields to provide information about the scan before or after scanning, as described in Add metadata to scans on page 130.

❖ **To take a picture before a scan:**

1. Select **Scan** from the Home screen.

2. If you want to perform a scan, press the Laser Arm button. To just take a picture, press OK in the next two screens.

3. Press the camera icon located in the top right of the screen as shown.

4. Hold the analyzer over the image you want to photograph so that the camera lens (located on the bottom of the analyzer) can capture the image.

5. To use a flash, tap the square in the top right of the screen.

6. Tap the middle of the screen or press the Camera button on the keypad to take the picture. The image is displayed and you have the option to delete or accept the picture. If you tap Review, you have the options to either retake or accept the picture.
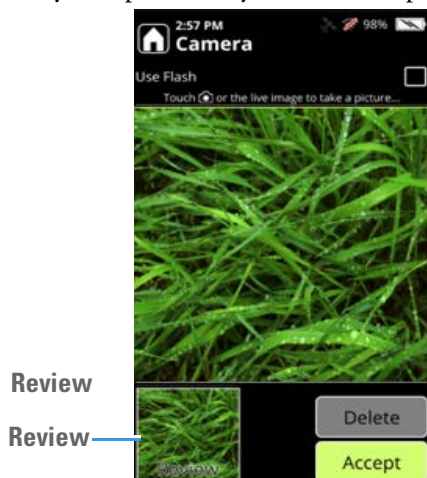
Review

Review

7. Click Accept to confirm the picture. The Position Scan screen is displayed.

8. Run the scan. The photo is stored in the Data Fields section of the results.

❖ **To take or replace a picture after a scan:**

1. From the home screen go to Review Scans.
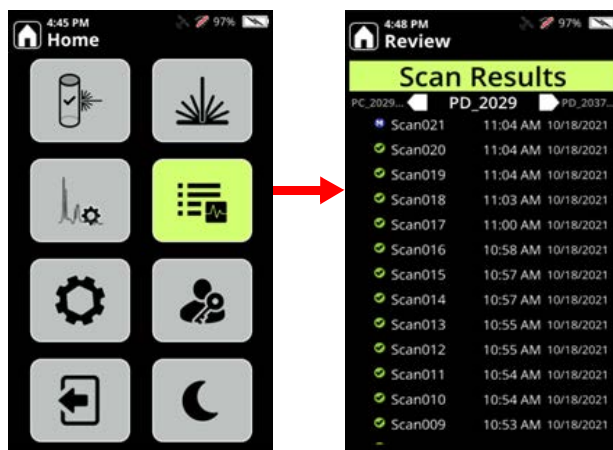
2. Select a scan result to add a picture to and press the right arrow at the top of the screen **twice**. The Data Fields screen is displayed.
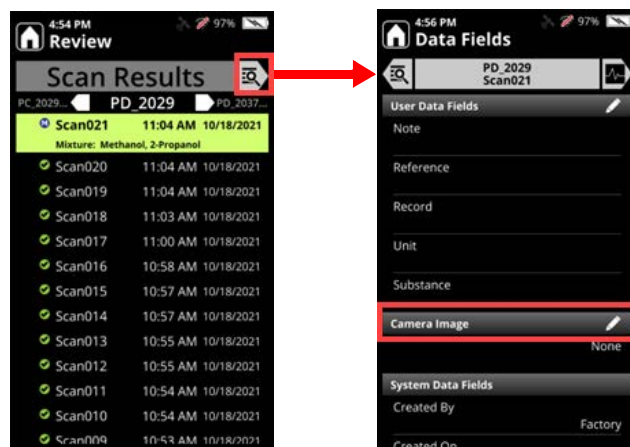
3. Click the pencil icon in the Camera Image field. The camera screen is displayed.

4. Touch the screen or the camera icon to take the picture. When you capture the desired image, click **Accept**. The picture is embedded in the Data Fields screen.

Note You can only have one image associated with a scan.

Specify scan sessions

The analyzer stores scans in folders called "Sessions." Sessions help organize your work and make it easier to review scans.

To choose an existing session

1. From the Position Sample screen, select the arrow next to the session name.
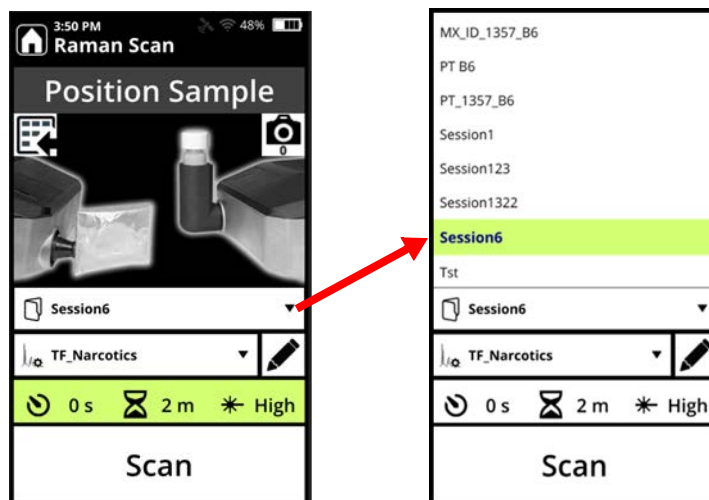
2. Select another session and then press **Scan**.

❖ **To create a new session**

1. From the Position Sample screen, select the arrow next to the session name.

2. Select **New Session**, enter the new session name, and press the enter key.

3. Press **Scan**.

Note Session names must be 1-18 characters in length. The following case-insensitive terms are prohibited: aux, com1 through com9, con, lpt1 through lpt9, nul, and prn.

Understand Scan Results

Contents

Scan results using ID analysis mode

This section describes scan results from scans that use profiles with the analysis type defined as **ID**. Running a scan using ID mode analyzes all chemicals present and displays a list of all the chemicals that are identified. You can tag items in libraries to ensure that those items are included in the analysis.

Read result screens

Scan results are displayed immediately after running the scan. You can also access scan results by pressing the Scan Results icon on the Home page:

The following screen shows a list of scan results accessed from the Scan Results screen.
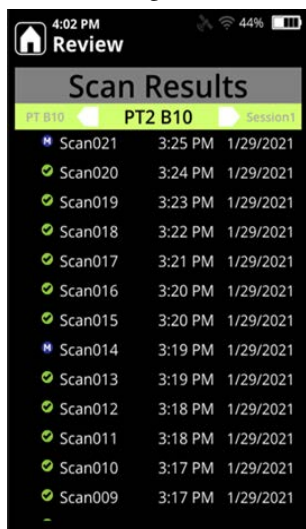
You can press the white arrows at the top of the screen to scroll the next session (right arrow) or the previous session (left arrow). The Review page (shown above) displays active session results. The icons at the left indicate which mode (Screener or ID) the user was in for scan acquisition, and what type of result occurred. In this case, these scans are in ID mode.

Table 17. ID Mode Icons

ID Scan Result	Scan Result Screen Color	Icon and Description
Positive Match	Green	Green circle with check mark
Mixture Match	Blue	Blue circle with M
Similar Item Found	Yellow	Yellow with exclamation point

Table 17. ID Mode Icons

ID Scan Result	Scan Result Screen Color	Icon and Description
No Match Found	Red	⊗ Red circle with X
Self Test Pass	Green	✔ Green check mark
Self Test Fail	Red	✖ Red X

You can select a scan by tapping on the Scan Number in the Scan Results list, and then tapping the right arrow at the top of the screen as shown here.
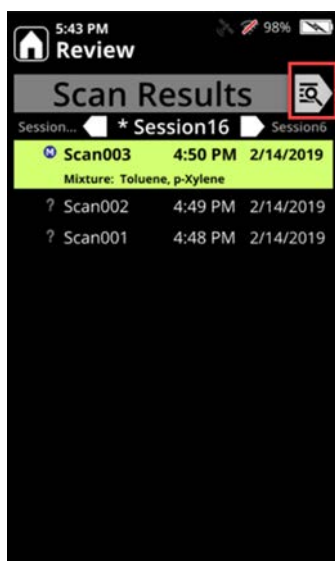
The NFPA (National Fire Protection Association) diamond identifies the type and level of risks that this library item poses, according to specifications set forth in NFPA standard 704.

CAS (Chemical Abstracts Service) number, a unique ID number for the library item

NFPA diamond. Number scale: 0 (no hazard) to 4 (severe) risk)

Library categories that apply to the identified item

Select to view the Explain Result screen
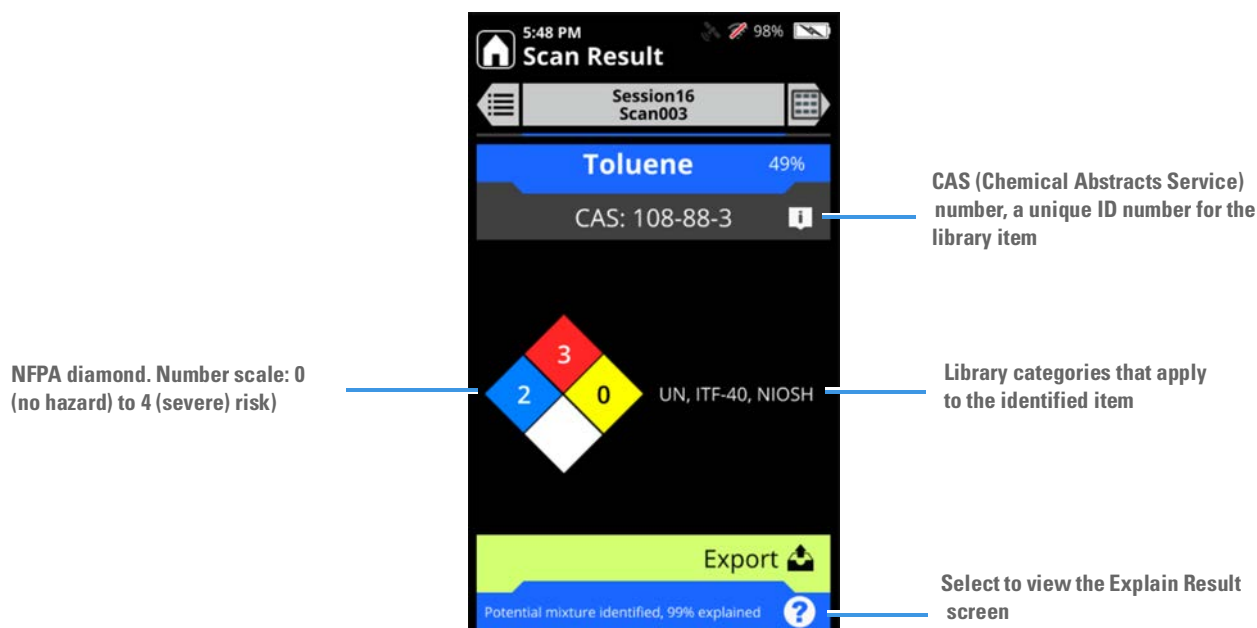
Interpret scan results

Single Positive Match - Green

The data matches a single library item.
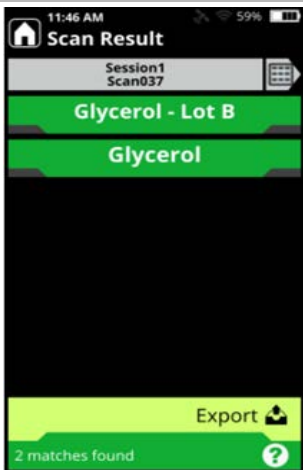
Multiple Positive Match - Green

The data matches two or more library items, meaning that the sample could be any one of them.

Mixture Match - Blue

The data matches a mixture of library items.

The percentages indicate the proportion of the data that matches the individual items. **The percentages are not concentrations.**

The percentages will not add up to 100 if any of the data cannot be matched.

Mixture identification is a complex analysis. It is more susceptible to false positives than the Single Positive or Multiple Positive results.
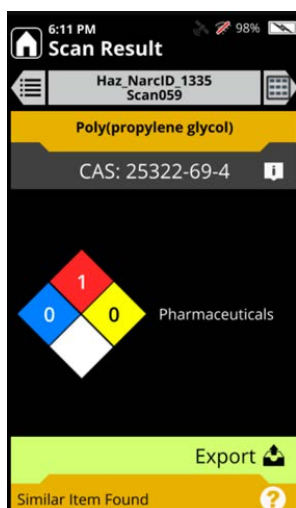
Similar Item Match - Yellow

The data is similar to one or more library items.

Be careful when interpreting this type of result! This screen does not mean that the listed substances are present, only that the data resembles them in some respects.

Possible reasons for a Similar Item match include the following:

- The sample is interacting with another chemical present.

- The substance emits little or no Raman signal or emits fluorescence.

- Your scanning technique was improper for the situation, so the analyzer could not collect enough data.

Consult Best practices for scanning sample vials on page 125 and Best practices for scanning bagged samples on page 127, and repeat the scan.
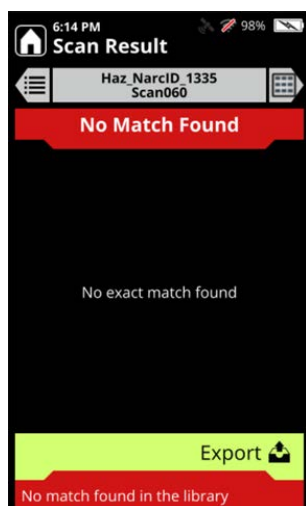
No Match - **Red**

The spectral data did not match anything in the library, including mixtures of library items.

Possible reasons for a No Match result include the following:

- The chemical is not in the selected library

- The substance emits little or no Raman signal or emits fluorescence.

- The scan reached the timeout setting and didn't collect enough data. You can increase the timeout value and try again.

- Your scanning technique was improper for the situation, so the analyzer could not collect enough data.

- You positioned the sample vial label in the laser path, and it blocked the laser.

Consult "Best practices for scanning sample vials" on page 125 and repeat the scan.

Scan results using Screener analysis mode

This section describes scan results from scans that use profiles with the analysis type defined as Screener. **Screener mode** prioritizes what is found and reported by alert level. The icons at the left indicate which mode (Screener or ID) the user was in for scan acquisition, and what type of result occurred. In this case, these scans are in Screener mode. The alert levels are:

Table 18. Alert Levels

Alert Level	Analyzer Icon	WebUI Icon
Alarm	Red bell: 🔔	Red bell: 🔔
Warning	Yellow triangle: ⚠️	Yellow bell: 🔔
Clear	Green shield: ✅	Green bell: 🔔
Inconclusive	Gray question mark: ❓	Gray bell: 🔔

Scan results for Screener mode are labeled with the alert type, as shown in the following examples.
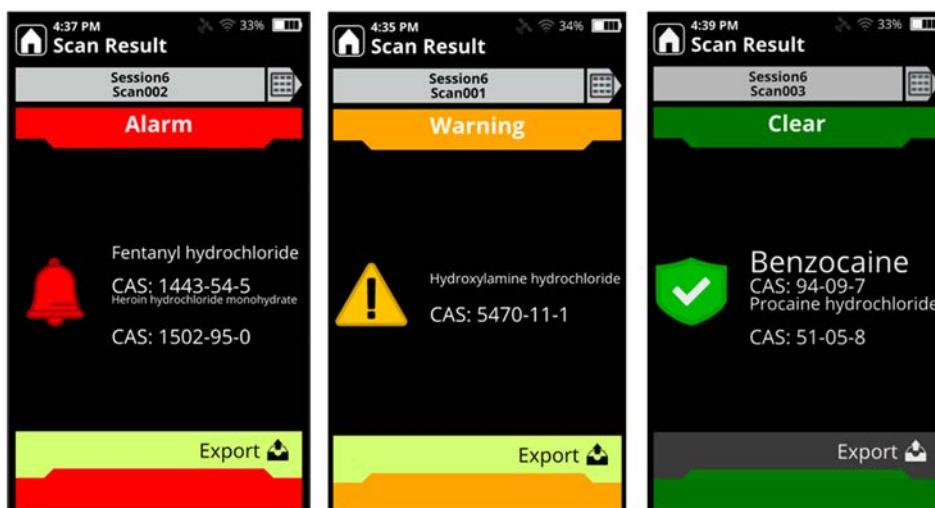
View ChemWatch information for scan results

From the Scan Result screen, tap the CAS value at the top of the screen.
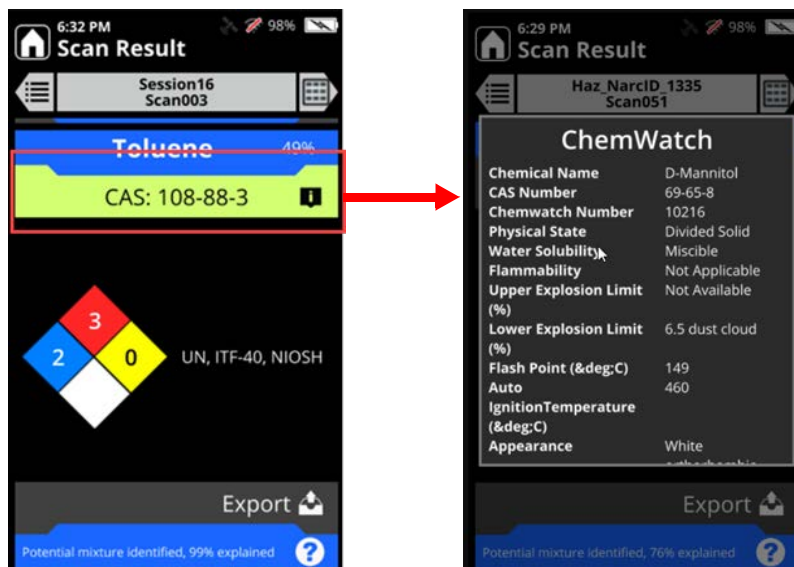
View the Spectra for scan results

Viewing the scan result spectrum can help you make a positive identification.

The scan spectrum is colored white, and the library spectrum is colored brown. In the case of a Mixture result, the analyzer also displays a blue-colored spectrum for the mixture itself.

However, if the result is inconclusive or there is no match, an additional spectrum from the library is not displayed.

❖ **To view spectrum for a result:**

1. From the Review screen, select a scan result.

2. Tap the right arrow at the top of the screen next to the title bar three times, as shown here.

The following examples show spectra for a single positive match result and a mixture result.
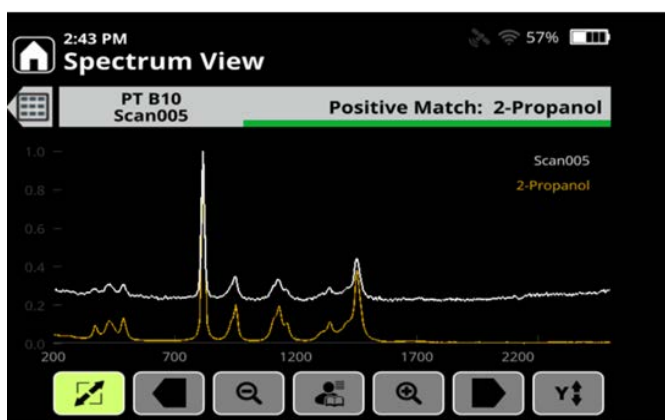
Spectral Result for Single Positive Match

* Library Spectrum is Brown
* Scanned Sample Spectrum is White
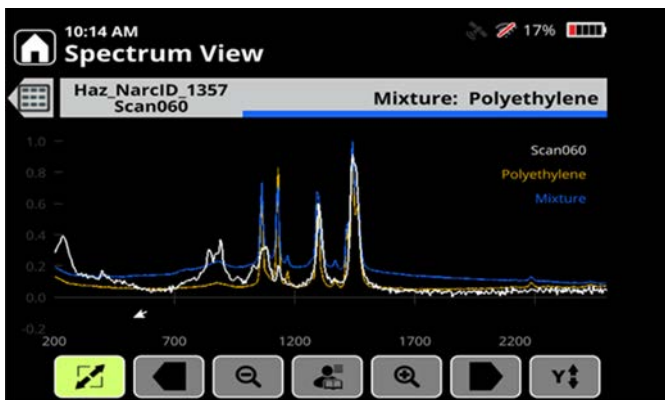
Spectral for Mixture Result

* Mixture Spectrum is Blue
* Library Spectrum is Brown
* Scanned Sample Spectrum is White

View spectrum details

1. With the result displayed, press the right arrow key twice. The spectrum control buttons are located at the bottom of the screen.
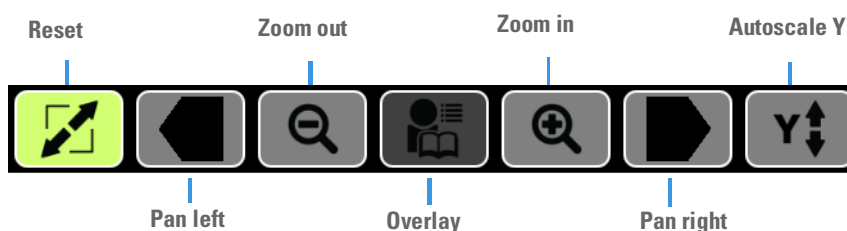
2. Select **Pan Left** or **Pan Right** to view regions of interest.

3. Select **Zoom In** or **Zoom Out** until the spectrum is magnified as you wish.

4. To rescale the zoomed spectrum, select **Autoscale Y**. The peak heights will increase.

5. To restore the original view, select **Reset**.

Overlay Spectra

You can overlay two spectra to compare peak patterns. The overlaid spectrum is colored light purple.

❖ **To overlay a spectrum**

1. With a spectrum displayed, select the **Overlay** button.

2. Select one of the overlay options. The spectrum for the option that you select appears on top of the previously displayed spectrum.

   • **Overlay Previous scan:** The Review screen appears. Select a stored scan > press the Enter key.

   • **Overlay Library item:** The library appears. Manually scroll to an item or search using the keyboard and then press the Enter key.

❖ **To clear an overlay**

With the spectrum and its overlay displayed, select the **Overlay** button > select **Clear Overlay**.

View stored scans

Scans are stored in the session folder that you choose (see Specify scan sessions on page 135). Use the arrow keys to scroll through session folders and stored scans. If you never create a new session, scans are stored in the Session1 folder.

View scans by date

A session can contain scans taken on different days. You can sort the results to review by date.

❖ **To view scans by date**

1. From the Home screen, select **Review**.

2. At the top of the screen, scroll left or right to select a session, and press the Enter key.

3. Select **View by Date** > press the Enter key.

Edit data fields

You can edit data fields in scan results.

1. From the Home screen, select **Review.**

2. Select a scan result and press the Enter key.

3. Select Edit Data Fields.
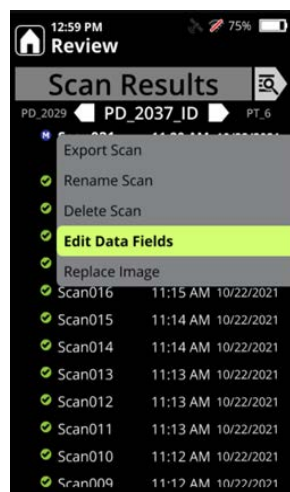
4. Edit the fields in the Data Field Values screen and press **OK**.

Add or edit camera images

You can add or edit camera images after running a scan.

1. From the Home screen, select **Review.**

2. Select a scan result and press the Enter key.

3. If the result does not have an image, you can add one now. If the result already has an image, you can replace it.

or
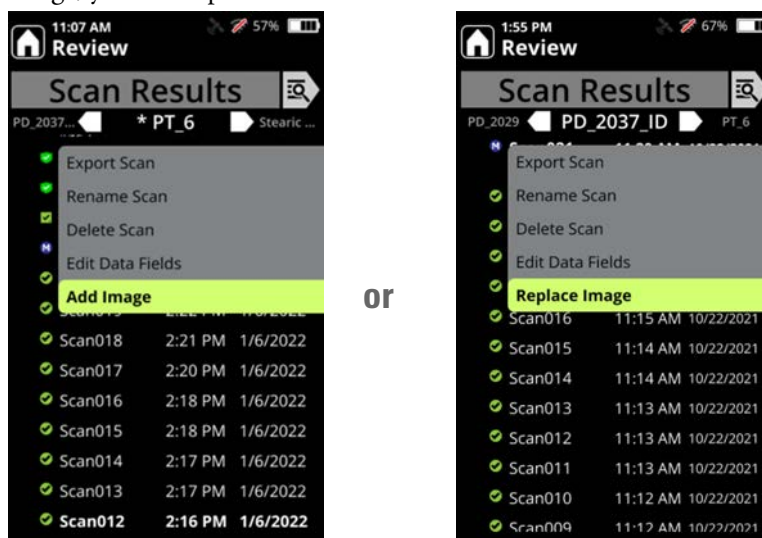
4. The Camera screen is displayed. Add or replace the image by following the instructions described in Add pictures to scans on page 132.

Rename scans or sessions

❖ **To rename a scan or session**

1. From the Home screen, select **Review**.

2. Select the scan or session > press the Enter key.

3. Select **Rename scan** or **Rename session** > press the Enter key.

4. Enter a new name. For naming restrictions see To create a new session on page 135.

Export scans or sessions

You can export scans to a USB flash drive and transfer them to a computer for analysis, printing, or emailing. The 1064Defender provides these export formats:

- **Report file (.pdf)**: A printable file that summarizes information about a scan (for an example, see page 149).

- **SPC file (.spc)**: A special format that can be read by data analysis packages.

- **Text file (.txt)**: A plain text file.

- **Reachback file (.lrb)**: A file that encodes scan data, analyzer calibration data, and the system log. Thermo Fisher Scientific Customer Support uses Reachback files to diagnose issues.

❖ **To export scans or sessions:**

1. Open the rubber gasket and insert the USB flash drive into the slot.

2. From the Home screen, select **Review**.

3. Select either an individual scan or a session and press the Enter key.

4. Select **Export Scan** or **Export Session** and press the Enter key.

Select an export format and select **OK** to start the export.

5. Press Eject to remove the USB flash drive.

6. Transfer the file to a computer memory drive via the USB flash drive and open to review.

Print a report file

You can export the scan as a PDF file (see page 149) and print the file from your computer. You can export reports for a session so that each report is a single file, or you can have all the reports in one file. Here is a sample report file.
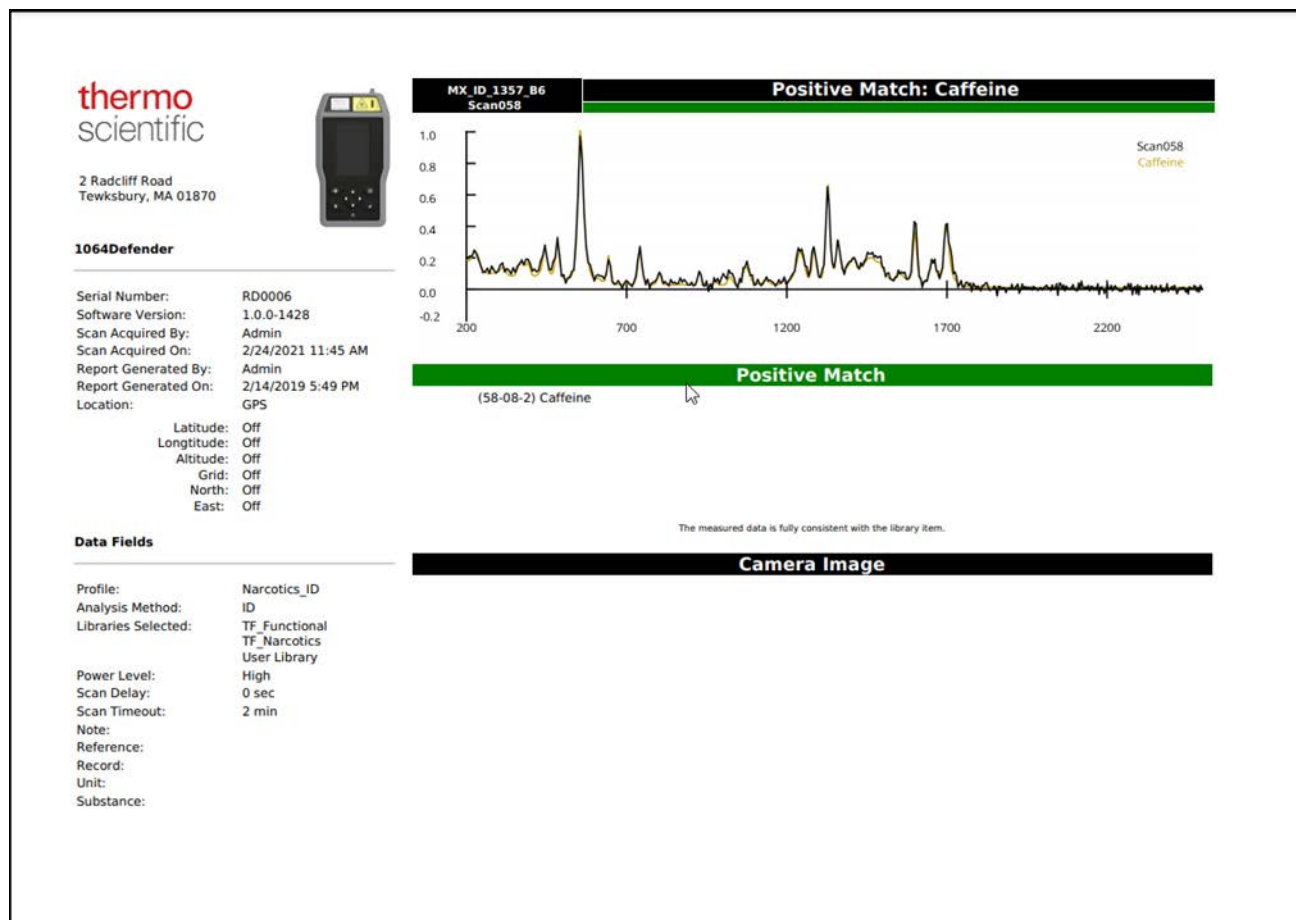
Delete scans and sessions

When you delete all scans at once, the analyzer deletes all scans and all sessions except for the default session. When finished, the analyzer has one empty session with the default session name Session1.

Note Deleted scans and sessions cannot be recovered.

❖ **To delete a single scan or session**

1. From the Home screen, select **Review**.

2. Select the scan or session > press the Enter key.

3. Select **Delete scan** or **Delete session** > press the Enter key > select **Delete**.

❖ **To delete all scans**

1. From the Home screen, select **Admin**.

2. Select **Delete Scans** and make a choice.

For more information, see Admin Tools on page 69.

View exported SPC files

To view SPC files on your computer, you must have software that can read them. One option is GRAMS® software, an integrated suite of spectroscopic software tools. You can also use OMNIC™ software or any software package that can open SPC files.

There is a free SPC view called GRAMS SPC Viewer that can be downloaded from http://gramssuite.com/Downloads/FreeViewer/Default.asp.

Maintenance and Getting Help

Contents

Get help and Reachback support

Customer Support is available by telephone or email 24/7, 365 days a year.

Telephone	1-800-374-1992 (USA)
	+1-978-642-1100 (International)
Email	FSI-Product.Support@thermofisher.com
Website	portables.thermoscientific.com
Mail	2 Radcliff Road, Tewksbury, MA 01876, USA

Please contact Customer Support by telephone before emailing a Reachback file. Your call will immediately be escalated to a senior Customer Support specialist, who will explain the Reachback process and help you to email your scan results to us in Reachback file format. For information about the Reachback file format, see Export scans or sessions on page 149.

Note If you return an analyzer to Thermo Fisher, synchronize your data locally to ensure that your data are preserved.

Perform Self Tests

It is highly recommended that a Self Test is performed at least daily to verify that the analyzer is operating properly. The Raman Self Test requires the use of the included polystyrene rod standard and vial holder accessory.

For information about how to perform a Self Test, see Performing an analyzer Self Test on page 122.

Locate the software version and serial number

You can view the software version and serial number in the analyzer About screen. This information is required to obtain software upgrades and to request assistance from Customer Support.

❖ **To view software version and serial numbers**

1. From the Home screen, select **Tools.**

2. From **General** Settings, select the **About** button.

3. The **About** screen displays the software version number and serial number.
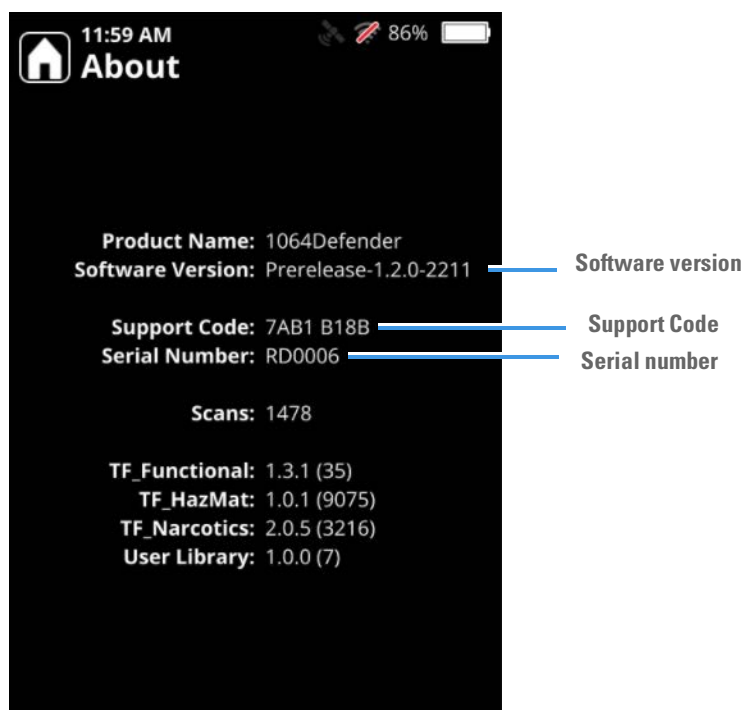
Note The serial number is also located on the back of the analyzer (page 17). An example serial number is **RD1218.**

Update software

Customer Support will notify you when a software upgrade is available on the Customer Support website. To login to this website, you must enter the support code and serial number for your analyzer. See Locate the software version and serial number on page 154.

Please have your instrument serial number available when contacting Customer Support (see Locate the software version and serial number on page 154).

Note The support code changes on a daily basis. To obtain a valid support code, the time and date must be set correctly on your analyzer.

❖ **To obtain new software**

1. Open the Customer Support website (https://portables.thermoscientific.com/) and click the picture that matches your analyzer.

2. Enter the serial number and support code for your analyzer.

3. Unzip the installation file to a flash drive.

❖ **To update the analyzer**

Note Ensure the analyzer is operating on AC power during the update process.

1. Insert the flash drive into the analyzer. The following is displayed

2. Click **OK**. The Software Update screen is displayed. Select the **Upgrade Device** check box, and then click **OK** for the upgrade to begin.
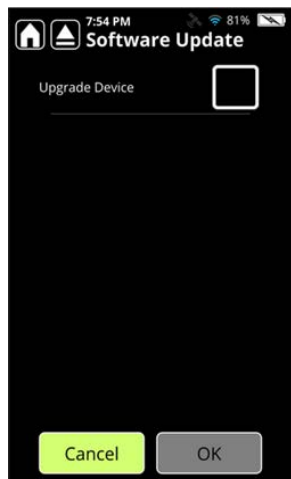
3. When the upgrade completes, the following image is displayed.
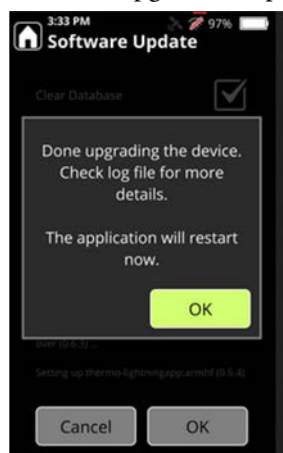
4. **The software update process takes approximately 30 minutes.** After the installation, the install.log file is copied to the flash drive and the analyzer restarts automatically.

Update libraries

Periodically, the 1064Defender default libraries are updated with new chemical information. To acquire updated libraries, you must have the current entitlements. Contact your Customer Support representative or visit the Customer Support website (https://portables.thermoscientific.com/) for information about the availability of library updates and how to acquire them. For information about how to contact Customer Support, see Contact us on page 9.

Reboot the analyzer

If the analyzer becomes unresponsive, reboot it by turning it off, then on again. If the analyzer fails to reboot, contact Customer Support.

Clean the analyzer

To remove nonhazardous contaminants from the outside of the analyzer and the nose cone, wipe them with a soft cloth moistened with water or isopropyl alcohol.

If the analyzer is contaminated with potentially hazardous substances, follow the decontamination procedures described in the following section.

Remove the boot

The boot may be removed for cleaning or decontamination. To remove it, peel it away from the analyzer.

Decontaminate the analyzer

Before decontaminating the analyzer, be sure to:

- Remove the analyzer boot before decontamination. Although the boot fits tightly, contaminants may enter along its edges.

- Make sure the power is turned off.

- Close the battery compartment door and make sure the rubber gaskets are sealed tight.

Note When the rubber gaskets are open, the environmental seal is broken. Do not immerse the analyzer in any liquid when the rubber gaskets are open.

You may immerse the analyzer up to 1 meter deep and for up to 30 minutes in either water or a solution of 1 part household bleach (5% sodium hypochlorite) and 9 parts water.

Return the analyzer for service

Before returning the analyzer, contact Customer Support or your local distributor and request a return material authorization (RMA) number.

Note Packages that are not identified with an RMA number will be returned unopened.

❖ **To return an analyzer**

1. Clean the analyzer and decontaminate if necessary. Safety and common carrier requirements both require all returned analyzers to be clean and decontaminated.

2. Package the analyzer securely and write your RMA number on the outside of the package.

3. Mail the package to Customer Support at:

> **Thermo Fisher Scientific**
> **2 Radcliff Road**
> **Tewksbury, MA 01876**
> **USA**

Operating Specifications

Contents

1064Defender Specifications

Specification	Value
Weight	With battery: 3.5 lbs (1.58 kg)
Size	Length: 9.5 inches (24.1 cm) Width: 5.1 inches (12.9 cm) Height: 2.2 inches (5.6 cm)
Electrical rating	12 V DC, regulated
Power rating	12v 3A 36W
Ingress Protection (IP) rating	IP-68
Max Laser Power	490 mW
Battery	Removable and rechargeable LI-ION, 7.2V, 6.8Ah, 49Wh
Battery Life	4 hr runtime at 25°C
Power supply input	100-240 V AC(+/- 10%), 50-60 Hz, 1A
Power supply output	12V DC

Raman Optical Specifications

Specification	Value
Principle of operation	Raman spectroscopy
Spectrometer spectral range	1054 nm to 1468 nm
Raman spectrum range	200 cm^{-1} to 2500 cm^{-1}
Spectral resolution	8 to 13 cm^{-1} (FWHM) across range
Laser (excitation wavelength)	1064.25 nm +/- 0.5 nm, 2 cm^{-1} linewidth
Laser output	Settable, 480 mW, 240 mW, 96 mW
Rayleigh rejection filters	OD 7
Detector	512 pixel InGaAs array, TE cooled
Detection mode	Direct dispersive
Dispersion mode	Single-pass spectrometer (600 groove/mm blazed at 22 degrees)
Nose collection optics	NA= 0.30
Nose beam divergence	12.5 degrees half angle
Nominal Ocular Hazard Distance (NOHD)	63 inches (160 cm)

Compliance

Specification	Value
Safety standards	UL 61010-1, 3rd Edition CSA C22.2 No. 61010-1, 3rd Edition EN 61010-1:2010, 3rd Edition
Laser safety	US Code of Federal Regulations Title 21 1040.1 IEC 60825-1:2014, 3rd Edition
Emissions	FCC Part 15 Subpart B, Class A ICES-003, Issue 4 Industry Canada, Class A EN 55011:2009 and A1:2010
Immunity	EN 61326-1:2013
RF Communications	ETSI 301 489-17 Section 7.2 ETSI 301 489-19 Section 7.2 ETSI EN 300 328 v2.2.2 Section 4.3.2.9.3 ETSI EN 300 328 v2.2.2Section 4.3.1.10.3 ETSI EN 303 413 v1.1.Section 4.2.1 ETSI EN 303 413 v1.1.Section 4.2.2.2

CE declaration of conformity is available at Declarations of Conformity.

Environmental Considerations

Specification	Value
Indoor or outdoor use	Indoor and outdoor
Wet location	Approved for wet locations
Ambient operating temperature	-20° C to +50° C
Humidity	0-80% Relative Humidity, Non-condensing
Cold Storage	-33° C
Hot Storage	+71° C
Elevation	Up to 2000 meters
Pollution degree	3
Enclosure type	Immersion to 1.1m and dust proof according to IP68

MIL-STD Specifications

Test Standard	MIL-STD-810H Test Method	Description	1064Defender Certification Value
	500.6	Low Pressure Altitude	15000ft
	501.7	High Temperature Storage	+71°C
	501.7	High Temperature Operational	+50°C
	502.7	Low Temperature Storage	-33°C
	502.7	Low Temperature Operational	-20°C
	503.7	Temperature Shock	-30°C to +60°C
	507.6	Humidity	Ten aggravated temperature humidity cycles, per Figure 507.6-7 of MIL-STD-810H
	514.8	Vibration, Loose Cargo, Procedure II	Compliant
	516.8	Shock Procedure I: Functional Shock	Saw tooth pulse at 40g, 11ms duration. Three shocks in each direction of three mutually perpendicular axes.
	516.8	Shock Procedure IV: Transit Drop	48" drop onto plywood on concrete for all surfaces, edges, and corners. Tested with and without packaging.
	516.8	Shock Procedure VI: Bench Handling	4" on all edges and practical rest surfaces
IP68		Immersion	Dust and Immersion 1.1 meters for 30 minutes

Labels and Regulatory Statements

Regulatory Compliance

Thermo Fisher Scientific performs complete testing and evaluation of its products to ensure full compliance with applicable domestic and international regulations. When the system is delivered to you, it meets all pertinent standards as described in the next section or sections by product name.

Changes that you make to your system may void compliance with one or more of these EMC and safety standards. Changes to your system include replacing a part or adding components, options, or peripherals not specifically authorized and qualified by Thermo Fisher Scientific. To ensure continued compliance with EMC and safety standards, replacement parts and additional components, options, and peripherals must be ordered from Thermo Fisher Scientific or one of its authorized representatives.

FCC Compliance Statement

THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES. OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS: (1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE, AND (2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE RECEIVED, INCLUDING INTERFERENCE THAT MAY CAUSE UNDESIRED OPERATION.

Contains: FCC ID: TFB-1003

Canada

This Class A digital apparatus complies with Industry Canada Standard ICES-003.
Cet appareil numérique de la classe A est conforme à la norme NMB-003 d'Industrie Canada.

Contains: IC: 5969A-1003

Export Regulation Statement

The technical information contained with this document is subject to the Export Administration Regulations. Export of this technical information to foreign persons or foreign companies, within or outside the United States, may require prior written authorization by the U.S. Department of Commerce, Bureau of Industry and Security. Contact Thermo Fisher Scientific, Inc., prior to such a transfer.

European WEEE Recycling and RoHS

WEEE Directive 2012/19/EU

Thermo Fisher Scientific is registered with B2B Compliance (B2Bcompliance.org.uk) in the UK and with the European Recycling Platform (ERP-recycling.org) in all other countries of the European Union and in Norway.

If this product is located in Europe and you want to participate in the Thermo Fisher Scientific Business-to-Business (B2B) Recycling Program, send an email request to weee.recycle@thermofisher.com with the following information:

- Name of the manufacturer or distributor (where you purchased the product)

- Number of product pieces

- Pick-up address and contact person (include contact information)

- Appropriate pick-up time

- Declaration of decontamination, stating that all hazardous fluids or material have been removed from the product

IMPORTANT This recycling program is **not** for biological hazard products or for products that have been medically contaminated. You must treat these types of products as biohazard waste and dispose of them in accordance with your local regulations.

RoHS Directive 2011/65/EU

This product is in conformity with Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment as amended by (EU) 2015/863 and (EU) 2017/2012.