

Thermo Scientific
● FirstDefender RMX
General User Training

Today's Agenda



1. Introduction to FirstDefender[®] RMX
2. Basic operation
3. How FirstDefender RMX works
4. Safety
5. Performing a scan
6. Maintaining your instrument
7. Thermo Fisher Scientific Customer Support procedures

Training Objectives

- At the completion of this course you will be able to:
 1. Describe how FirstDefender RMX works
 2. Safely operate FirstDefender RMX
 3. Correctly interpret FirstDefender RMX scan results
 4. Manage saved scans and sessions
 5. Demonstrate FirstDefender RMX maintenance and care procedures
 6. Describe how to get help from Thermo Fisher Scientific Customer Support, including spectral analysis help

FirstDefender RMX

INTRODUCTION

What You Will Learn in This Section

1. Where FirstDefender RMX fits in your toolbox
2. FirstDefender RMX's capabilities
3. What FirstDefender RMX can and can't identify

Your Equipment Toolbox



FirstDefender RMX: Tough and Versatile

- Highly miniaturized, self-contained Raman spectrometer and embedded analysis software
- Two use modes:
 - Point-and-shoot™
 - Vial scan with integrated vial compartment
 - Robot integration
- Hundreds of unique spectral signatures in library
- Rugged and lightweight
 - Waterproof, < 4 lbs
 - Tested per MIL-STD-810F
 - -20°C to +40°C (14°F to 104°F)
 - MTBF > 6 years



MIL-STD-810F Compliant

Test	Specification
Mechanical shock	40 g in 11 ms, saw-tooth
Vibration	1 hr/axis, composite wheeled vibration
Transit shock	4 -foot drop onto plywood on concrete 26 times
Humidity	10X(24 hrs) @ 60°C and 95% RH
Sand/dust/dirt	Blowing dust
Thermal shock	-30°C to +60°C in <1min
Low temp. (op)	-20°C for 1hr following stabilization
High temp. (op)	+40°C for 2 days following stabilization
Low temp. (store)	-30°C for 1 day
High temp. (store)	+60°C for 7 days
Immersion (op)	30 min. in > 1 meter of water

Thousands of Unique Spectral Signatures in Library

- ITF-40 most hazardous chemicals
- EPA list of high-volume production
- CW agents
- Energetics
- Pharmaceuticals
- Narcotics
- Common plastic blends and recycled plastics
- “White powders”

Can Identify These Substances

Explosives

Organic compounds

- Petroleum products, pesticides, fertilizers, plastics, industrial plant materials
- Drugs (legal or illicit)
- Chemical weapons
- “White powders”

Substances in water

- But not highly diluted solutions

Inorganic compounds

- Mineral acids such as sulfuric and nitric acid
- Oxides such as rust or titanium dioxide (common chemical used as a pigment in paints, sunscreens, and food coloring)
- Some ionic compounds, such as sulfates, phosphates, perchlorates, carbonates
- Crystalline semi-metals, such as silicon

Cannot Identify These Substances

Dark-colored materials

Highly fluorescent materials

- Some natural products
- Some brightly colored materials, dye-coated materials (for example, blues, greens, blacks)
- A range of miscellaneous materials, such as brake fluid, ketchup, detergent, some types of diesel, some agents used to cut heroin

Most pure metals and elemental substances

Certain acids

- Hydrochloric, hydrofluoric

Biological agents

- For example, anthrax and ricin
- Often fluorescent

Radiation, gases, vapors

Highly diluted substances

- Will not perform trace detection

FirstDefender RMX

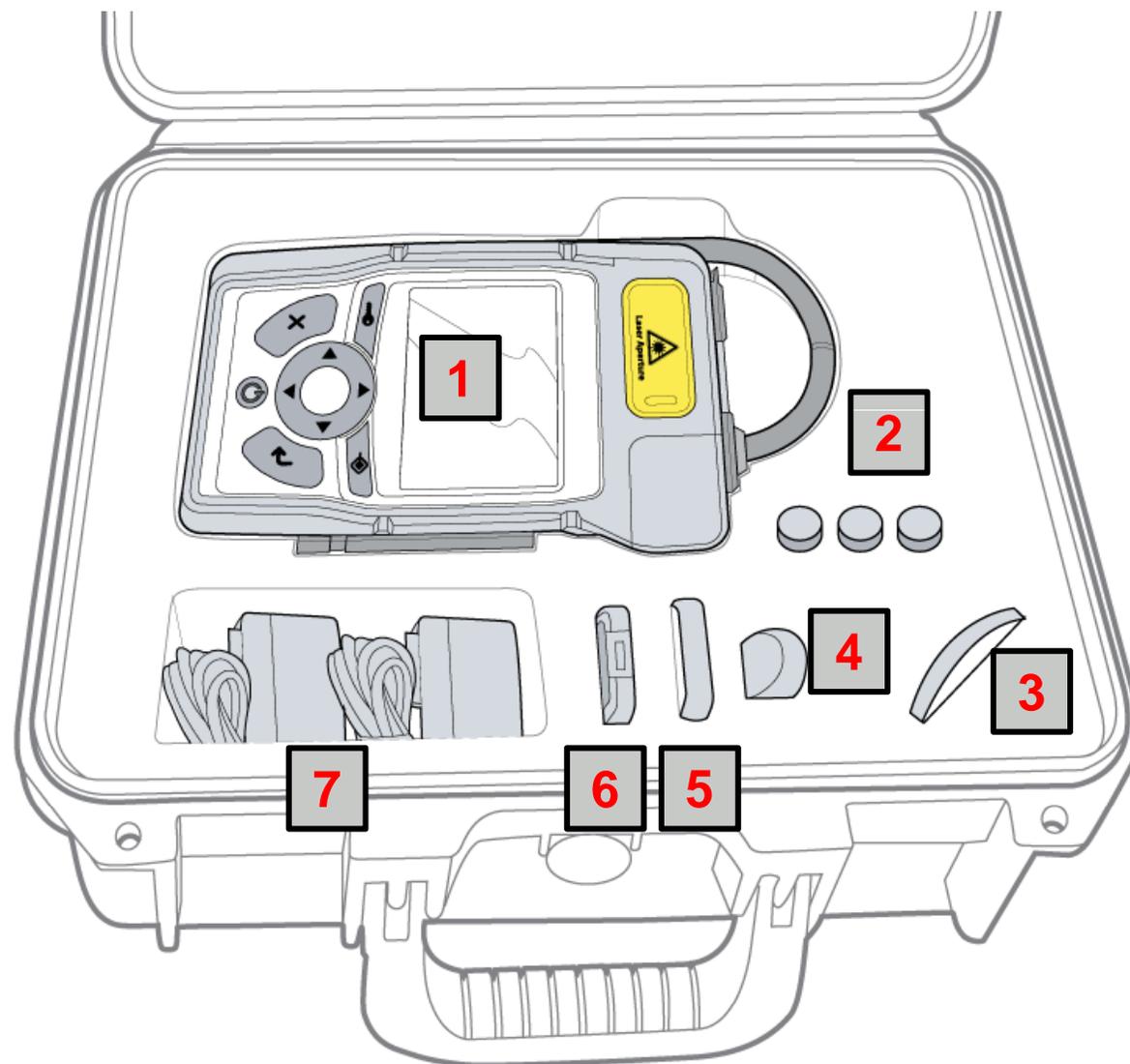
BASIC OPERATION

What You Will Learn in This Section

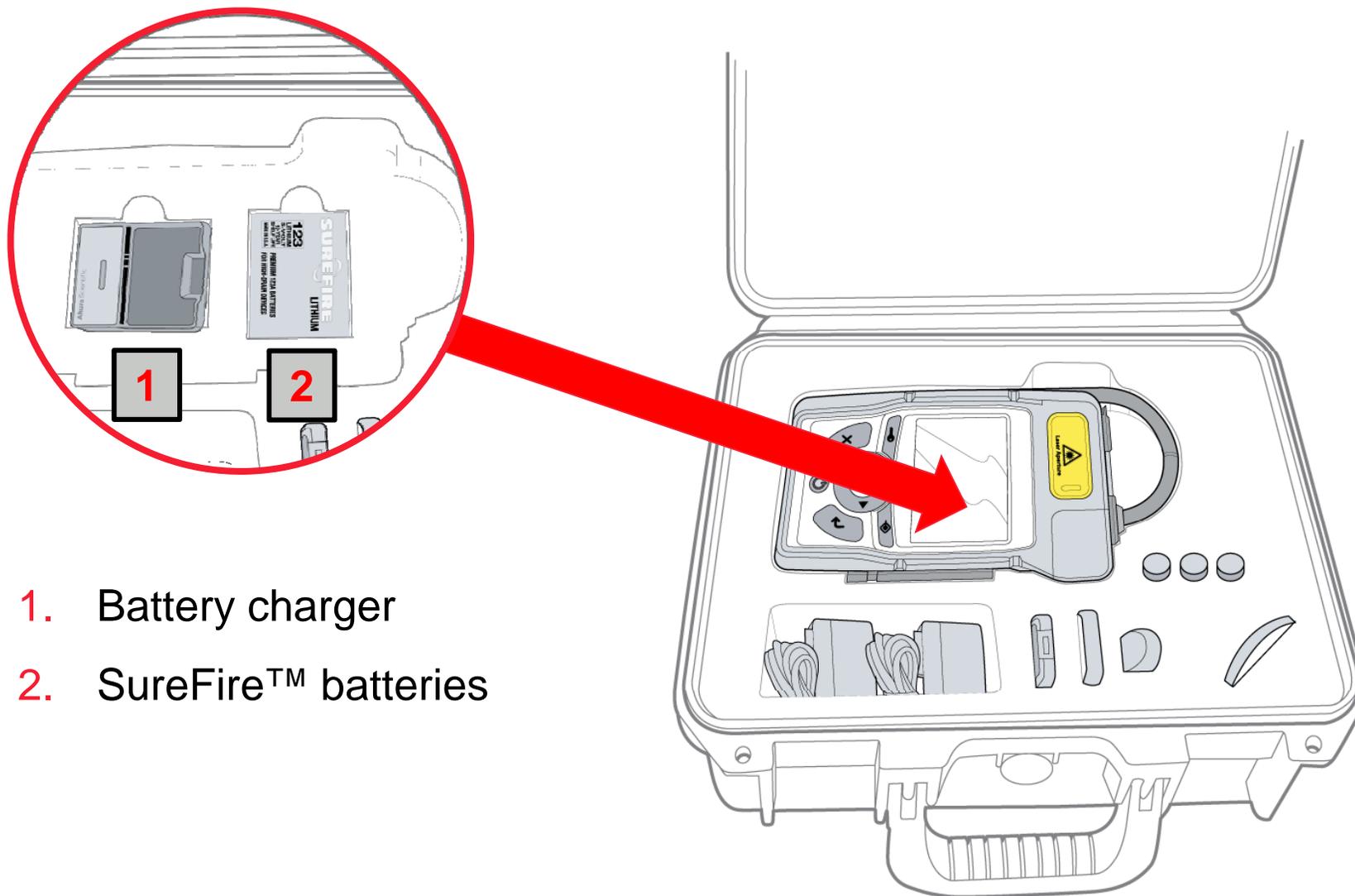
1. Names of instrument parts and accessories
2. How to power cycle the instrument
3. How to replace the battery and charge the battery
4. How to use the keypad
5. What you can do in the main software screens

What Is in the Carrying Case?

1. FirstDefender RMX
2. Sample vials and polystyrene rod
3. Nose cone
4. Card reader
5. Spare battery
6. Memory card
7. AC power cord and adapters



What Is Under the Instrument?

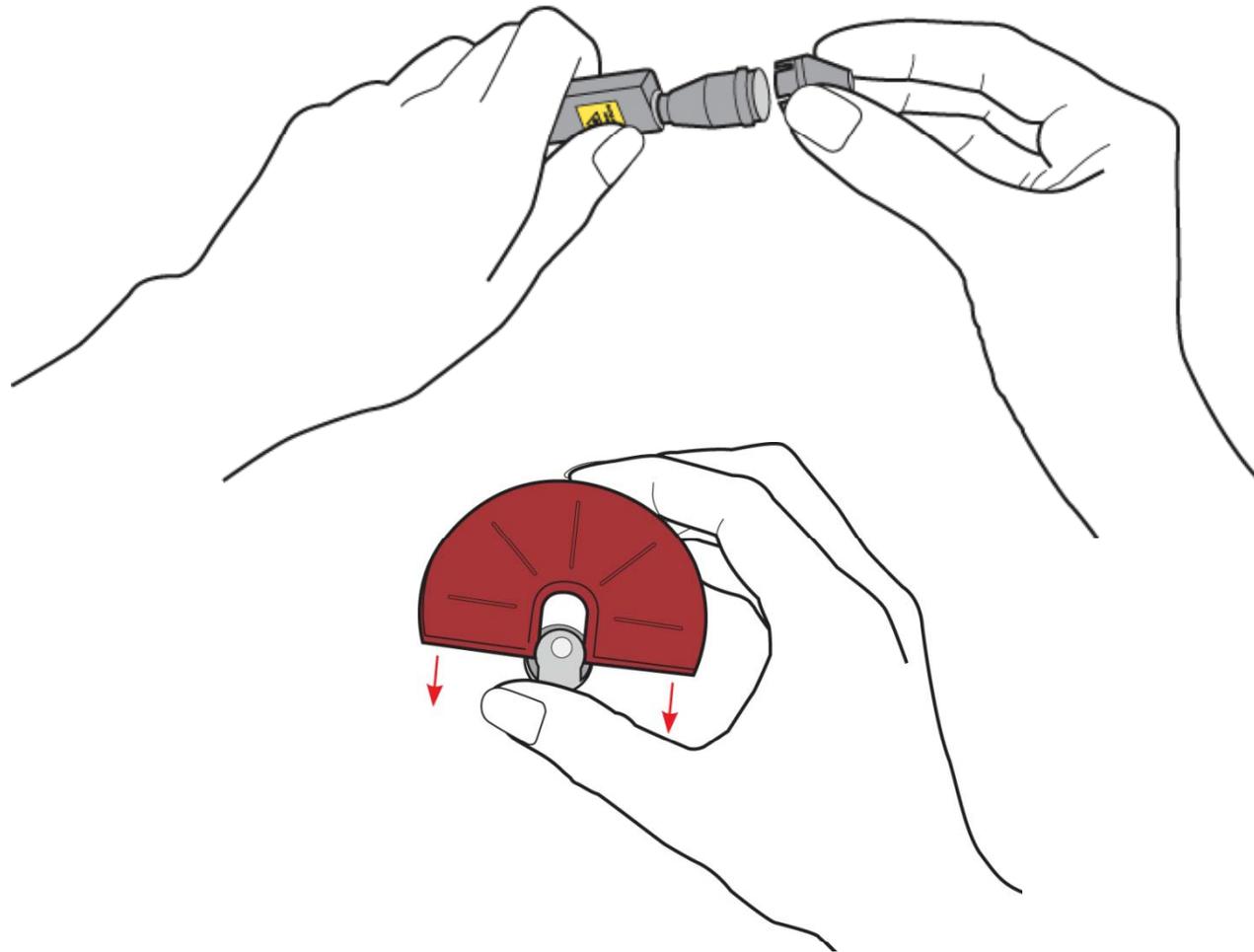


1. Battery charger
2. SureFire™ batteries

Key Instrument Components



Installing the Nose Cone and the Shield



Powering Up the Instrument

Main menu



Sleeping and Waking the Instrument

- Power-saving mode (“sleep mode”):
Briefly press the Wake/Sleep key
- Wake if in sleep mode:
Briefly press the Wake/Sleep key
- Fully power down:
Hold down the Wake/Sleep key for several seconds
- When running on battery power, FirstDefender RMX goes to sleep if idle for 5 minutes



Opening the Access Panel



Opening the Battery Compartment Door

Memory card slot

Power connector

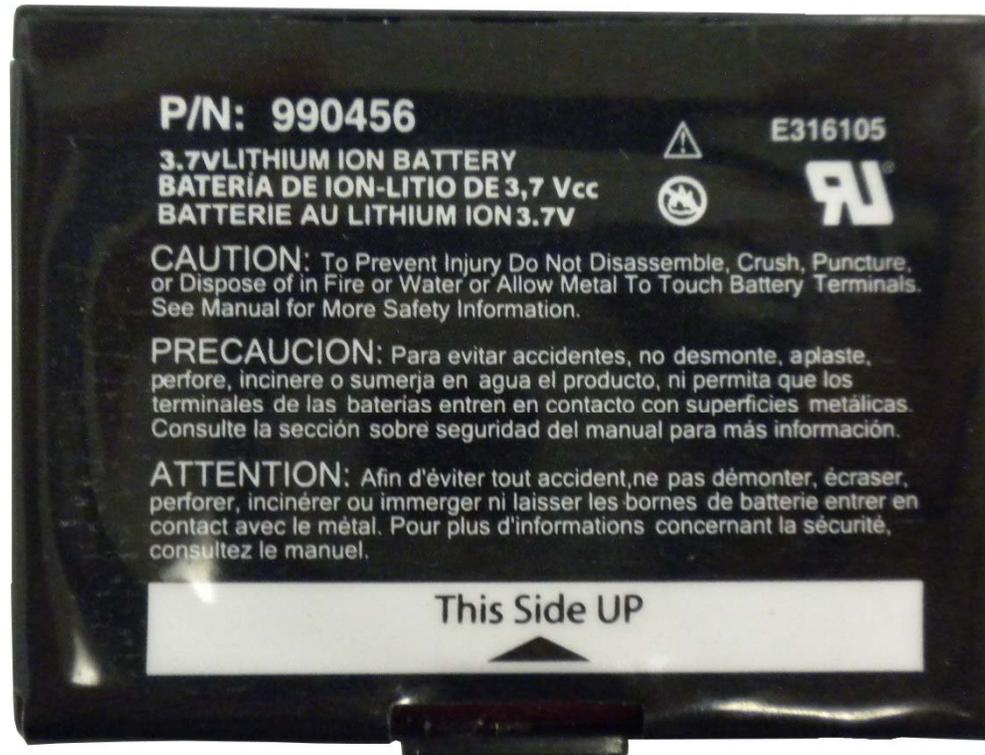


Removing the Battery



Inserting the Rechargeable Battery

- Orient the replacement battery correctly



Recharging the Battery

- Use the battery charger (charging is done when the light turns green)
- Operate the instrument on AC power with the battery installed



Inserting the SureFire Batteries



Menu Operation Keys

- Arrow keys select menu items
- The Enter key activates a menu selection
- The Escape key stops an event or backs out of an action



Scan Key



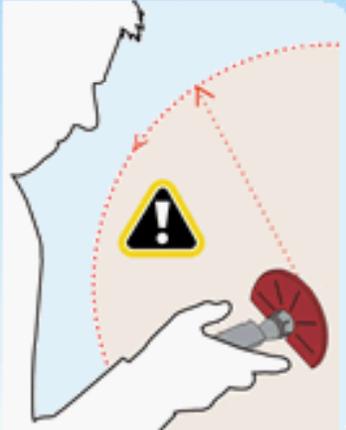
Scan 

Scan in progress
Hold unit still.

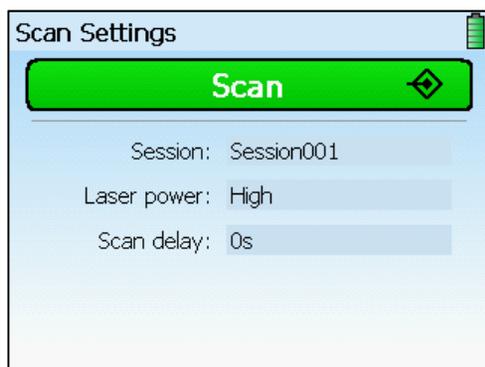
 Keep the laser aperture at least arm's length away from eyes.

 : Cancel scan

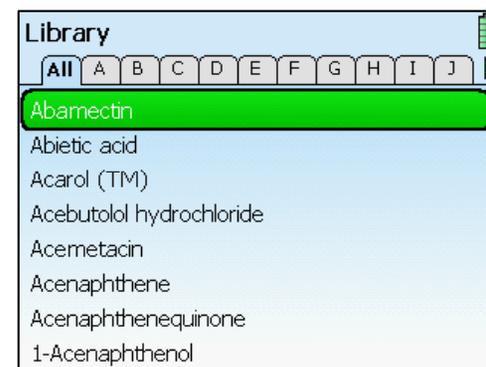
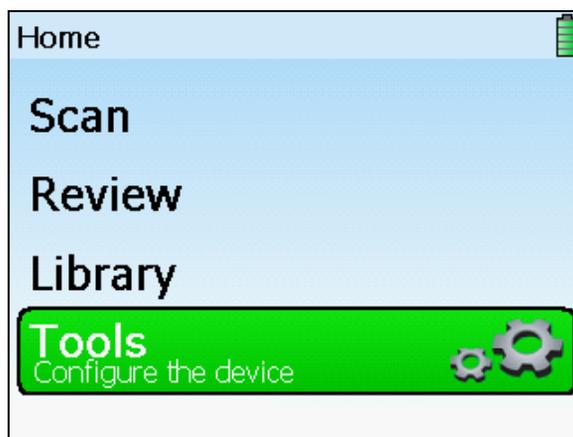
 Auto Exposure

A diagram illustrating the scanning process. A hand is shown holding the device, with a red laser beam projecting from the lens. The beam is shown scanning across a surface, with a dashed red line indicating the scan path. A warning icon (a triangle with an exclamation mark) is placed near the beam, indicating a safety hazard. The background is a light blue and orange gradient.

So What Can You Do with FirstDefender RMX?



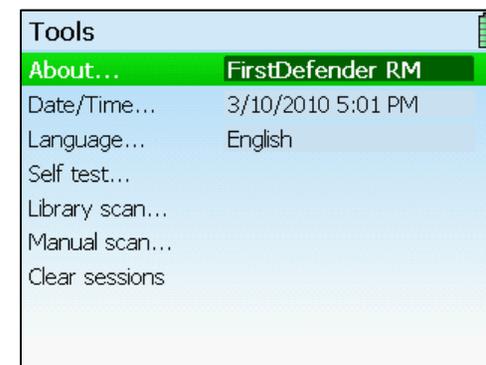
Perform a scan



Check the library



Work with stored scans

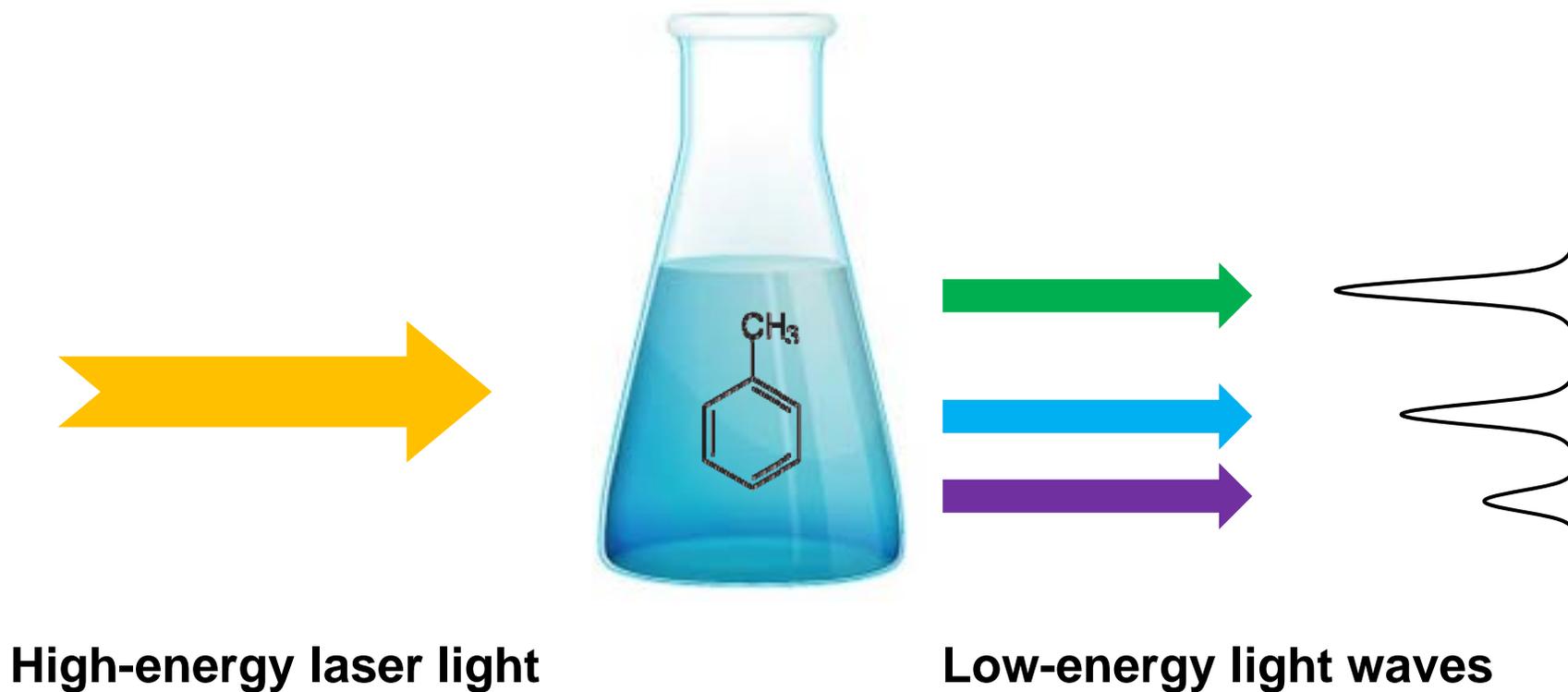


Use system tools

FirstDefender RM

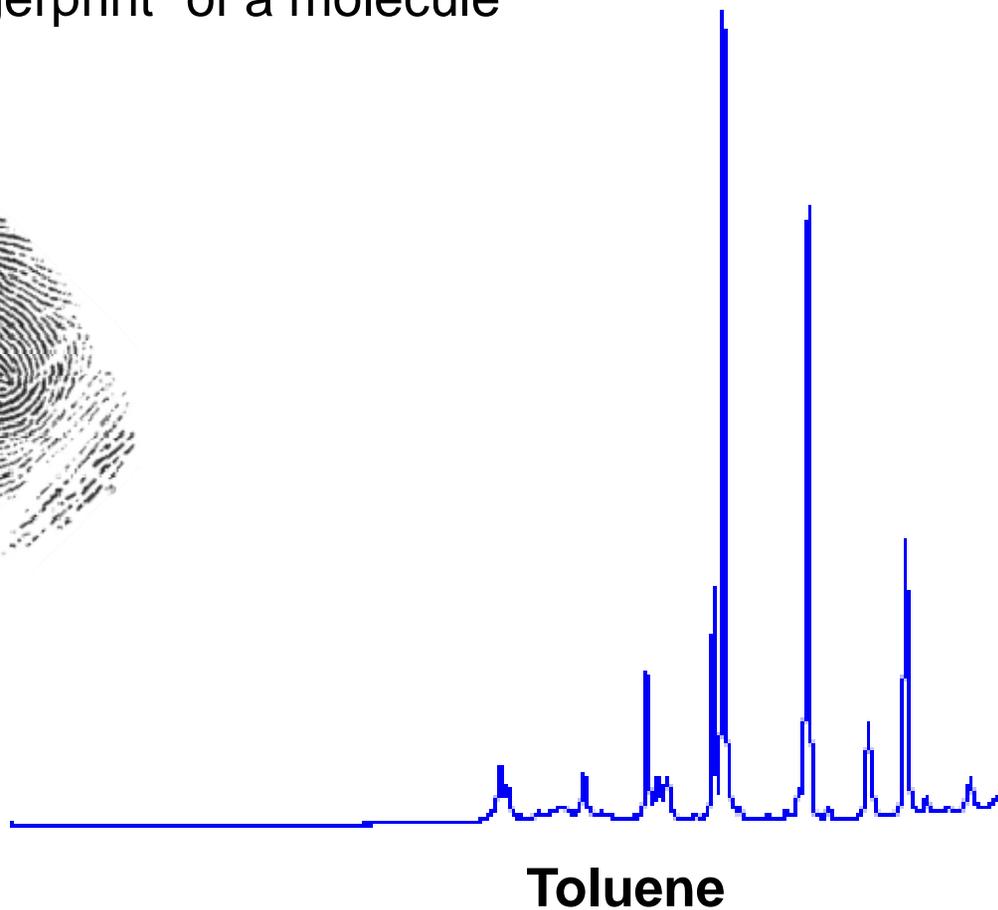
HOW FIRSTDEFENDER RMX WORKS

What Is Raman Spectroscopy?

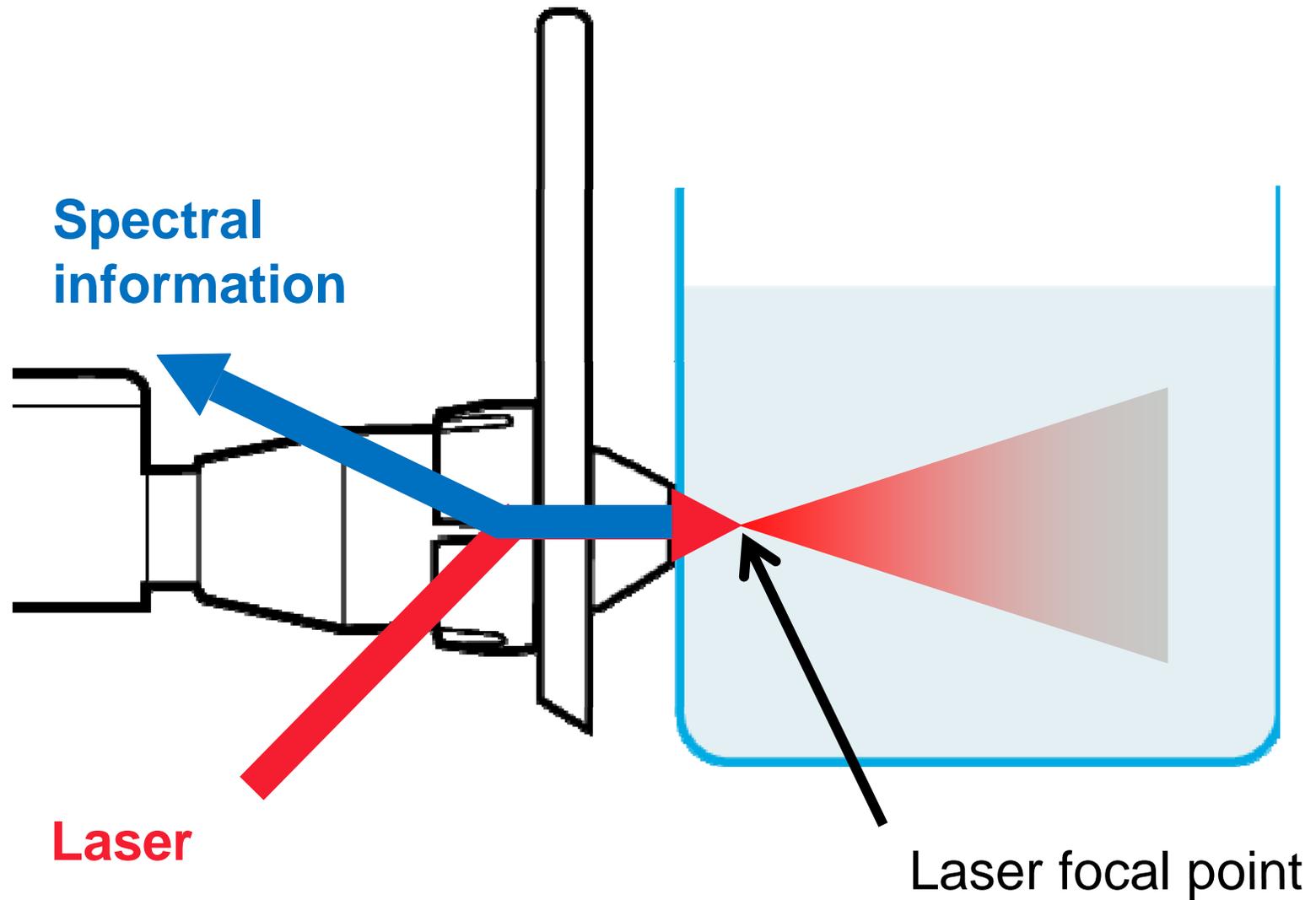


What Is a Spectrogram?

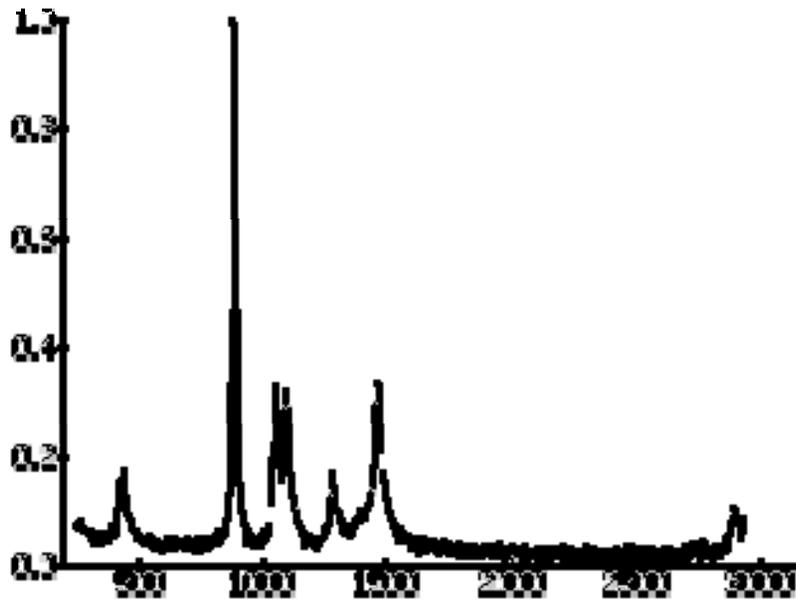
Molecular “fingerprint” of a molecule



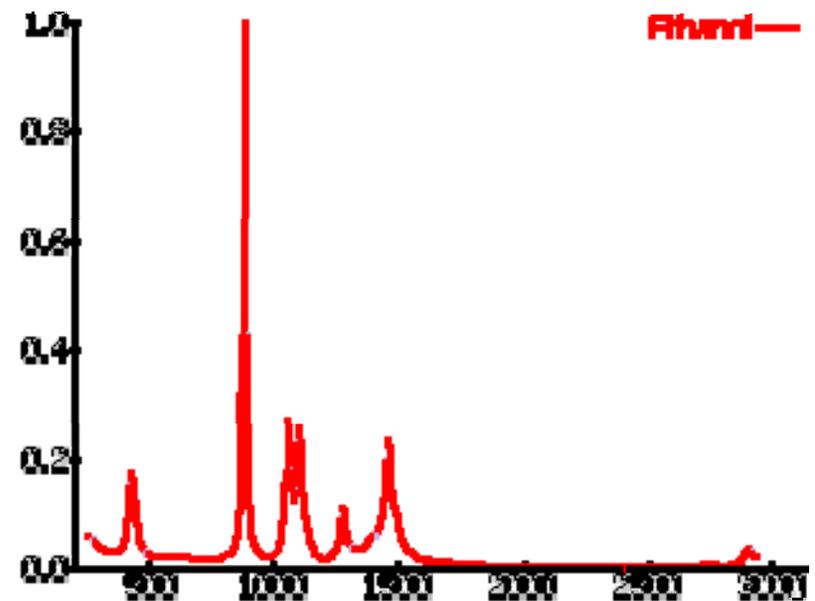
From Scan to Spectrum



From Spectrum to Identification



Scan spectrum



Library spectrum

Match  Identification!

Highly Fluorescent Substances Are Hard to Scan

- Fluorescence masks Raman light waves, like glaring light masks a photo



Fluorescence Interferes with Sample Identification

Black line:

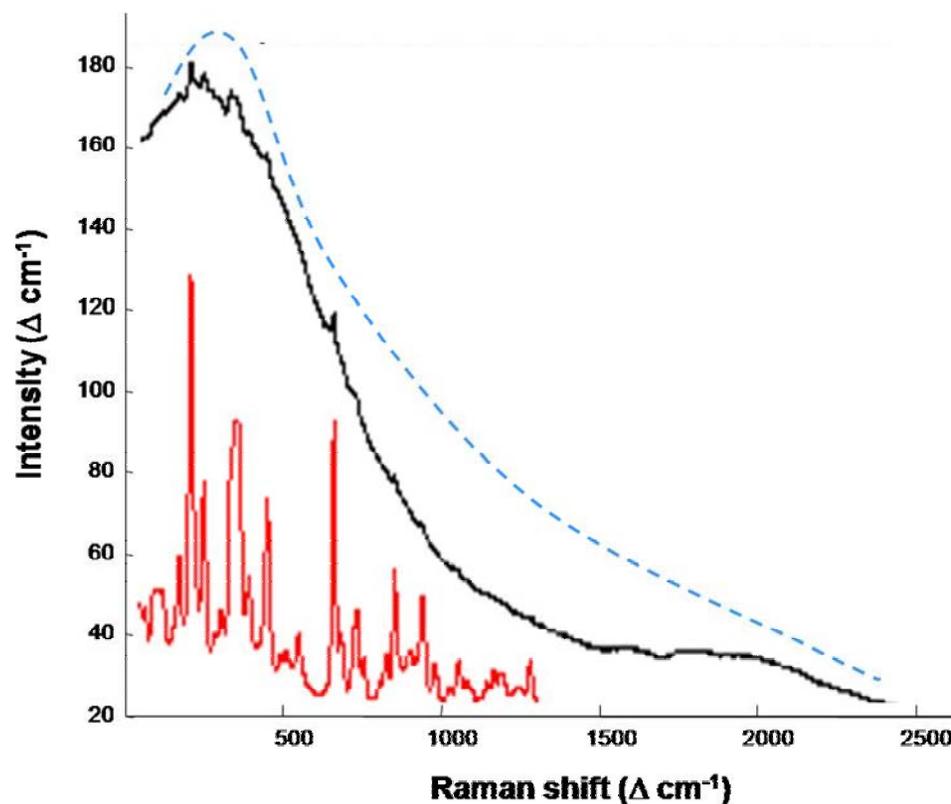
Obtained spectrogram

Blue line:

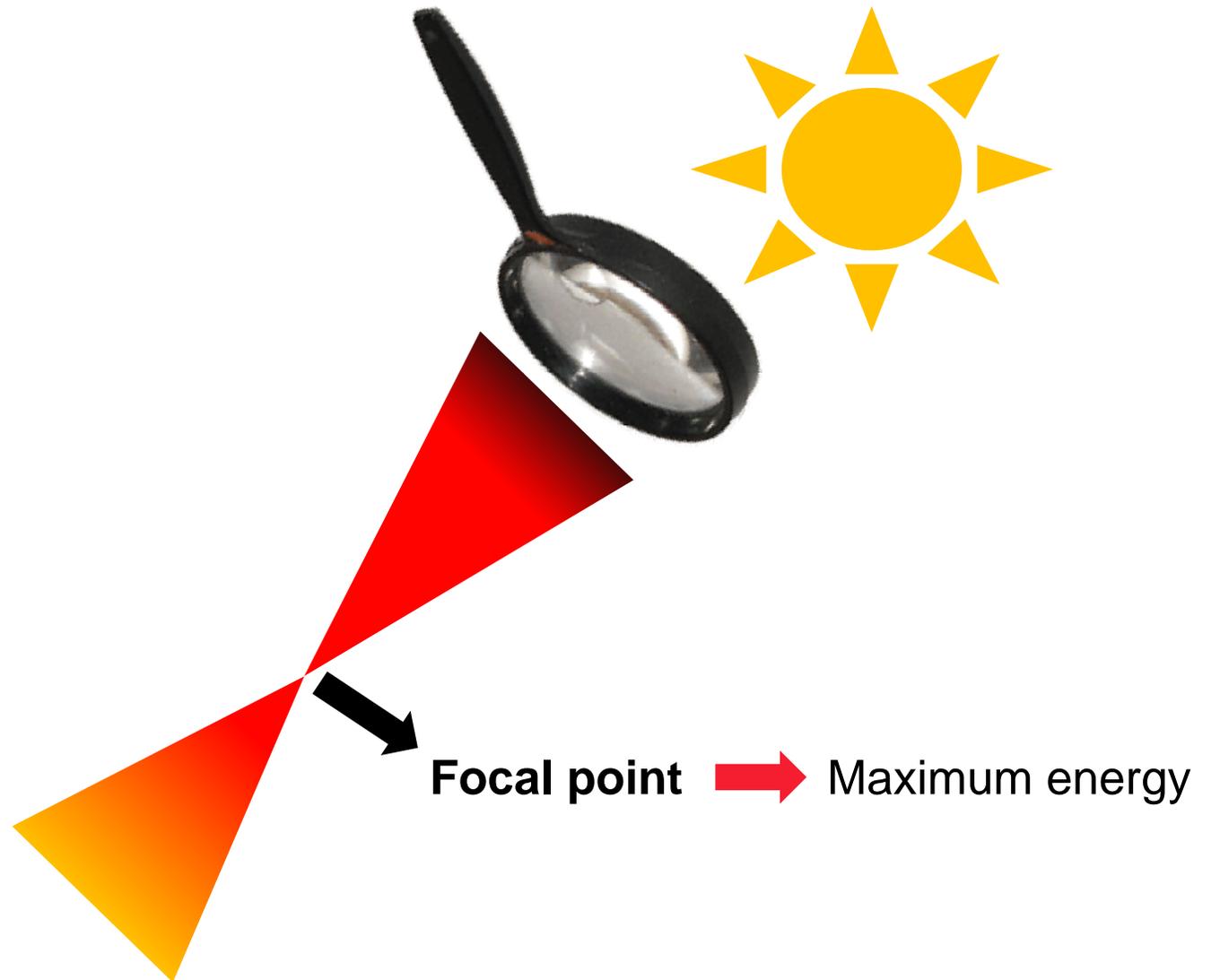
Fluorescence from sample

Red line:

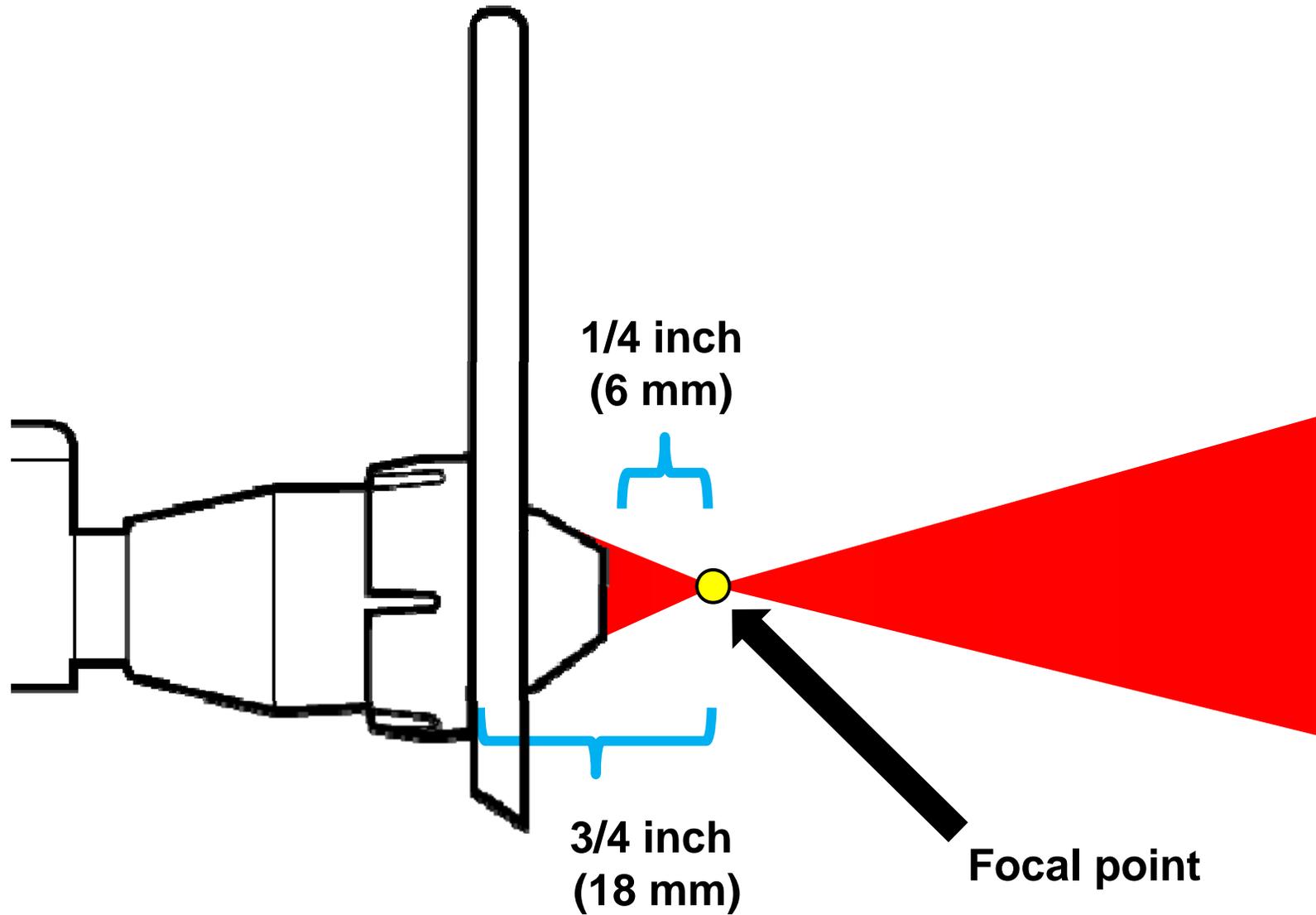
Masked Raman spectrogram



What Is the Laser Focal Point?



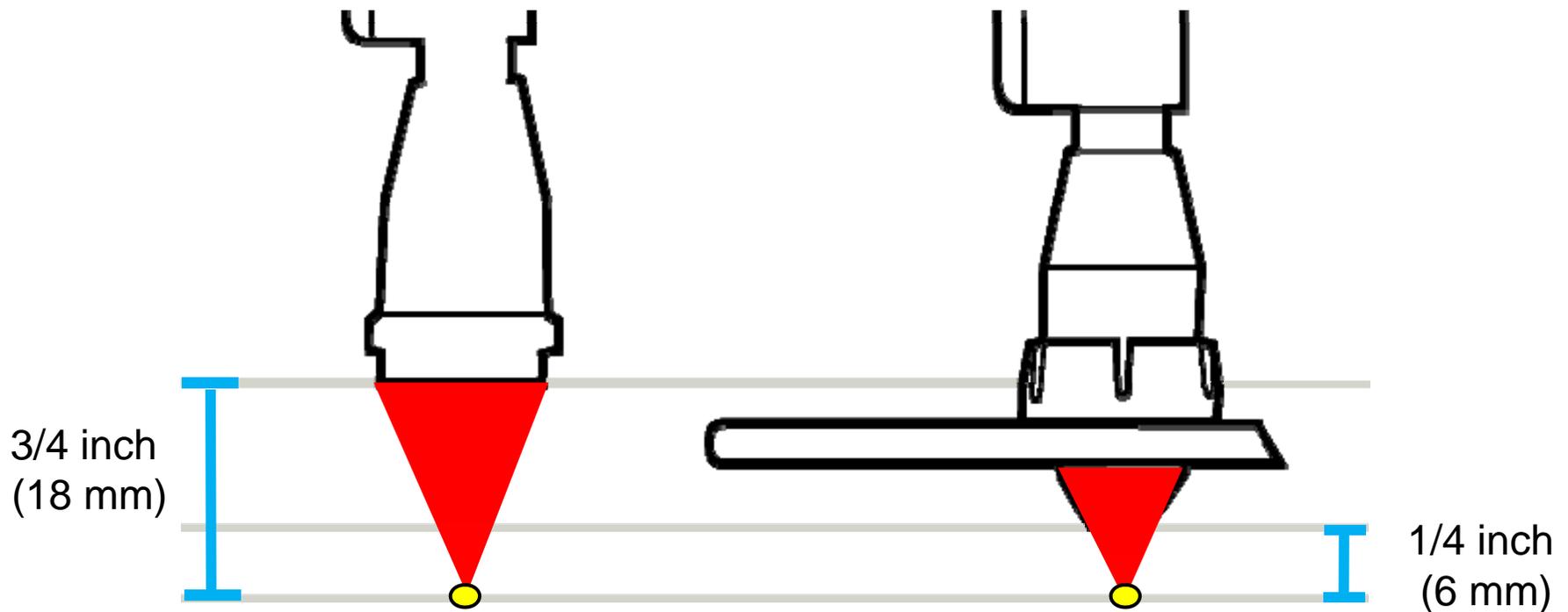
Where Is the Focal Point?



Does the Nose Cone Change Focal Point Position?

NO

- The nose cone does not change the position of the focal point
- It only helps you to position the laser aperture



Get the Focal Point Into the Sample!



FirstDefender RMX

SAFETY

What You Will Learn in This Section

1. Laser safety precautions
2. Guidelines for safely handling thermally sensitive materials

FirstDefender RMX Contains a Laser

- FirstDefender RMX operates with a 350mW, Class 3B laser
- FirstDefender RMX is not rated as intrinsically safe
- Failure to follow prescribed safety guidelines can cause:
 - Damage to the eyes
 - Hazard of fire
 - Hazard of explosion
- See the FirstDefender RMX User Manual for complete information about laser safety precautions

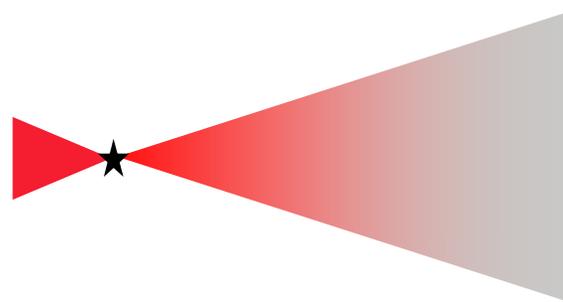


Lasers 101

- Collimated laser (example: laser pointer)
 - Emits parallel laser beams without divergence. Collimated laser beams remain collimated (parallel) over a distance, depending on beam diameter.
 - Typical laser pointers are 400 – 700 nm and 1 – 5 mW

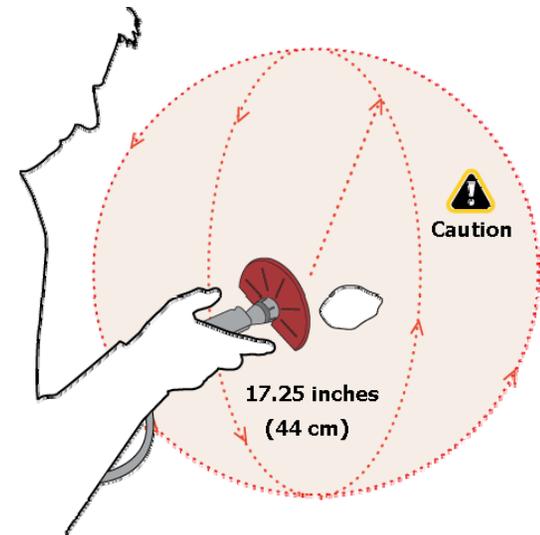


- Focused laser (example: FirstDefender RMX)
 - Emits focused laser beam to a focal point. Focused laser beams converge to a focal point and then diverge. The focal point distance depends on the focal length of the exit lens.
 - FirstDefender RMX laser is 785 nm and about 350 mW at focal point



Protecting Your Eyes During a Scan

- Do not point FirstDefender RMX at people
- Do not look at the laser aperture when the laser is on
- Raise the laser eye shield before beginning the scan
- Hold the instrument so that there is a minimum of **17.25 inches (44 cm)** of distance between your eyes and the laser aperture, to prevent severe eye damage
- Stay behind the laser eye shield until the scan finishes and the laser indicator light is turned off



Thermally Sensitive Materials: **CAUTION**

- Dark-colored solids absorb more laser energy than light-colored solids
- Thermally sensitive materials include:
 - Gunpowder, black powders, silver azide, match tips, black plastics, latex paint, cardboard
 - Dark-colored solids can absorb enough energy to ignite
 - Not all thermally sensitive items are dark-colored (for example, nitrocellulose)
- Thermally sensitive materials may ignite or explode if not scanned in a safe manner
- Always operate on LOW laser power when scanning potentially thermally sensitive materials



Thermally Sensitive Scenarios: **CAUTION**

- **Dark specks of contaminant** in an otherwise light-colored sample
 - Even though the primary sample does not look thermally sensitive, dark-colored contaminants could heat up the primary sample and cause ignition
 - This is true for all situations, not just EOD ones
- **Dark background or substrates**
 - Dark-colored background/substrates such as dark table tops can absorb heat and laser energy, especially under thinly spread samples
- **Thermally insulating papers**
 - Coffee filter papers and paper towels are made of dense cellulose fibers and can trap heat generated from the laser, which can cause low burn point explosives to detonate (such as HMTD)



Critical Safety Precautions

- When dealing with potentially energetic materials, follow these protocols:
 1. Perform a vial scan only, and **UNCAP the VIAL**
 2. Scan the smallest possible amount of material (< 300 uL: < 5 drops, or < 300 mg)
 3. Do not scan materials on filter paper or similar cotton bases
 4. When scanning in open space, a small pile of material is easier, and safer, than a thin layer (helps ensure that the focal point is within the sample)
 5. Never point the laser at people; maintain the Nominal Ocular Hazard Distance (NOHD): minimum 17.5 inches (44 cm)
 6. Wear personal protective gear as appropriate
 7. Do not scan thermally sensitive dark-colored materials (e.g., black powder)
 8. Lower the laser power setting to LOW
 9. Use the Scan Delay feature

Smallest Possible Amount for a Vial Scan



**Always follow your organization's
procedures and regulations for the
handling of unknown substances**

FirstDefender RMX

PERFORMING SCANS

What You Will Learn in This Section

1. How to arm the laser
2. Purpose and procedure for performing a self test
3. How to create and name a new session
4. How to perform a scan in vial mode and point-and-shoot mode
5. Types of scan results
6. How to use the library
7. Characteristics of good and bad spectra

Arming the Laser

- Press the Arm key
- Enter the password:
 - Press the left arrow twice
 - Press the down arrow once
 - Press the Enter key
- Remember:
Left, Left, Down, Enter
- To deactivate the laser, press the Arm key

Keys light up



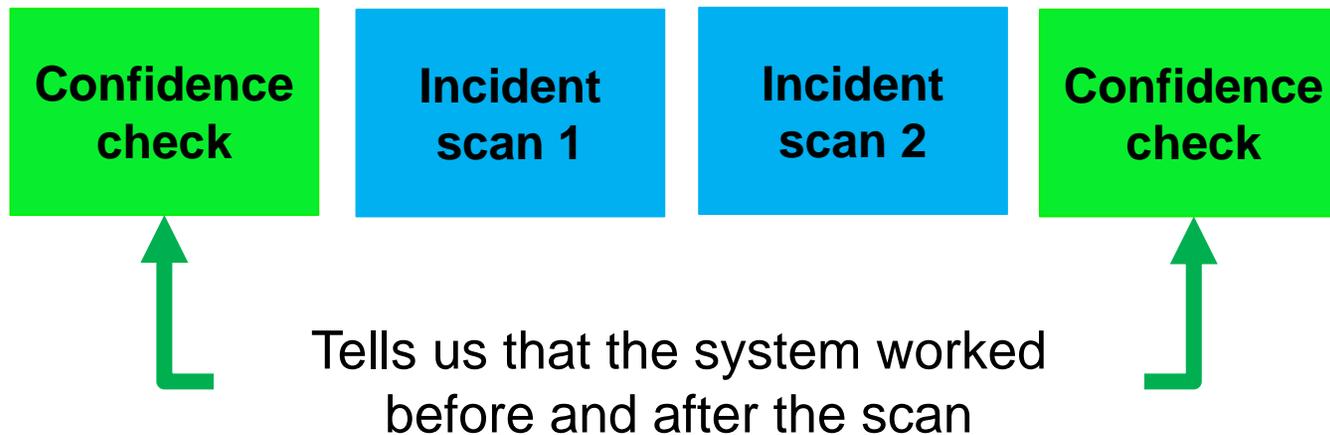
What Is the Self Test?

- **Purpose:** Performs an instrument calibration check
- **When:** At the start of every shift, before and after scans in criminal cases
- **How it works:** The instrument performs internal checks during a scan of the polystyrene test rod (in the carrying case)



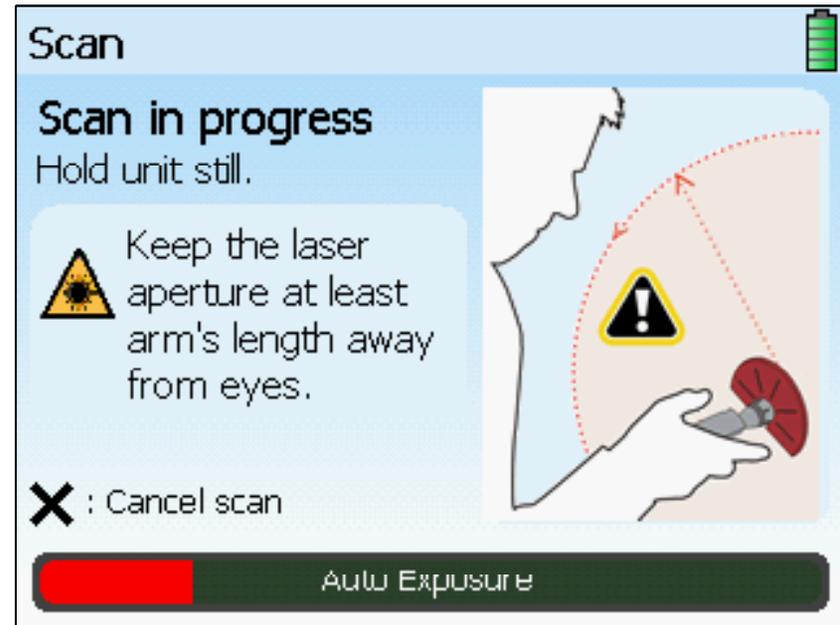
Self test Is Helpful for Investigations

- In a criminal investigation (Arson, Explosives), scan data may be used as evidence
- Self test strengthens your evidence

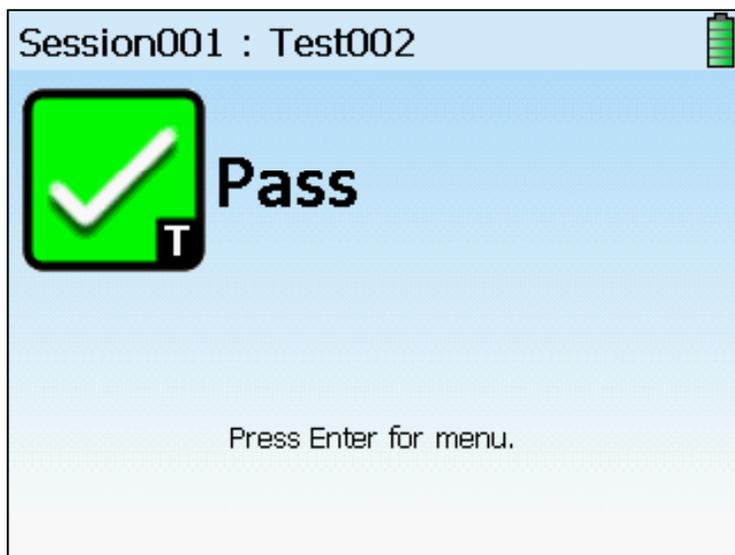


Self Test Procedure

1. Put the polystyrene rod into the vial compartment and arm the laser
2. Select **Tools** > Enter key
3. Select **Self test** > Enter key
4. Select **Go** > Enter key
5. Hold the instrument still during the scan



Self Test Results



- The instrument is operating within specifications



- Clean the rod and repeat
- If the result persists, take the instrument out of service and contact Customer Support

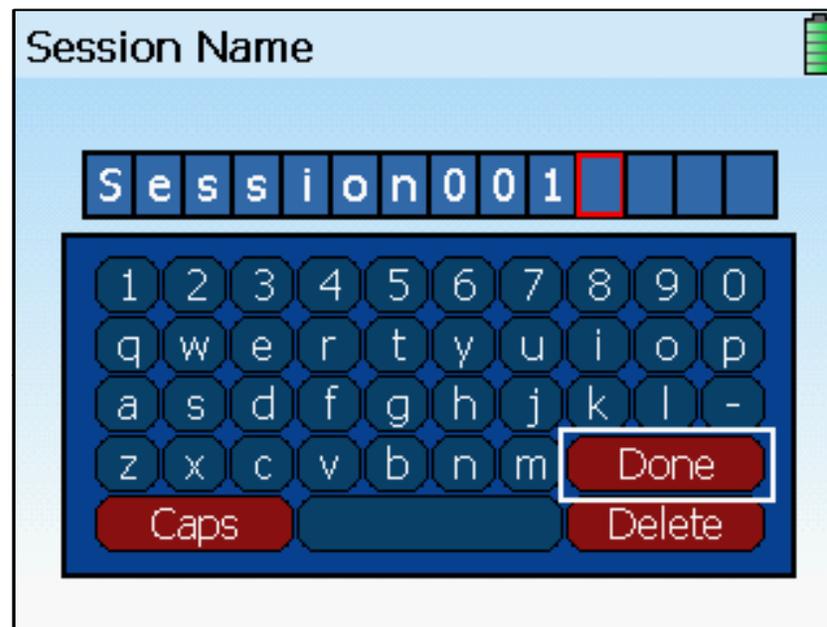
Creating a Session to Store a Scan

The screenshot shows a 'Review' window with two tabs: 'Session001' (selected) and 'Session002'. A list of scans is displayed, with the top entry highlighted in green. The highlighted entry is 'Scan026' at 4:46 PM on 3/10/2010, with a 'Positive Match: 2-Propanol, test' result. Below it are 'Scan025', 'Scan024', 'Scan023', 'Scan022', 'Scan021', and 'Scan020'. Red arrows point to the scan list from the left.

Scan ID	Time	Date	Result
Scan026	4:46 PM	3/10/2010	Positive Match: 2-Propanol, test
Scan025	4:46 PM	3/10/2010	
Scan024	4:45 PM	3/10/2010	
Scan023	4:42 PM	3/10/2010	
Scan022	4:42 PM	3/10/2010	
Scan021	4:05 PM	3/10/2010	
Scan020	4:04 PM	3/10/2010	

Creating a New Session

- Press the Scan key
- Select **Session** > Enter key
- Select **Create new session** > Enter key
- Enter a session name
- Select **Done** to accept the name



What Happens If You Don't Create a New Session?

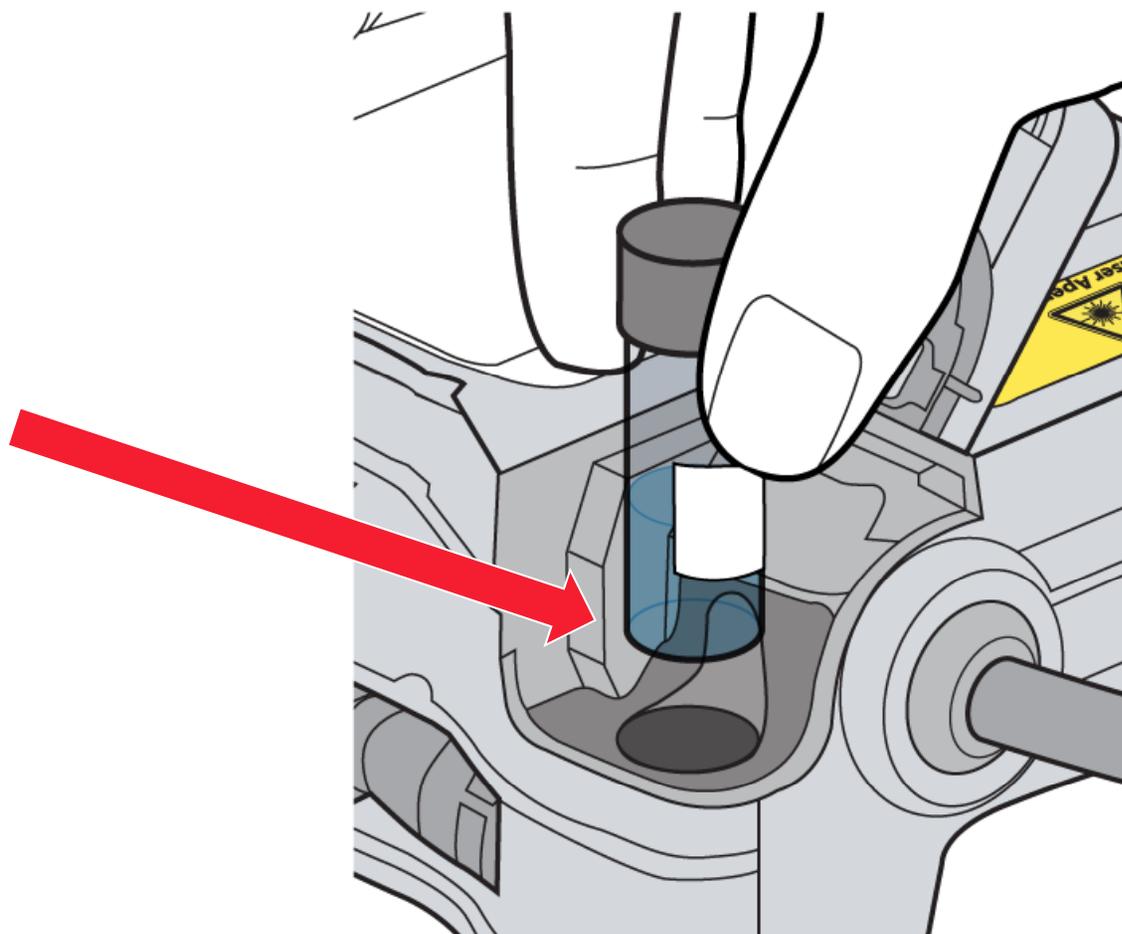
- FirstDefender RMX stores your scans in a session named session000N (where N is a number)
- **FirstDefender RMX saves all scans**

Scanning in Vial Mode

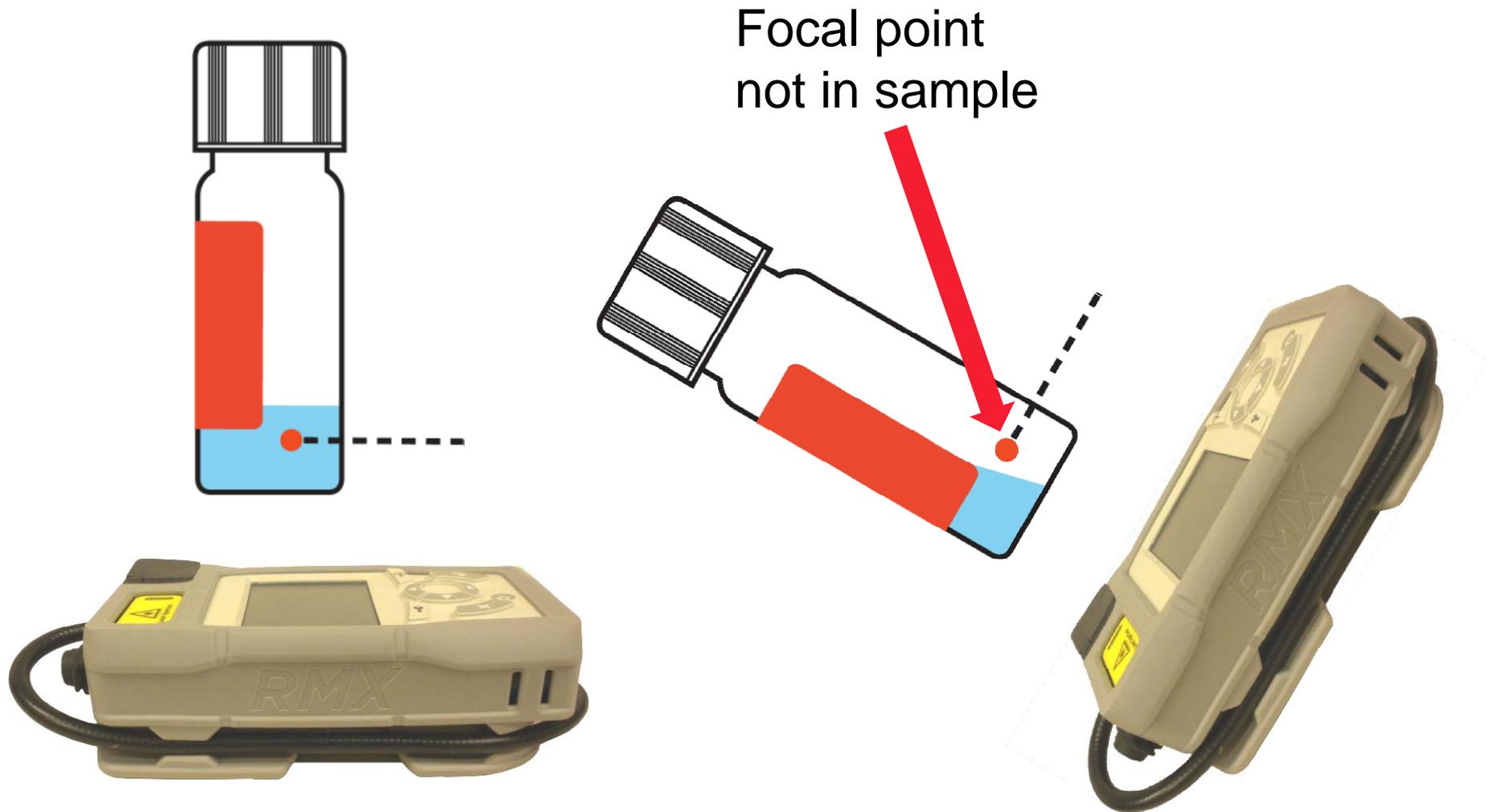
- Useful when:
 - You can't scan through the container
 - You only have a small amount of a substance
 - Site conditions demand delayed scanning
- Can scan liquids, pastes, and powders in vial mode
- **Focal point is always correctly positioned in vial mode**



How to Position a Labeled Vial

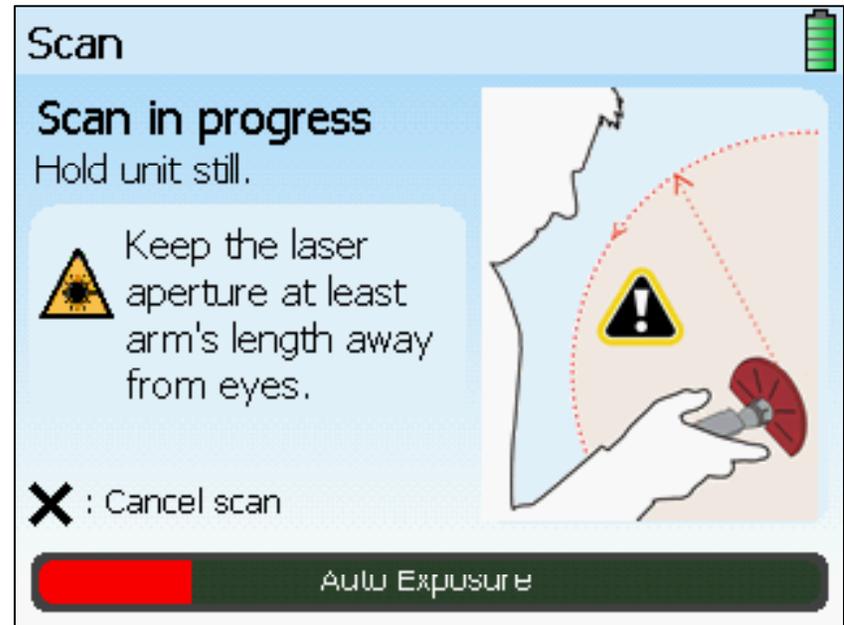


Hold the Instrument Level



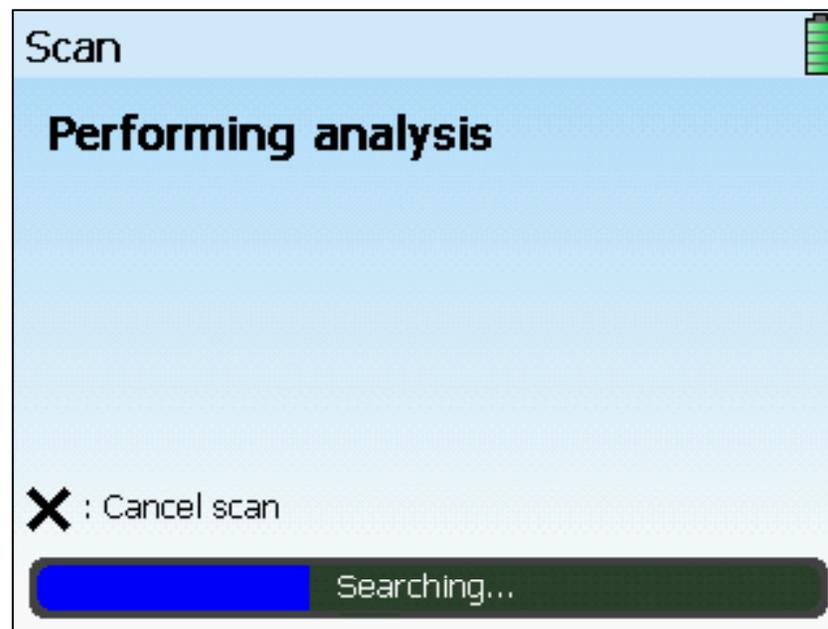
Perform the Scan

- Check battery power (at least 3 bars in icon)
- Put vial into the vial compartment
- Press the Scan key
- Press the Enter key or Scan key
- Hold the instrument still and watch the display



When the Scan Finishes

- The instrument compares the collected sample spectrum against the on-board library
- You can move the instrument



Result: Single Positive Match

- The data matched one library item

Result name → Session002 : Scan012

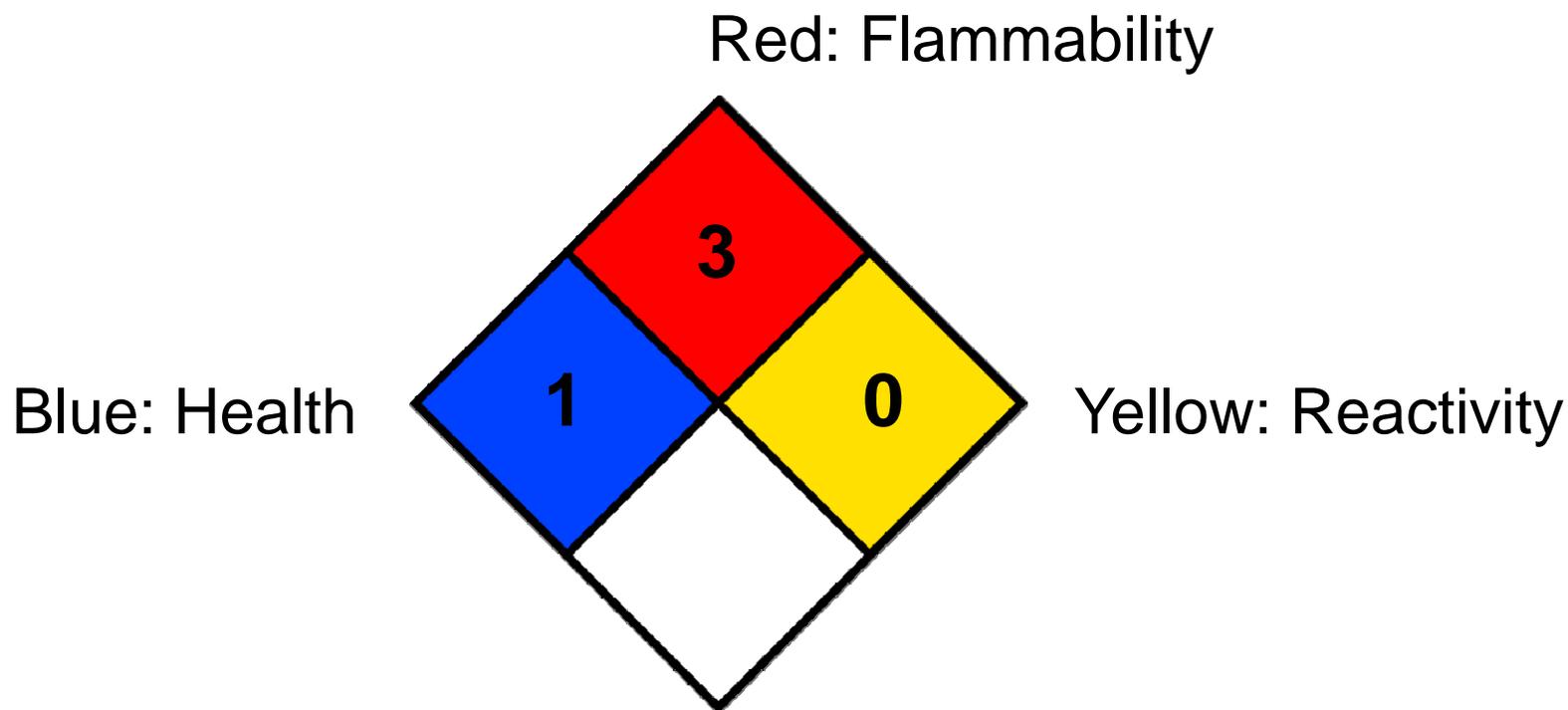
Library category → **Acetone**
EPA-HVP 1990, Household/Commercial, IT...
CAS: 67-64-1

Chemical Abstract Service (CAS) record number → CAS: 67-64-1

← **NFPA 704**

1 match found

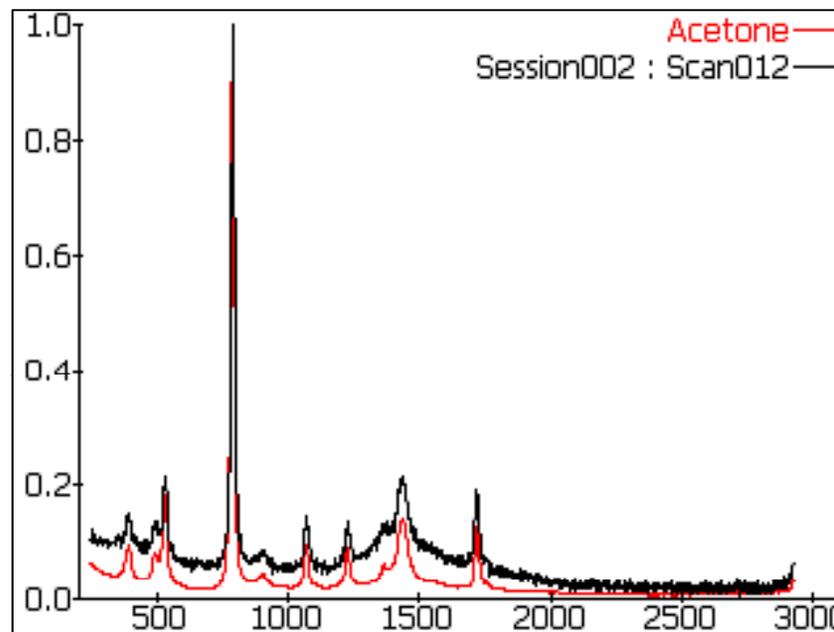
Understanding the NFPA 704 Diamond



Numbers rank risk:
0, little or no risk
4, severe risk

Viewing the Spectrum for the Scan Results

- Enter Key > select **View Spectrum**
> Enter key
- **Red line** is the library spectrum
- **Black line** is the scan data



View Library Info for Acetone

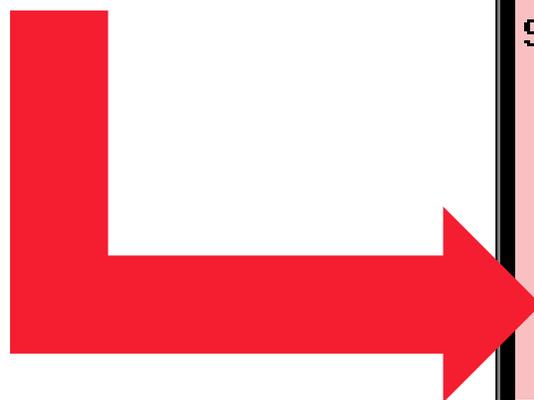
- Escape key > return to scan results
- Enter key > select **View info** > Enter key
- Use the arrow keys to open other tabs

Acetone		Desc	NIOSH	Gear	Fire	FirstAid
Description						
CAS:	67-64-1					
UN:	1090					
Formula:	$(\text{CH}_3)_2\text{CO}$					
Mtl Vend/Source:	Alfa Aesar stock #30698 lot# G16P102					
Hazard Ranking:	Critical					
Principal Hazard:	Flammability					
General Description						

The Synonym List Is Handy

- Library Desc tab includes a list of **synonyms** for chemicals
- Example: What is 2 propanol?

Rubbing alcohol



2-Propanol Desc NIOSH Gear Fire FirstAid

...ate standing pools of liquid. (REACTIVITY, 2003)"

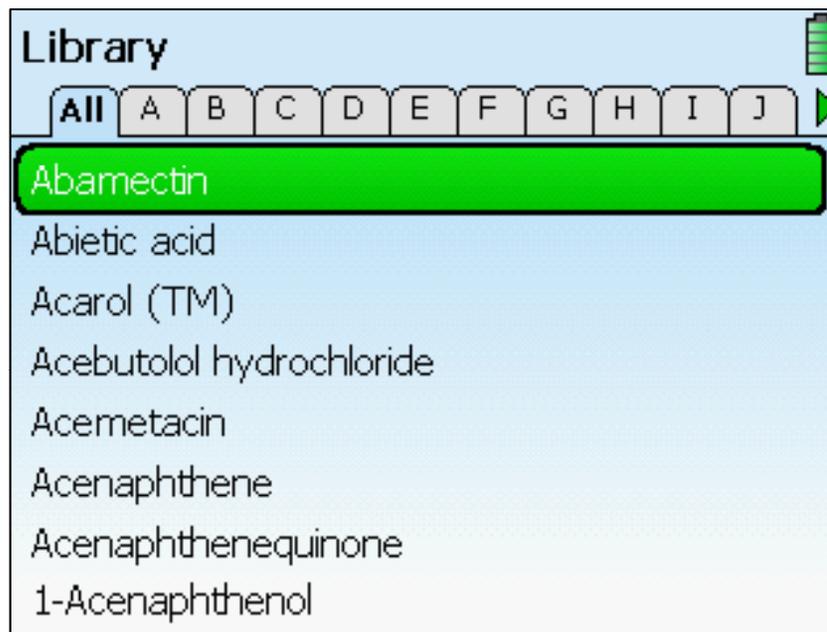
Air & Water Reactions
Highly flammable. Water soluble.

Synonyms

- 2-Propanol
- Dimethyl Carbinol
- IPA
- Isopropanol
- Isopropyl Alcohol
- Rubbing Alcohol
- 1-METHYLETHANOL
- 1-METHYLETHYL ALCOHOL

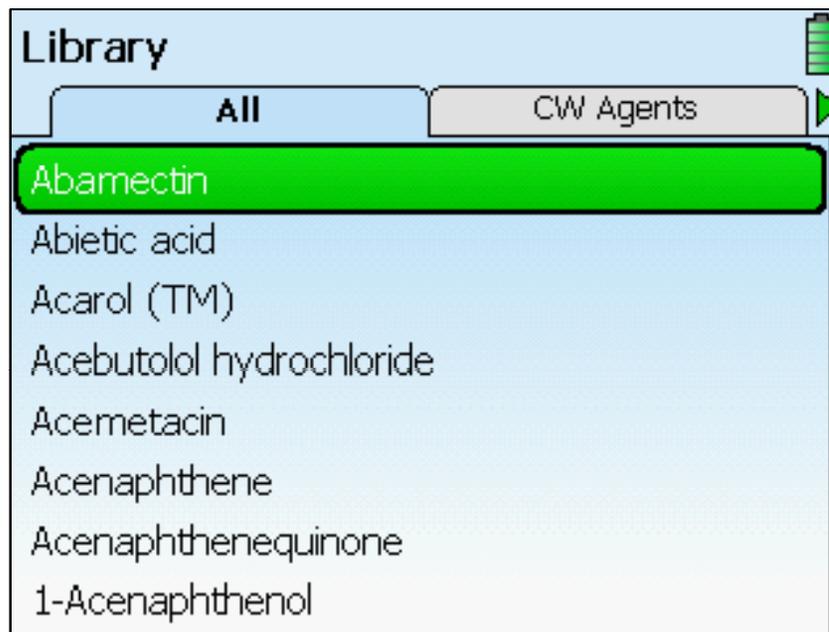
Viewing Other Library Items

- About 10,000 items in the FirstDefender RMX library
- Press the Escape key until the main menu appears
- Select **Library** > Enter key



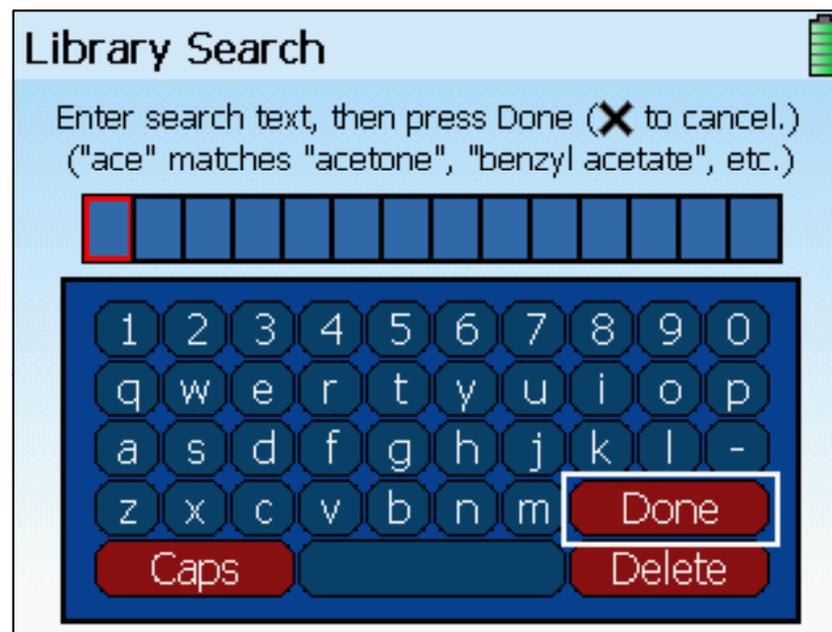
Viewing Library Items by Category

- Default view is alphabetical
- Enter key > select **View: Name**
- Right/left arrow key to select **View: Type** > Enter key
- Press the Enter key twice



Searching the Library

- Press the Escape key until the main menu appears
- Press the Enter key
- Select **Search Items** > Enter key



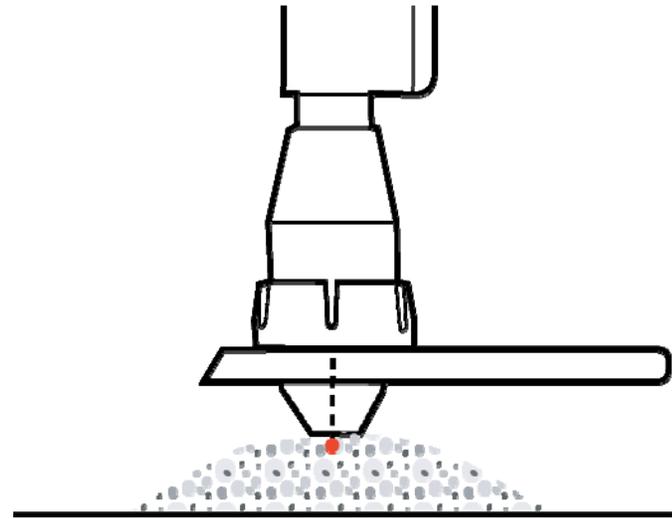
Adding Items to the Library

- Only recommended for advanced technical users
- Involves performing a special scan of a substance (library scan)
- Custom library items are tagged “User”
- For more information on building libraries, contact Thermo Fisher Scientific Customer Support

Scanning Powders in Point-and-Shoot Mode

new photo

Position Focal Point at Surface of Pile



**NEW
PHOTO**

Result: Multiple Positive Match

- The data matched two or more library items

Session002 : Scan013 

Dextrose monohydrate
Pharmaceuticals, White Powders
CAS: 14431-43-7 

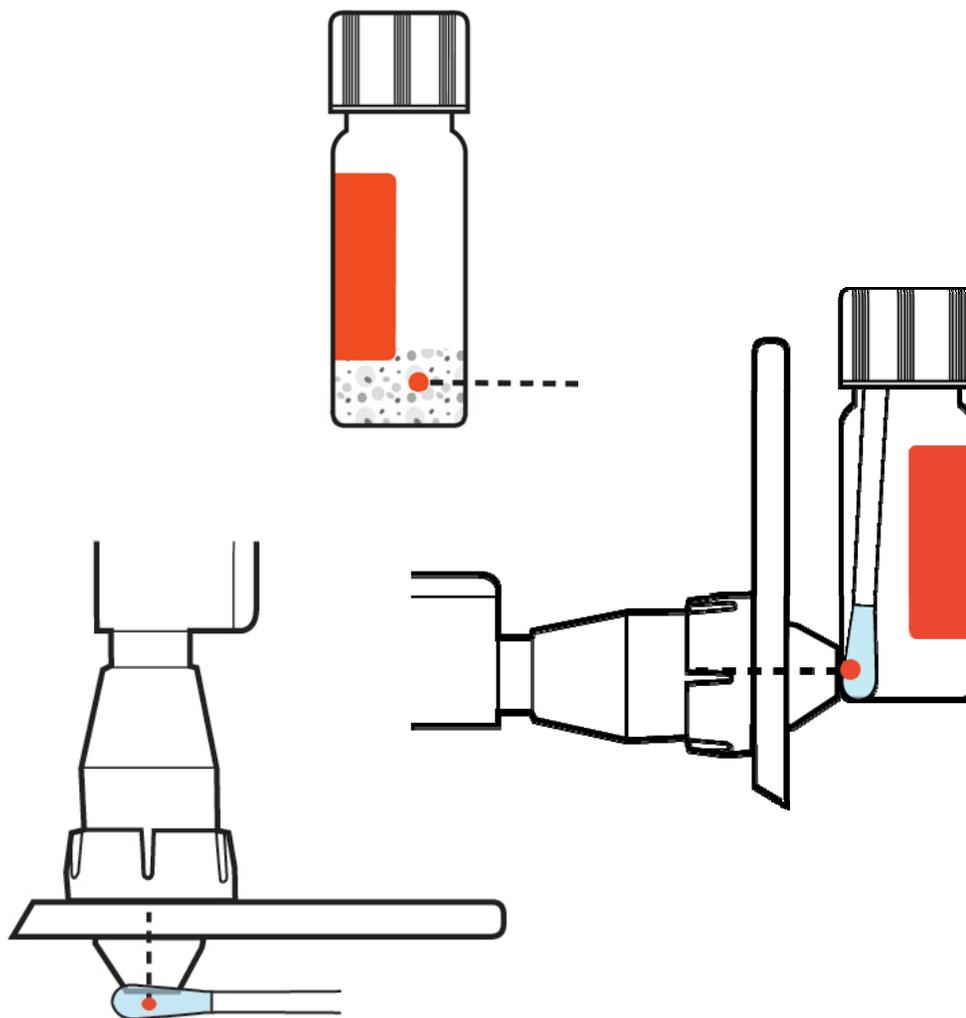
Sweet'n'Low sweetener

Equal sweetener

Splenda sweetener

4 matches found

Dealing with Small Amounts of Powder



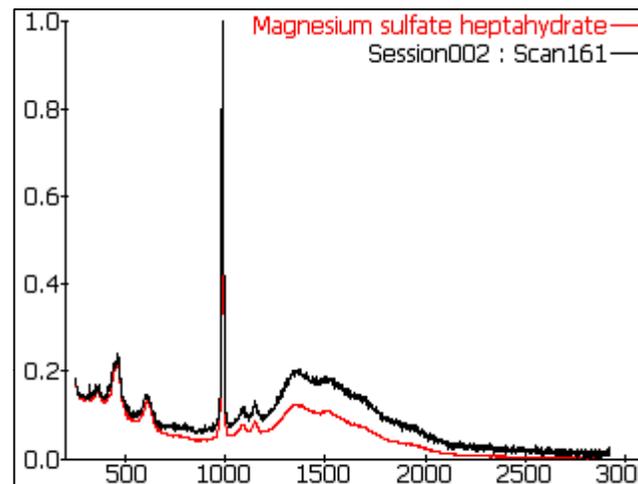
Viewing Spectra for Multiple Positive Match

Session002 : Scan161

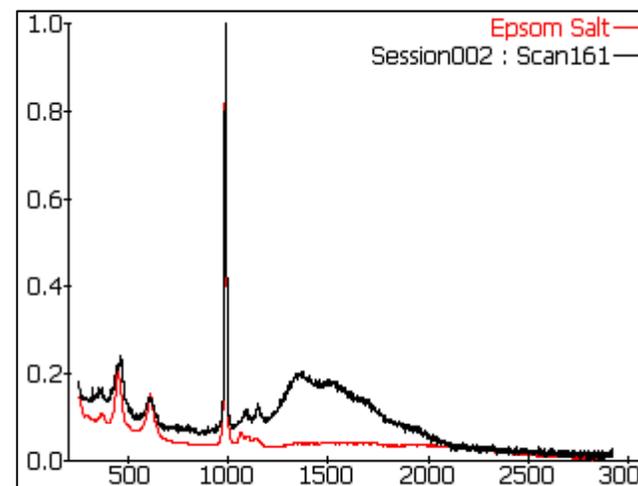
Magnesium sulfate heptah...
Industrial Chemicals, Pharmaceuticals
CAS: 10034-99-8

Epsom Salt

2 matches found

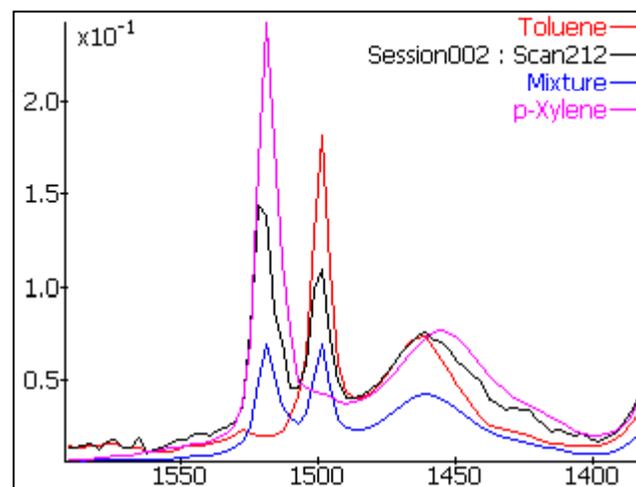
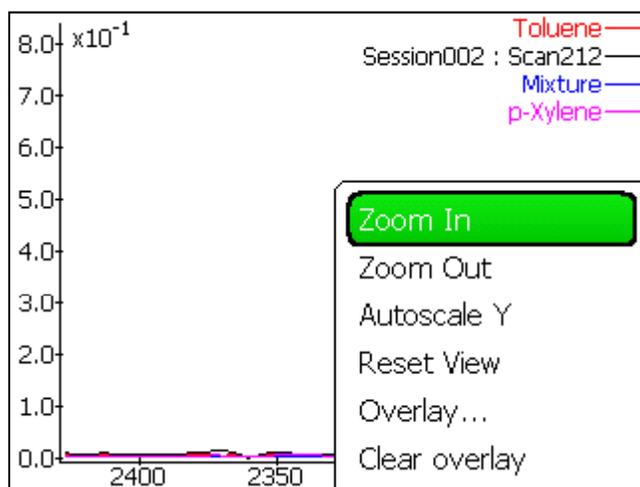


Press the down arrow
to see next spectrum



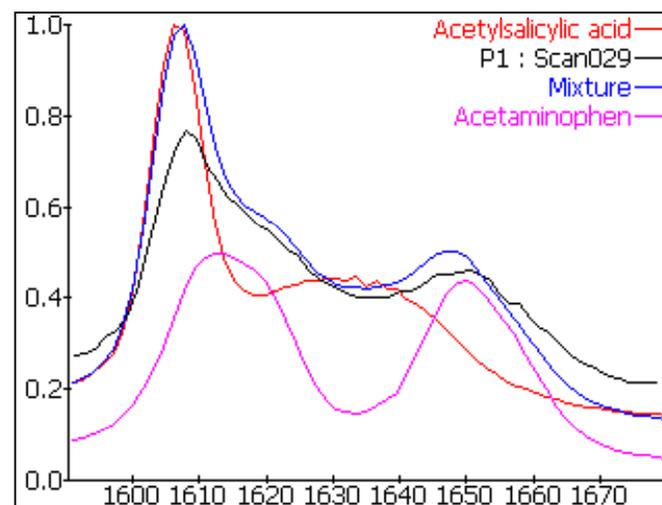
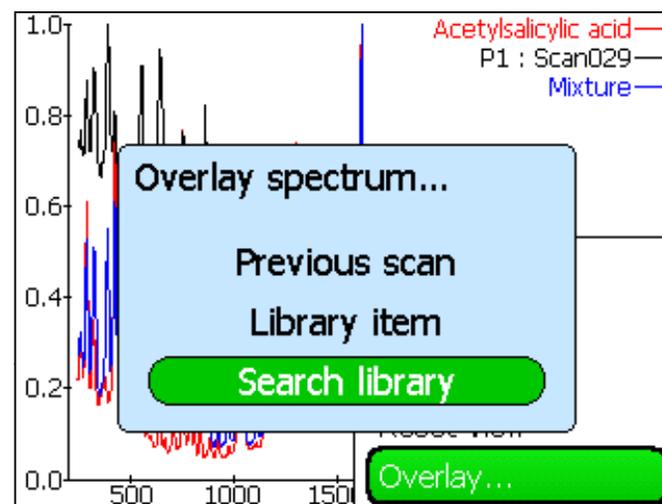
Zooming the Spectrum

- Allows you to view a spectrum in greater detail
- Assists in comparing multiple items

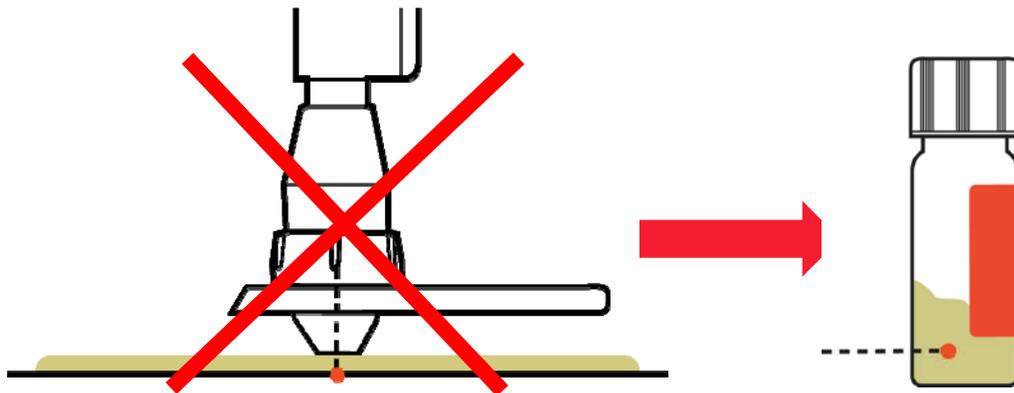
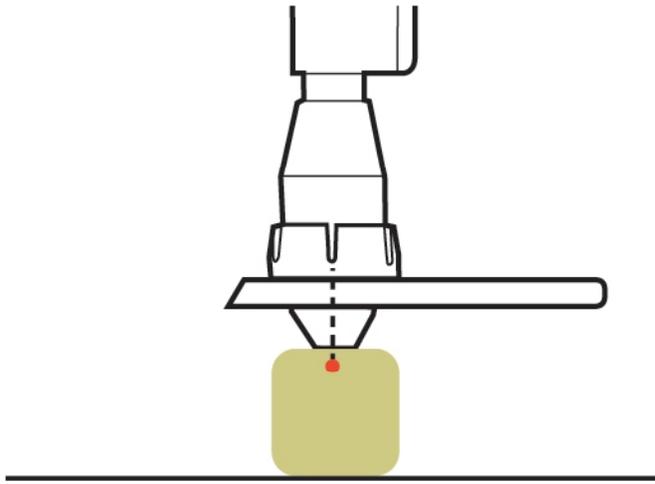


Overlaying the Spectrum

- You can overlay two spectra to compare the relationship between two samples
- You can compare against library items or previous scans



Scanning Solids in Point-and-Shoot Mode



Result: Mixture

- A mixture of library items matched the data

Name	Weight
Acetaminophen Pharmaceuticals, White Powders	71%
Acetylsalicylic acid	26%

Potential mixture identified, 98% explained

Scanning Containers



Can the Laser Penetrate the Container?

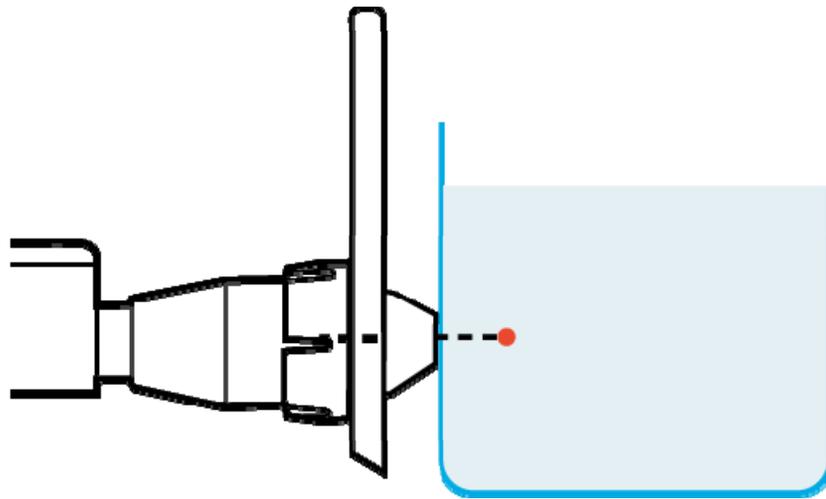
Yes

No

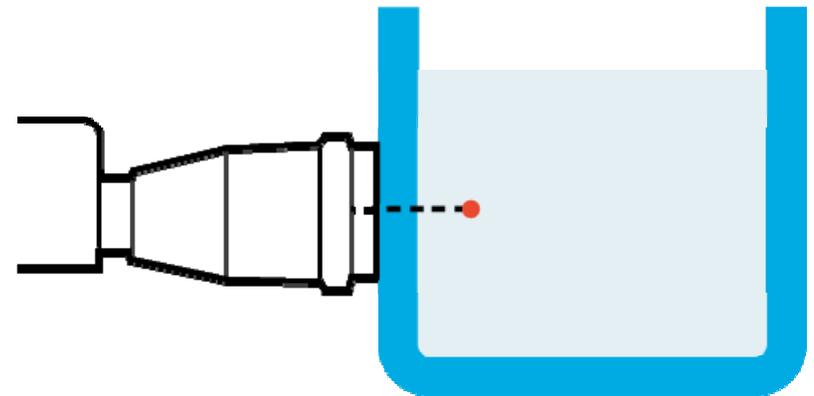


When to Use the Nose Cone for Containers

Focal point is same position in both cases!



1/8 (2mm) or less thick



> 1/8 (2mm) thick

Result: Single Positive Match

- The data matched one library item

The screenshot displays a software interface for a scan. At the top, it reads "Session001 : Scan004" next to a battery icon. Below this, a green box highlights the match information: "Acetone", "EPA-HVP 1990, Household/Commercial, IT...", and "CAS: 67-64-1". To the right of this text is a diamond-shaped hazard symbol with the numbers 1, 3, and 0. At the bottom of the interface, a green bar indicates "1 match found".

Plastic Bags and Thin Envelopes Are Containers Too



Result: Multiple Positive Match

- The data matched two or more library items

Session002 : Scan013 

Dextrose monohydrate
Pharmaceuticals, White Powders
CAS: 14431-43-7 

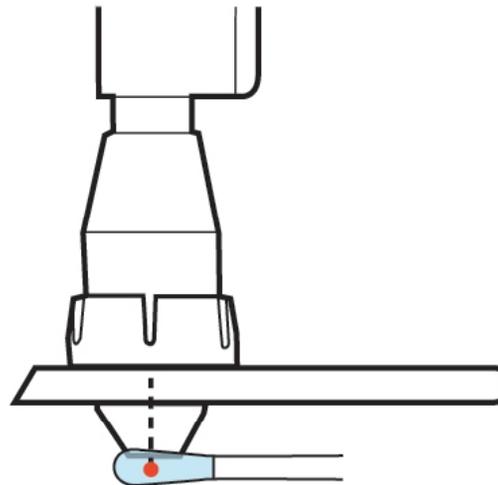
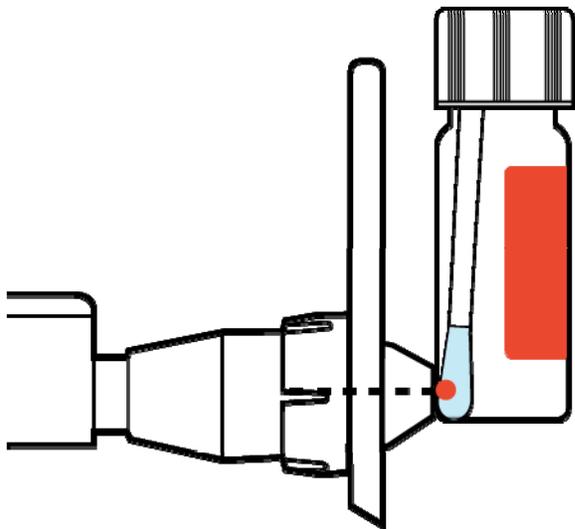
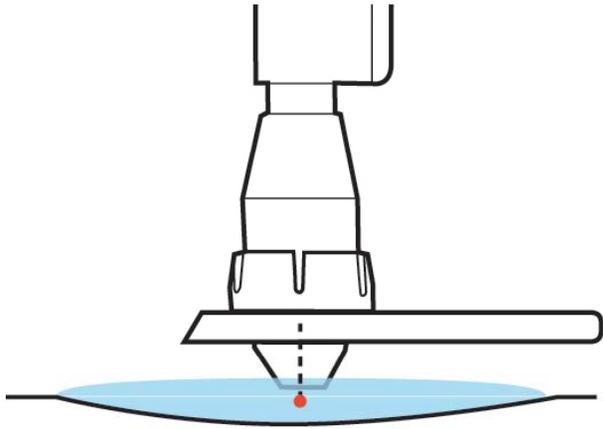
Sweet'n'Low sweetener

Equal sweetener

Splenda sweetener

4 matches found

Scanning Exposed Liquids



Why Is My Scan Taking So Long?

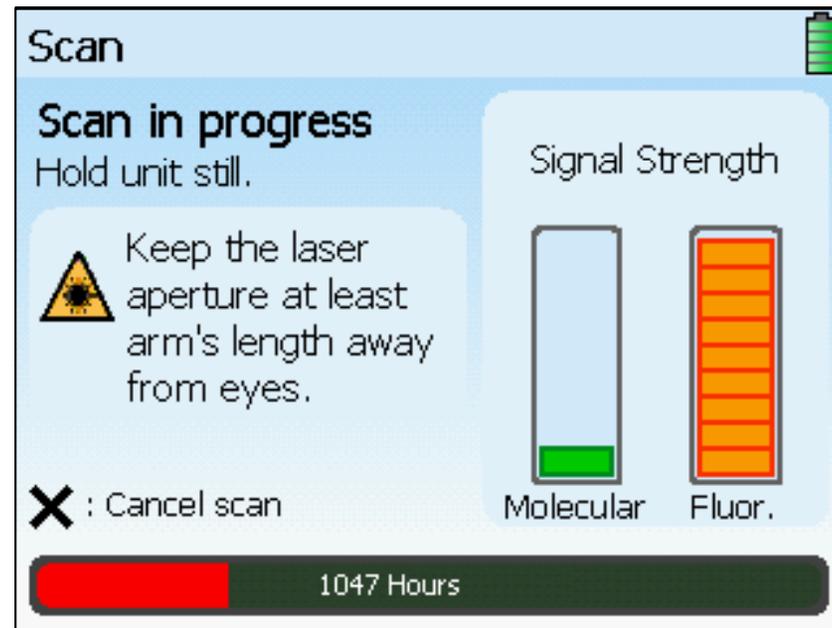
- Results usually display in 30 to 60 seconds
- Scans that take longer than 5 to 10 minutes usually don't finish (although there are exceptions)
- You may be scanning a substance that:
 - Has very weak or no molecular signal (for example, table salt, flour)
 - Is diluted with water
 - Has high fluorescence (for example, brake fluid, coffee, biological materials)
- The focal point may not be positioned in the sample
- The ambient light is interfering with the spectrometer

Environmental Conditions Can Delay Scan Time

- Bright lights can delay a scan
- Shade the nose cone or the vial compartment when scanning in a brightly lit environment
- When performing a vial scan in the presence of fluorescent lighting, put a finger over the tip of the nose cone

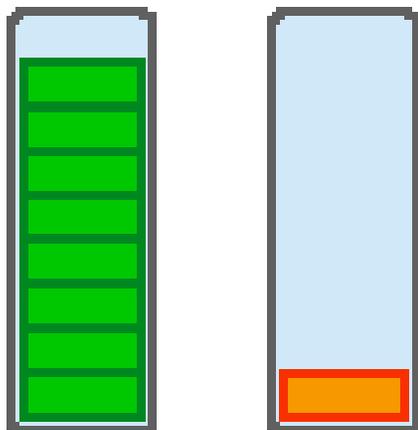


How Fluorescence Affects Scans

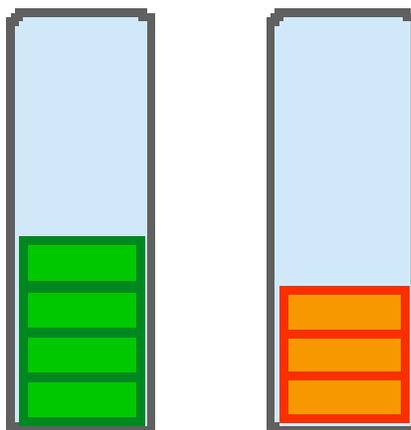


1047 hours!

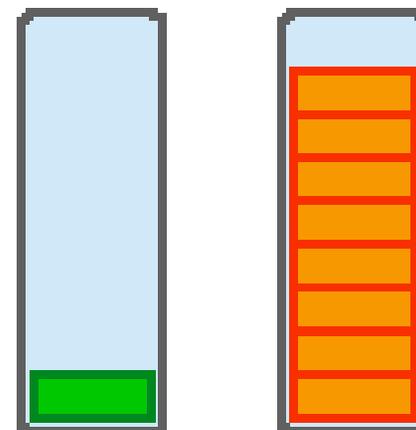
Using the Signal Meter



Strong Raman signal
Weak fluorescence



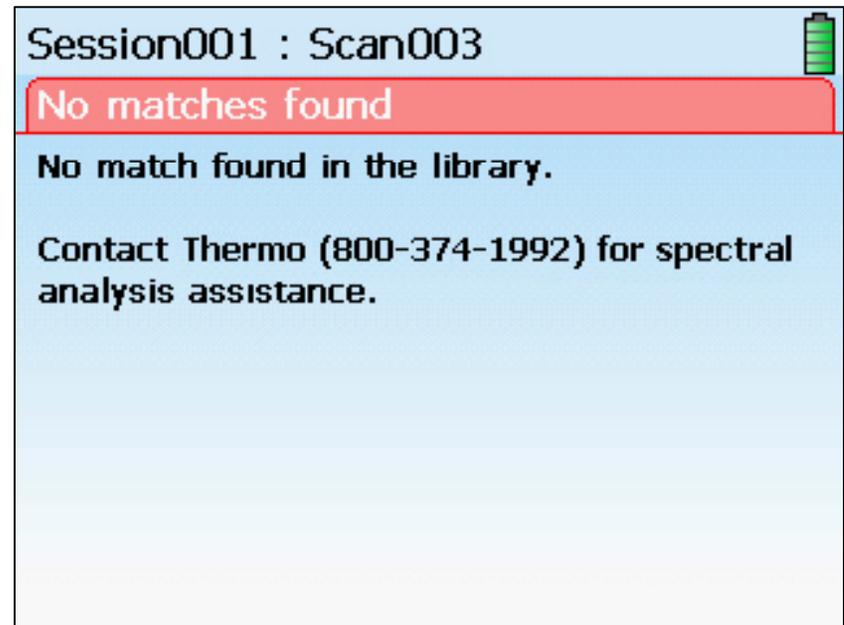
Good Raman signal
Low fluorescence



Weak Raman signal
Strong fluorescence

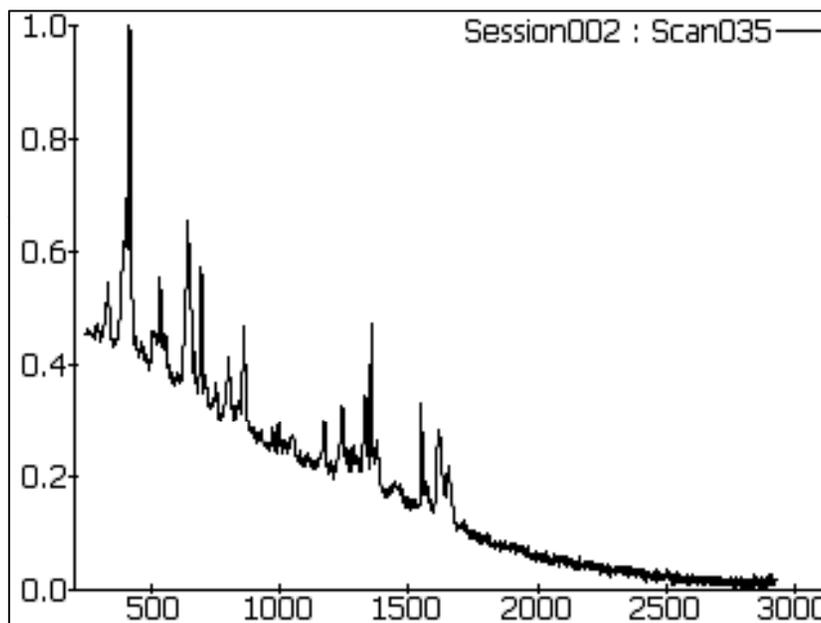
Result: No Match

- The data did not match anything in the library
- Read the screen
- View the spectrum
- Check library
- Repeat the scan **3 times**
- Contact Thermo Fisher Scientific Customer Support if you continue to get result
- Technology toolbox



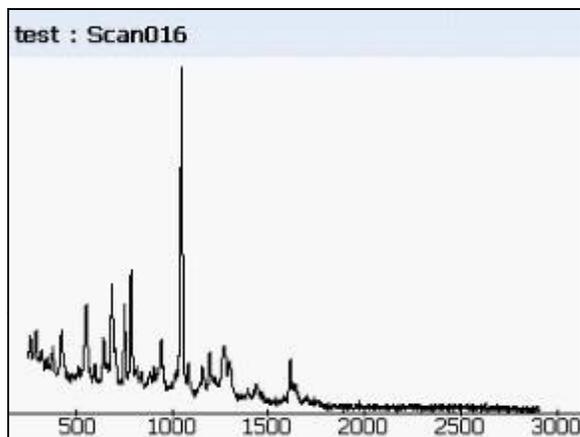
No Match Found result may have useful data!

Good data detected



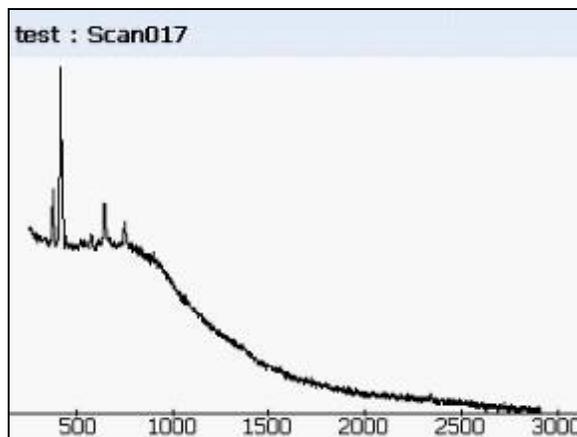
Substance is either not in library or
is an unresolvable mixture

Spectra for for No Match Found Screens



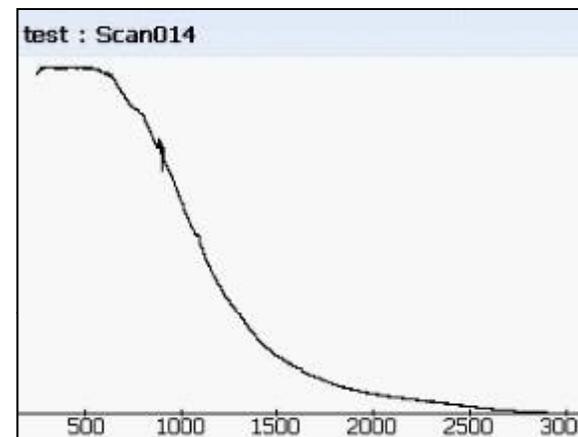
Good spectrum

Check library
Re-scan
Contact Thermo
Scientific Customer
Support



Weak or poor signal

Re-scan
Contact Thermo
Fisher Scientific
Customer Support



High fluorescence

Toolbox

Result: Similar Match

- The instrument could not make a positive match
- This result lists library items that are similar to the data
- Does not mean the identified chemical is present
- Only means the data is **similar to** the identified chemical
- Repeat the scan

The screenshot displays a software interface for a scan. At the top, it reads 'Session002 : Scan025'. Below this, a yellow box contains the following information: 'Diethylamine', 'ITF-40, UN', and 'CAS: 109-89-7'. To the right of this text is a diamond-shaped hazard label with the number '3' in the top and bottom quadrants and '0' in the right and left quadrants. At the bottom of the interface, a yellow box contains the text 'A similar item found; verify with other means', which is circled in red.

Result Screens Review

Session001 : Scan014

Sodium bicarbonate
ITF-40, Pharmaceuticals, White Powders
CAS: 144-55-8

1 match found

Session002 : Scan013

Dextrose monohydrate
Pharmaceuticals, White Powders
CAS: 14431-43-7

Sweet'n'Low sweetener
Equal sweetener
Splenda sweetener

4 matches found

Session002 : Scan016

Name	Weight
Acetaminophen Pharmaceuticals, White Powders	71%
Acetylsalicylic acid	26%

Potential mixture identified, 98% explained

Session002 : Scan025

Diethylamine
ITF-40, UN
CAS: 109-89-7

A similar item found; verify with other means

Session001 : Scan003

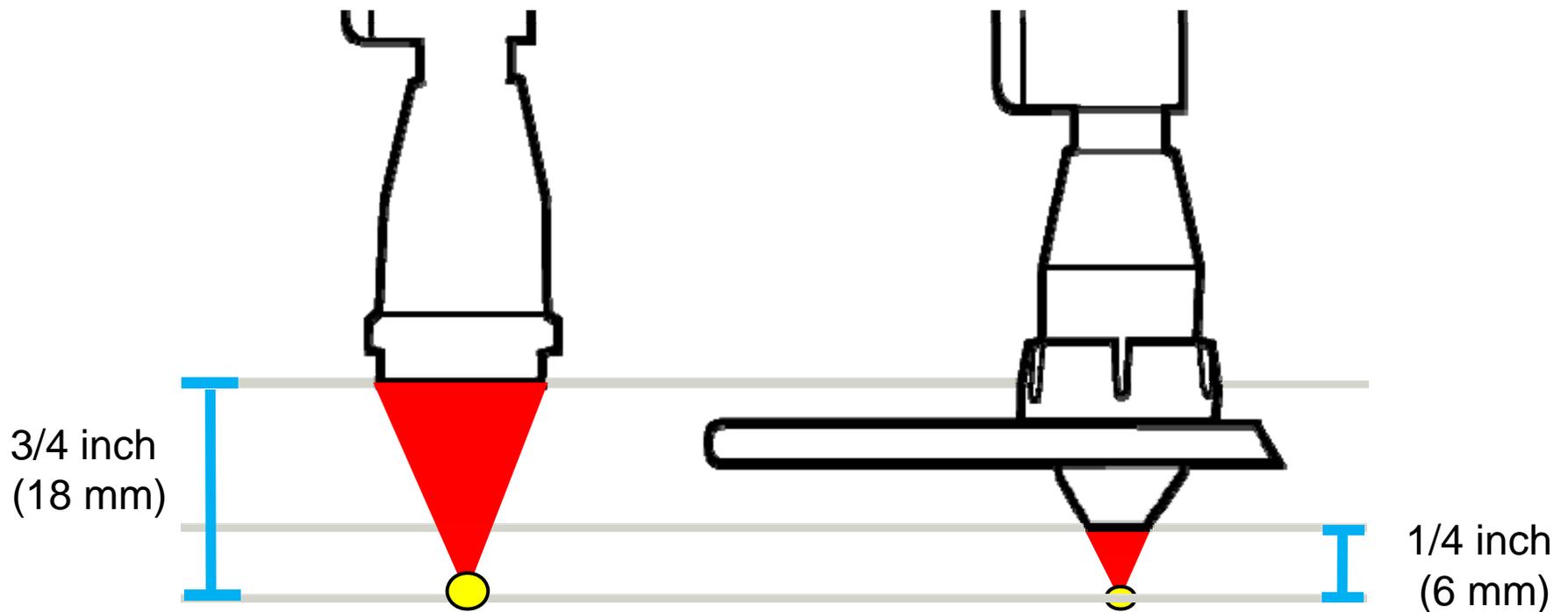
No matches found

No match found in the library.

Contact Thermo (800-374-1992) for spectral analysis assistance.

Focal Point Review

- The nose cone does not change the position of the focal point
- It only helps you to position the laser aperture

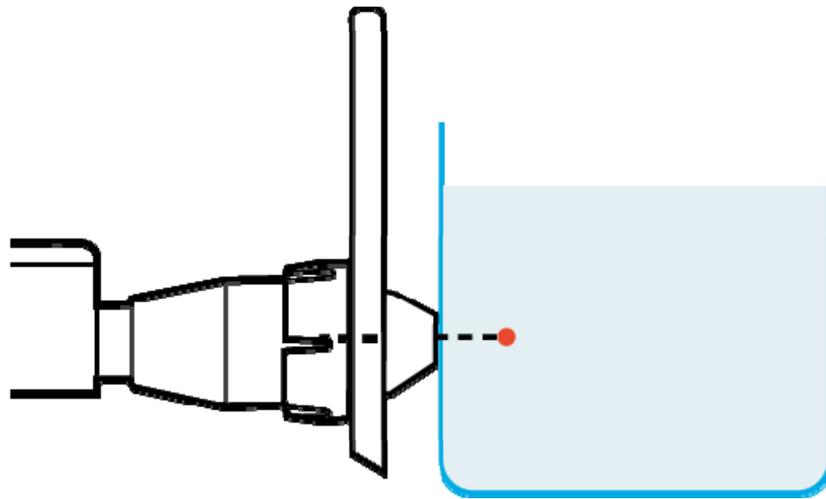


Get the Focal Point Into the Sample!

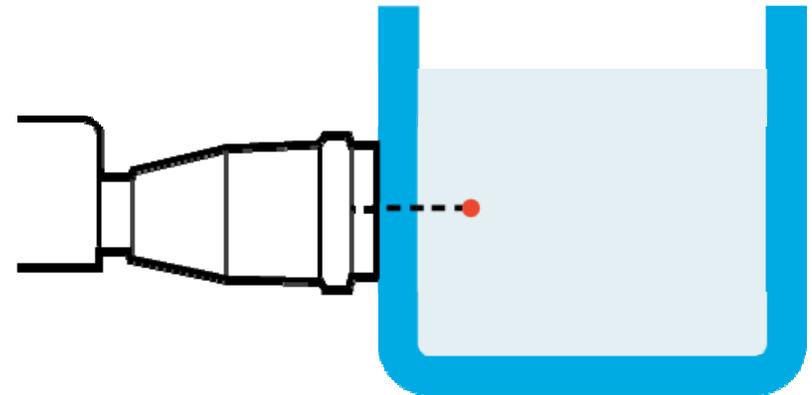


When to Use the Nose Cone for Containers

Focal point is same position in both cases!



1/8 (2mm) or less thick



> 1/8 (2mm) thick

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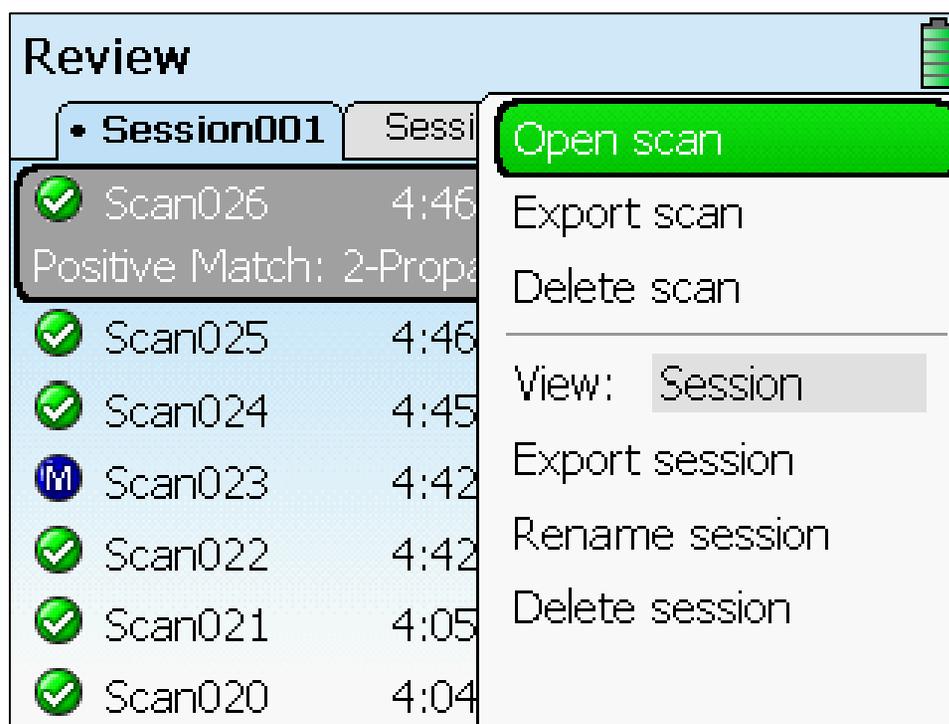
MANAGING SCANS

What You Will Learn in This Section

1. How to view a saved scan
2. How to view scans by date instead of session
3. How to rename sessions
4. How to export sessions and scans
5. How to print a scan
6. How to delete sessions and scans

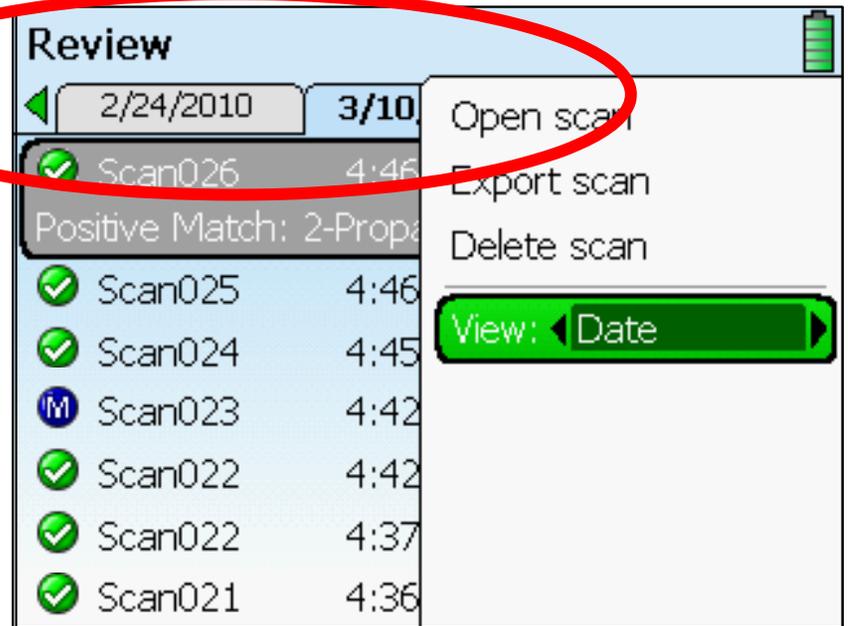
The Review Menu

- Select **Review** in the Main menu and press the Enter key twice



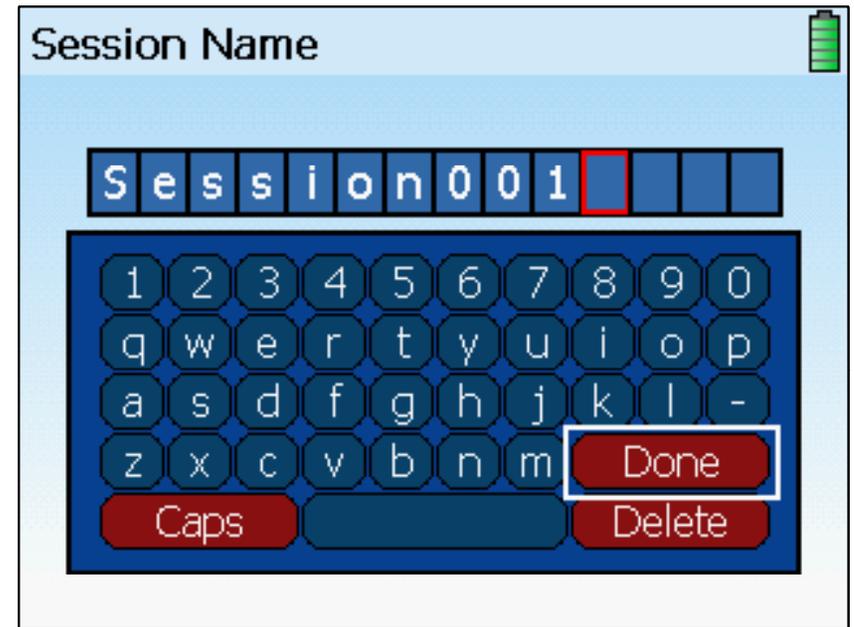
Viewing Scans by Date

1. Select **Review** in the Main menu > Enter key
 2. Select a scan > Enter key
 3. Select **View: Session**
 4. Click a right or left arrow button to select **View: Date**
 5. Press the Enter key twice
- Sessions are now organized by scan date instead of session name



Renaming a Session

1. Select a session > Enter key
 2. Select **Rename session**
 3. Enter a new session name
> select **Done**
- You can't rename a scan, only a session



Deleting Sessions and Scans

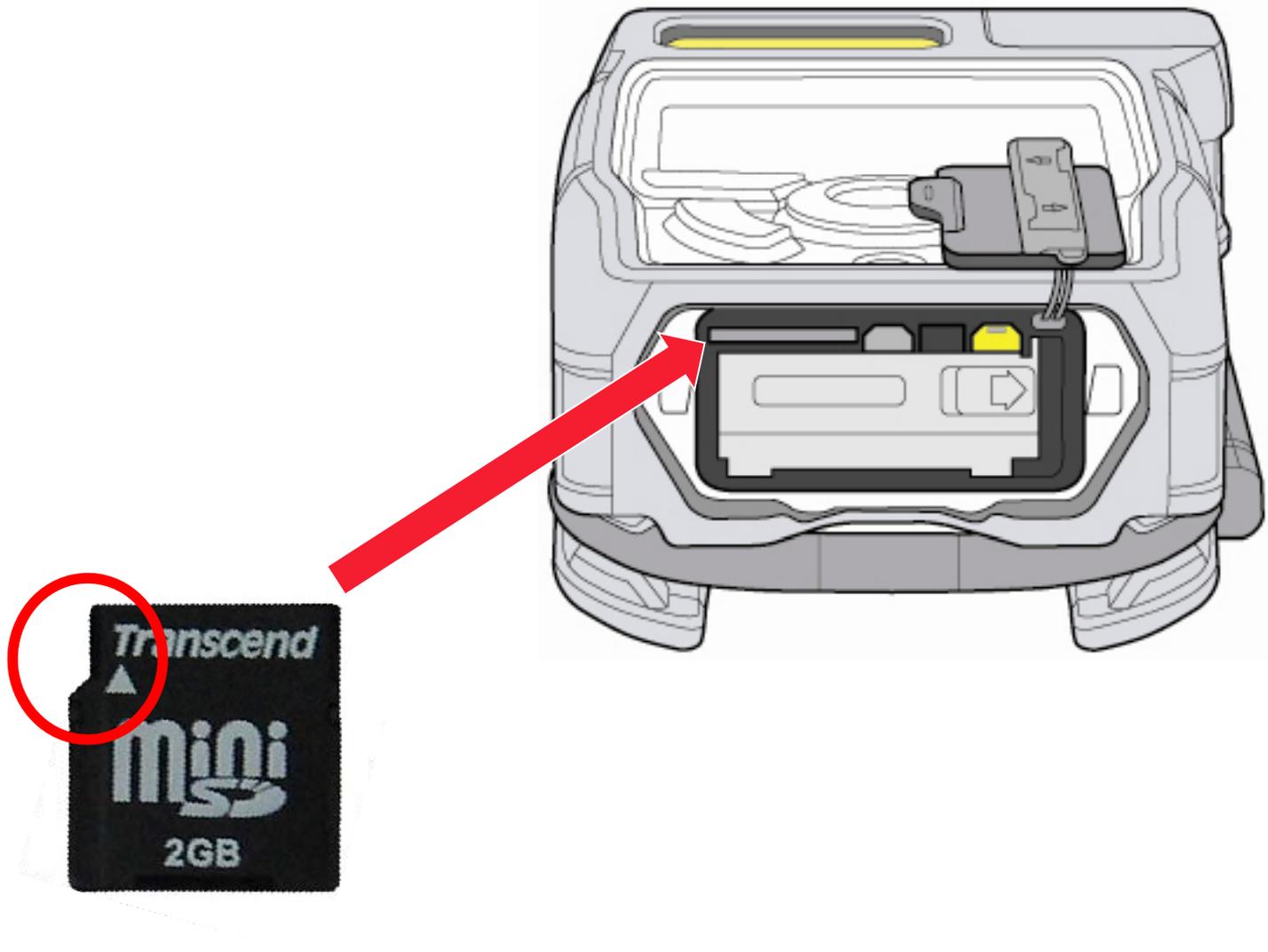
- A deleted session or scan is gone for good!
- Navigate to the session or scan
> Enter key
- **Delete scan** or **Delete session**
> Enter key
- **Yes** or **Cancel** > Enter key



Exporting Sessions and Scans

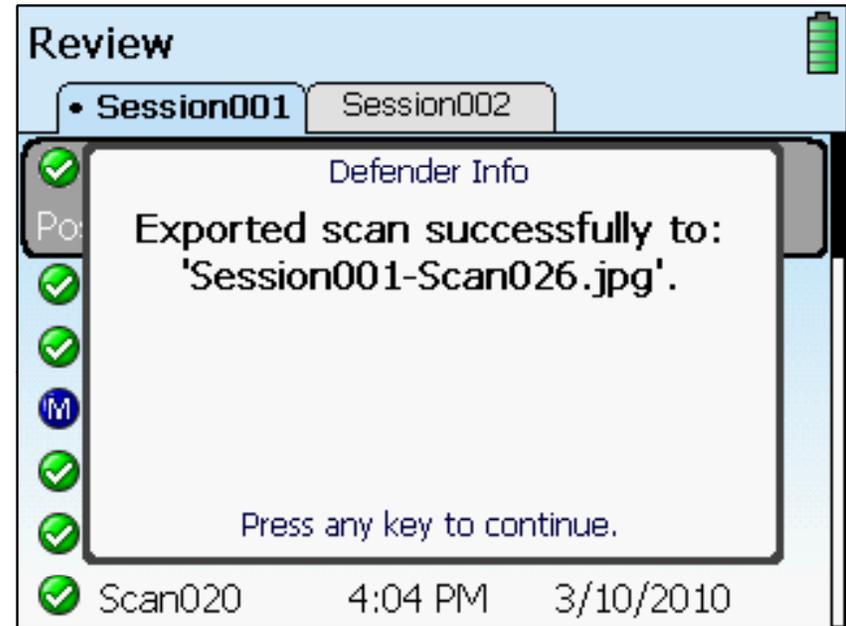
- You can export all scans or individual scans to the mini-SD card
- To view the exported data on your computer:
 - Put the card into the card reader (in the carrying case)
 - Connect the reader to your computer
- You can print individual exported scans
- You cannot batch print all scans in a session

Exporting a Scan or Session: Insert the mini-SD Card



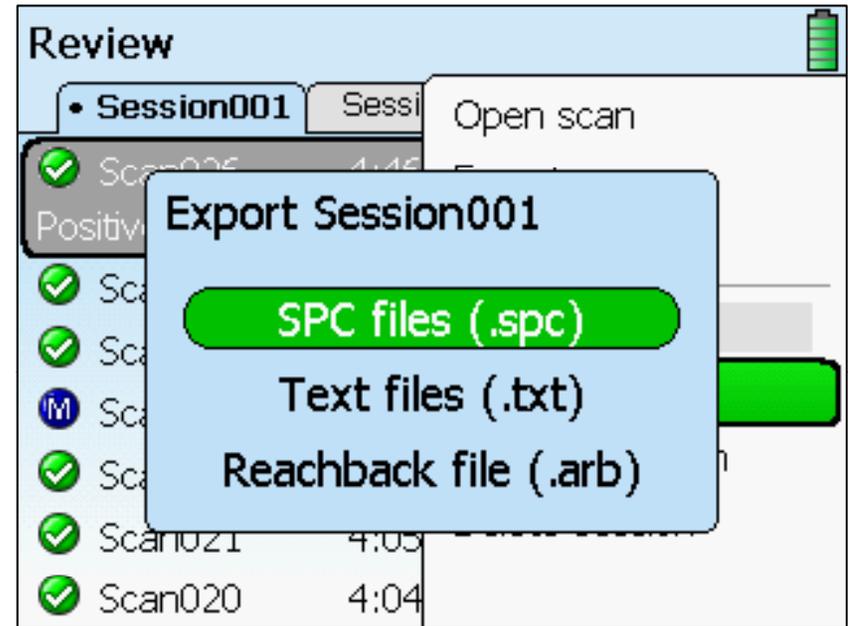
Exporting a Single Scan from the Review Menu

1. Select a scan > Enter key > select **Export scan**
2. Select a format > Enter key
 - A confirmation message appears
 - You can also export a single scan from a scan result screen

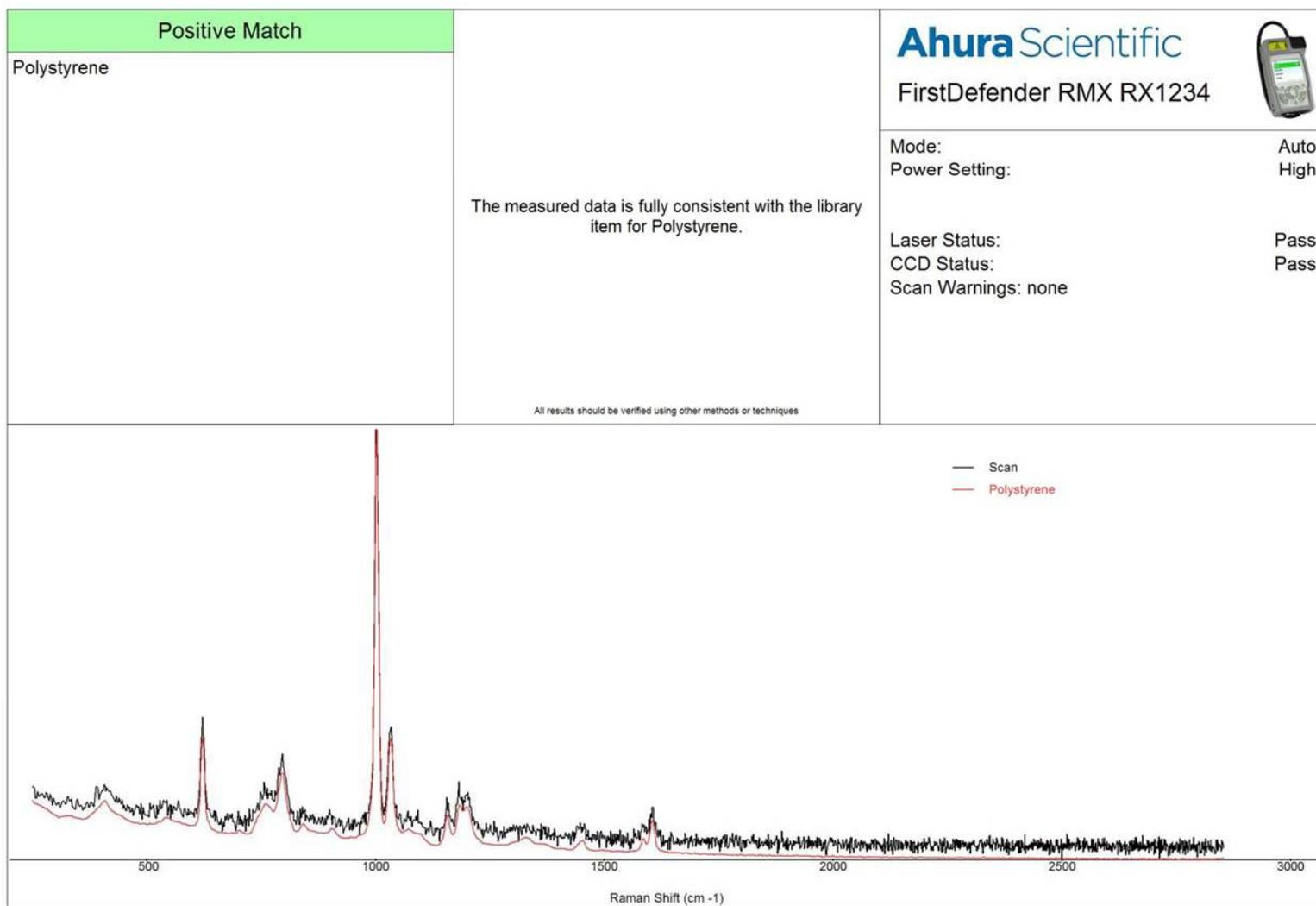


Exporting an Entire Session

- Just like exporting a scan, but only 3 formats available
- No report format because you can only print individual exported scans
- You cannot batch print all scans in a session



Sample Printed Scan Report



Session001 - Scan036

5/15/2009 12:31 pm

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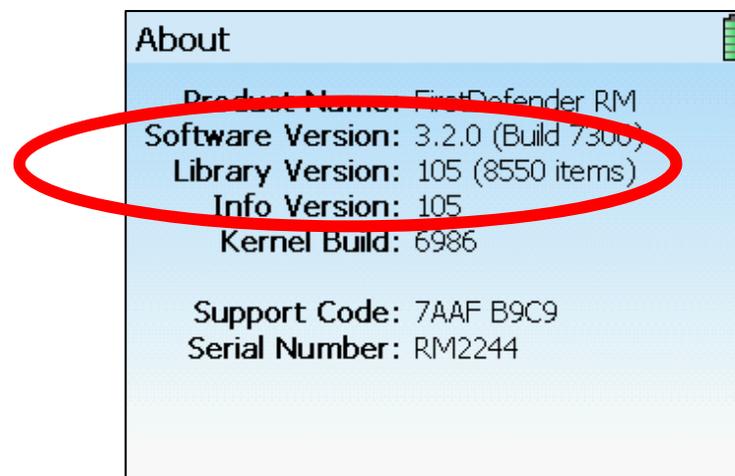
MAINTAINING YOUR INSTRUMENT

What You Will Learn in This Section

1. How to update the library and instrument software
2. How to find system software and library version numbers
3. How to find the instrument serial number
4. How to clean the instrument

Keeping the Library and System Software Current

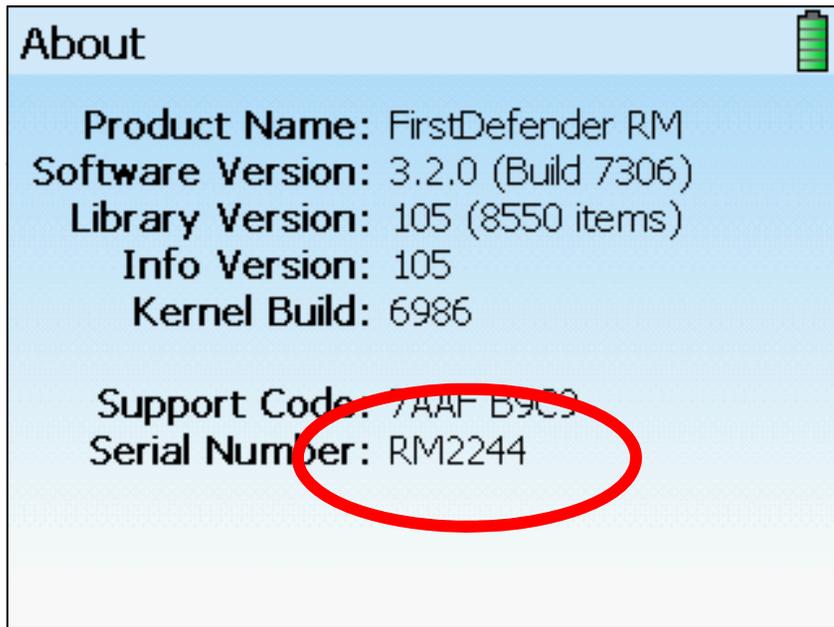
- For optimal performance, your instrument should have the most recent releases of the library and operating software
- Thermo Fisher Scientific Customer Support will notify you via email when updates are available
- To find the software version number:
 - **Tools** > Enter key
 - **About** > Enter key



Downloading a Software or a Library Update

- Go to www.ahurascientific.com/customer-support
- Select your instrument in the Choose Your Product section
- Enter the instrument serial number and your Customer Service support code
- Follow the website instructions to install the update
- If you run into problems, contact Thermo Fisher Scientific Customer Support

Where Is the Instrument Serial Number?



Cleaning and Decontaminating

- Follow your organization's decontamination procedures
- The instrument can be cleaned with or immersed in any of the following for 30 minutes:
 - Water
 - Alcohol
 - Solution of 1 part household bleach (5% sodium hypochlorite) and 10 parts water
- Rinse thoroughly after decontamination
- Clean the laser aperture with water
- Clean the nose cone with alcohol wipes



Before You Decontaminate

- **Press the Wake/Sleep key** to put the instrument into sleep mode
- **Fully tighten** the access door fasteners
- **Make sure** the door gasket is properly seated

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CUSTOMER SUPPORT PROCEDURES

What You Will Learn in This Section

1. How to contact Thermo Fisher Scientific Customer Support
2. How the Reachback process works
3. How to export a Reachback file and send it to Thermo Fisher Scientific Customer Support

How to Get Help

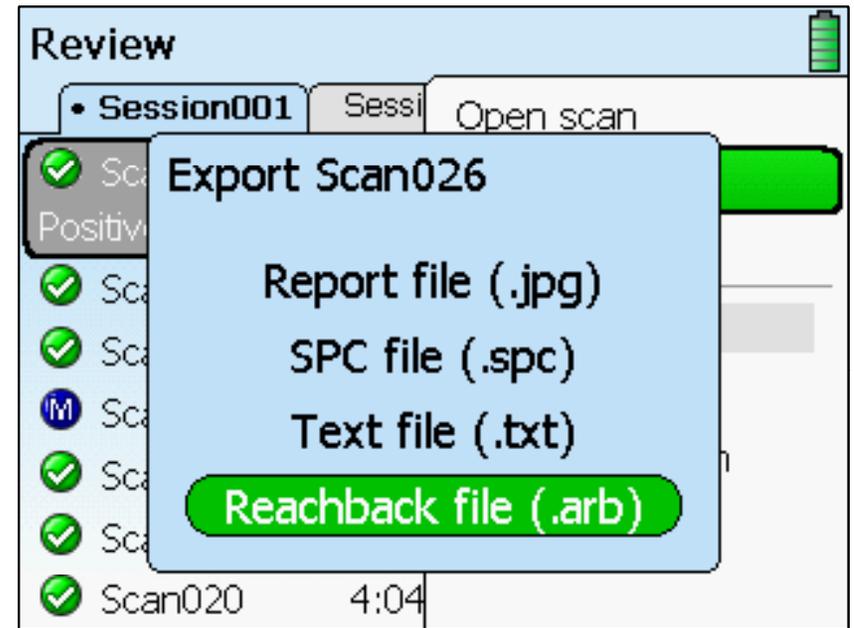
- Email or telephone anytime, 24/7, 365 days a year
- You will need to know your instrument serial number
- **24/7 customer support:**
 - 800-374-1992 (domestic)
 - 1-978-643-1100 (international)
- **Non-critical, non-emergency email support:** product.support@ahurascientific.com
- **Website:** www.ahurascientific.com/customer-support

When You Call For Reachback Support ...

- Reachback support helps you:
 - With a No Match Found result
 - If you have questions about a scan result
- A Level-2 Customer Support Specialist:
 - Explains the Reachback process
 - Tells you how to export and email a Reachback file
- Customer Support acknowledges receipt of your emailed file
- In most cases, within 1 hour of receipt of your file, Thermo Fisher Scientific chemists provide a preliminary report
- Within 1 business day, Customer Support provides a final report

Exporting the Reachback File

1. Select **Review** in the main menu
> Enter key
2. Select a scan > Enter key
3. Select **Export scan** > Enter key
4. Select **Reachback file (.arb)**
> Enter key



Emailing a Reachback File to Customer Support

1. Remove the mini-SD memory card (press the card to eject, use the “fingernail groove”)
2. Connect the card reader to a USB port on your computer
3. Insert the card into the reader
4. Copy the file to your computer and attach it to an email
5. Email file to reachback.support@ahurascientific.com

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PRACTICE SCENARIOS

Scenario 1

- Police and Fire Departments were dispatched to the 1800 block of West Oxford Avenue on a report of dumped hazardous material. When the firefighters and police officers arrived on scene they learned that someone had dumped five containers of unknown substances in the parking lot behind the local food market.
- The on-scene commander has established an initial cordon, and the police officers have secured it. The firefighters are requesting assistance from the regional HAZMAT team to identify the unknown chemicals and mitigate any threats.
- **Your mission: Identify all unknown substances**

Scenario 2

- Two police officers went to an apartment building on the 5200 block of South Huron Way at 9:45 p.m. to arrest a 29-year-old man wanted on two active warrants. The suspect opened the door as the officers approached and was arrested after a brief struggle. The officers searched the apartment and found a large amount of cash and a backpack with several unknown substances.
- When the suspect was questioned about the backpack, he told the officers the materials belonged to a woman he had met in a drug rehab class. The officers noticed that the suspect had kept some of his court paperwork in the bag.
- **Your mission: Identify all unknown substances**

Scenario 3

- This morning SWAT conducted a raid on a suspected terrorist cell located on 5th Street in the lower ward. After a brief exchange of gunfire five suspects were arrested. One suspect required medical care and was sent to St. Ann's Hospital. A search turned up blueprints, electrical components, martyrdom videos, numerous cell phones, and computers. In addition, many unknown powders, liquids, and lab supplies are present.
- **Your mission: Identify all unknown substances**