

# FirstDefender

Handheld Raman for Unknown Chemical Identification



**FirstDefender®** is relied on around the globe for rapid, accurate identification of unknown chemicals. Designed to meet the needs of the first responder, FirstDefender is a lightweight, rugged instrument which increases responder safety and delivers precise results in seconds.

FirstDefender has passed extensive testing for shock, drop, submersion, vibration, chemical resistance and operation in extreme temperatures. It is certified to MIL-STD 810F standard for ruggedness—amongst the most stringent requirements worldwide.

FirstDefender offers the superior performance, portability, accuracy and durability required by today's military and civilian first responders.

## KEY BENEFITS INCLUDE:

**Fast, accurate identification.** Using Raman spectroscopy, quickly identifies unknown solid and liquid chemicals in the field, including aqueous and other solutions.

**Vast substance library.** Identifies explosives, toxic industrial chemicals (TICs), toxic industrial materials (TIMs), chemical warfare agents (CWAs), narcotics, precursors, white powders and more.

**Lightweight, ergonomic design.** Weighs less than four pounds (1.8 kg) and is designed for use in Level A gear.

**Built for field use.** Certified to MIL-STD 810F standards for ruggedness. Ready to use in less than one minute from a cold start and offers 5 hours of battery life for continuous use.

**Point-and-Shoot™ identification.** Operates directly through glass or translucent plastic containers, minimizing contamination and avoiding exposure to potentially harmful substances. An integrated vial holder offers an alternative sampling method.

**Automatic mixture analysis.** Sophisticated chemometric algorithms automatically determine presence of mixed chemicals.

**Easy to use and maintain.** Intuitive menu-driven user interface requires minimal training. No scheduled maintenance or calibration required.

**Non-destructive testing.** Optical technique maintains sample integrity.

Mixture	98%
Ammonium Nitrate	51%
Sugar	47%

The measured data cannot be adequately described by a single library item, but a mixture of the items shown accounts for 98% of the data. Values shown are the amount of molecular signal that can be described by each item.



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*Advanced mixture analysis algorithms enable accurate identification of solid/liquid combinations and aqueous, organic solvent and other solutions.*

## Complementary Technology

FirstDefender is used by first responders, military organizations and national security agencies across the Americas, Europe and Asia. Building on this proven technology, Ahura Scientific, Inc. has introduced TruDefender™ FT, a complementary FTIR tool which weighs less than three pounds (1.4 kg) and has spectral resolution equivalent to laboratory instruments. Used together, FirstDefender and TruDefender FT provide a comprehensive solution for identification of unknown solid and liquid chemicals.



## Specifications

Raman Spectral Range	250 cm <sup>-1</sup> to 2875 cm <sup>-1</sup>
Spectral Resolution	7 to 10.5 cm <sup>-1</sup> (FWHM) across range
Laser (excitation wavelength)	785 nm +/- 0.5 nm, 2 cm <sup>-1</sup> linewidth, stability <0.1 cm <sup>-1</sup>
Laser Output Power	300 mW or lower (adjustable)
Collection Optics	NA = 0.33; 18 mm working distance; 0.2 mm to 2.5 mm spot size
Exposure	Manual, Automatic modes (100 ms minimum)
Battery	Rechargeable 7.4 V Internal Lithium Ion Battery; >5 hours at 25 °C
External Power Supply	Wall plug transformer 100-240 V AC 50/60 Hz
Weight	<4 lbs (<1.8 kg)
Size	12" x 6" x 3" (30 cm x 15 cm x 7.6 cm)
Operating Temperature	-20 °C to +40 °C

Note: Product details current as of printing. All information subject to change. 20Nov2008