



PENDAR
TECHNOLOGIES

Pendar X10



The Pendar X10 is a handheld, standoff Raman spectrometer to safely, quickly and accurately detect explosives, illicit drugs, chemical warfare agents, and hazardous materials.

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Introduction

The Pendar X10 enables rapid identification of toxic substances that traditional Raman-based systems have struggled to detect, including highly fluorescent, dark, and sensitive materials.

The Pendar X10 delivers handheld, standoff chemical identification at distances of up to six feet (2m), offering enhanced safety, accuracy, and speed via breakthrough Difference Raman technology. The Pendar X10 saves time, improves measurement reliability, and prevents exposure to dangerous substances while reducing the risk of igniting explosive chemicals.

-  Standoff Up to 6 Feet Away
-  Results Within Seconds
-  Minimal Sample Ignition Risk
-  No Eye Protection Required
-  Identify Dark and Highly Fluorescent Materials



Safe Distancing

The Pendar X10 prevents exposure to dangerous substances while reducing the risk of igniting explosive chemicals.

What sets the Pendar X10 apart from other products on the market?

The Pendar X10's design is founded on scientific innovation, and its performance parameters have been proven to hold in real-world scenarios. The Pendar X10 has been extensively tested by the U.S. government (including the U.S. Army and Navy, and the Department of Homeland Security) and is currently in use by multiple U.S. federal, state, and local agencies. When dealing with dangerous materials and substances, the Pendar X10 demonstrates high-performance capabilities in all the ways that matter most: safety, speed, and accuracy.

Who can benefit from using the Pendar X10?

From law enforcement to military specialists, bomb squads, first responders, and disaster management personnel, the Pendar X10 is applicable in many public service, government, and military sectors to fight crime, protect troops and civilians, and enhance homeland security. In the private sector, the Pendar X10 can provide a compelling solution for chemical identification needs in pharmaceutical manufacturing, agriculture, and environmental protection.



How do you use the Pendar X10 in the field?

The Pendar X10 is lightweight, rugged, and portable, with a battery that will last for 2 hours of continuous measurements. The handheld tool supports single-hand operation and comes apart in three components for easy storage and transport. The standoff distance is adjustable from 1 to 6 feet, adapting to the environment and situational needs. A 1/4-20 mounting hole allows for convenient, quick mounting on the included tripod and most other off-the-shelf tripods for a secure stationary setup. The standoff design prevents operators from disturbing potential crime scenes by leaving evidence intact. The Pendar X10 works in temperatures ranging between -20C and 40C (-4F to 104F). Because of its Class 3R eye safety rating, operators don't need to complete laser eye safety training, allowing for a broader range of users and better allocation of staff resources.

Capabilities: Safety

The Pendar X10 delivers true standoff detection with a novel point-and-shoot handheld design measuring at distances up to 6 feet. This feature allows users to avoid touching or accidentally inhaling potentially dangerous substances by aiming the Pendar X10 at materials from a safe distance, even inside clear plastic bags, under fume hoods, and behind transparent windows, doors, and car windshields. The Pendar X10's reach allows you to measure through openings inside of large containers, such as chemical drums, with no sampling required.

Chemicals that ignite or explode due to excessive heat generation from Raman systems have been a long-standing concern for operators, often preventing them from attempting to measure dark materials. The Pendar X10 offers added safety features when dealing with dark and sensitive materials. The Pendar X10 does not focus the Raman laser beam on one small spot, risking dangerous temperature levels. Instead, a novel optical system rapidly moves the laser spot across a larger area for measurement, preventing any particular sample area from reaching the ignition point. The laser system includes an automatic shut-off if an anomaly is detected in the laser motion, providing another critical level of safety.



Point and Shoot

The Pendar X10 delivers true standoff detection with a novel point-and-shoot handheld design measuring at distances up to 6 feet.

Capabilities: Speed

The Pendar X10 boots up from a cold start in 60 seconds or fewer, supporting quick setup and takedown in fast-moving and rapidly changing environments. Right after startup, a measurement can be started with a simple push of the trigger. While many fluorescent materials take minutes to identify with other Raman systems, the Pendar X10 frequently takes fewer than 30 seconds and identifies most other chemicals in fewer than 10 seconds. The standoff capability prevents time-consuming sample collection and handling.

Point and shoot to identify multiple samples in rapid succession and quickly adjust the measurement distance using the motorized optics. Take the guesswork out of focusing the system on successive targets by following the aiming lasers' feedback. The Pendar X10's precision and reliability save time by avoiding delays due to identification errors necessitating repeat measurements. Pendar's proprietary computer algorithm for data processing and our continuously growing digital library of substances allow for quick, accurate matching. The Pendar X10's powerful embedded processor delivers rapid analysis.



Handheld Design

Right after boot-up, start a measurement with a simple push of the trigger. Identify most chemicals in fewer than 10 seconds.

Capabilities: Accuracy

Chemicals emitting a fluorescent background when illuminated by a laser have been notoriously difficult to measure accurately with Raman spectroscopy. The Pendar X10 elegantly solves this challenge with Difference Raman spectroscopy using two lasers at two slightly different wavelengths. Both lasers return spectra with the same fluorescent background but shifted Raman signatures.

The Pendar X10 can remove the fluorescence by calculating the difference between the two laser measurements. In other words, Difference Raman technology reliably extracts the spectral signature's richest component for identification while protecting against calibration drift. The same technique also allows subtracting ambient light, an essential pre-requisite for successful standoff measurements.

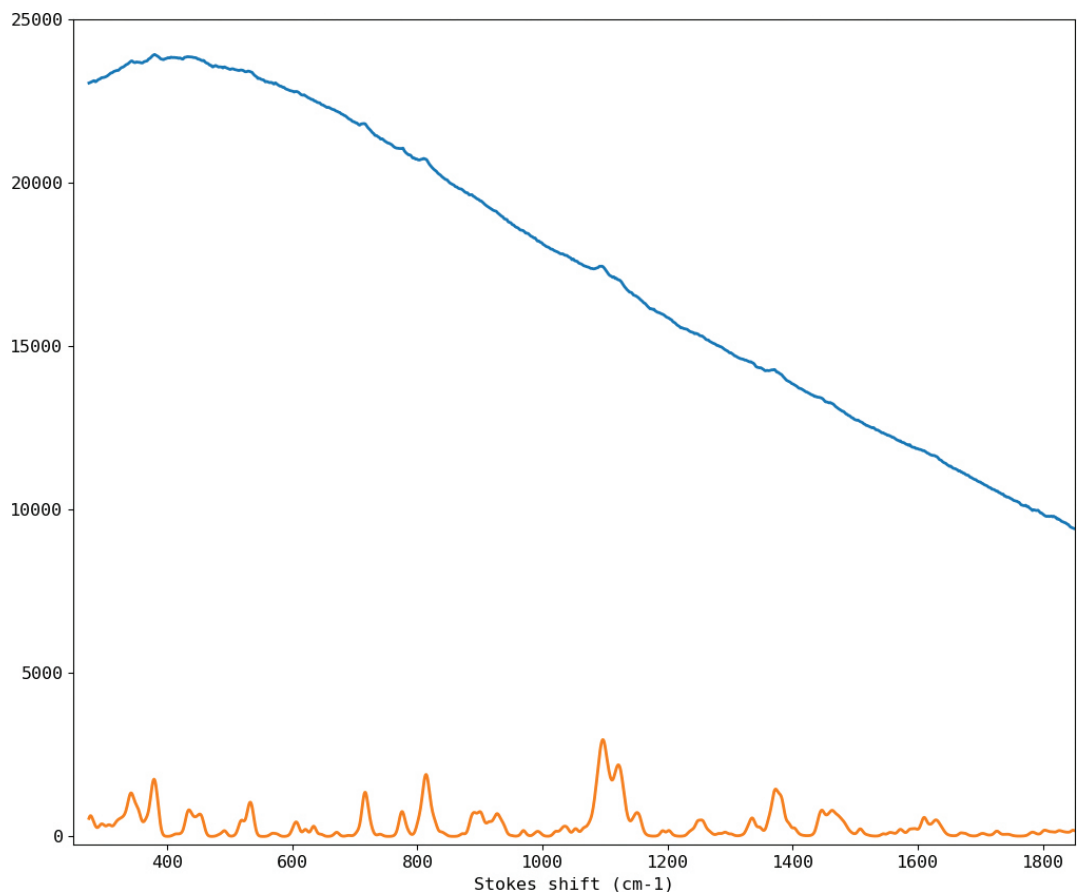
Spectrum from
Standard Raman
Spectroscopy

Spectrum from
Difference Raman
Spectroscopy



Ecstasy Pills (MDMA)

Our Difference Raman Spectroscopy technology extracts information from even the most fluorescent samples.



What can the Pendar X10 detect?

The Pendar X10 can identify a wide range of explosives, illicit drugs, and chemical warfare agents, as long as the sample is presented in a visible quantity of a liquid, gel, or solid substance. Pendar's digital library of identifiable materials is continually expanding, so don't hesitate to reach out to us regarding specific detection requirements.



Explosive Materials



Illicit Drugs



Toxic Materials



Explosive Materials

The Pendar X10 safely identifies dark or absorptive substances, as well as sensitive primary explosives.

Explosives

The Pendar X10 safely identifies dark or absorptive substances, sensitive primary explosives and heat-sensitive materials, like gunpowder, iron oxide, HMTD or fuminates. Also included are military explosives like RDX, HMX, TNT, and C-4, homemade explosives (HMEs) based on peroxides and nitrates, and explosives precursors such as oxidizers and acid mixtures. Our team works closely with HME experts to continually expand our library to cover everything you may find in a clandestine lab or an improvised explosive device.

What can the Pendar X10 detect?



Drug Detection

The Pendar X10 can detect DEA controlled substances, and more than 200 fentanyl analogs.

Illicit Drugs

The Pendar X10's ability to detect controlled substances, prescription drugs, and drug precursors includes DEA scheduled items, List I and II items, and more than 200 fentanyl analogs. Further, the Pendar X10 detects many common heroin and cocaine cutting agents and synthetic drugs such as MDMA/Ecstasy. The Pendar X10's enhanced safety features preventing the ignition of substances are especially helpful in averting the release of toxic fumes and aerosols.

Pendar currently has one of the most comprehensive libraries of new psychoactive substances (NPS) such as synthetic opioids, cannabinoids, and cathinones.

The Pendar X10 is uniquely equipped to handle non-homogeneous mixtures because it leverages a large sampling area to spatially average the measurement.

Our Difference Raman provides first-in-class ability to deal with laser-induced fluorescence, a common issue with many illicit drugs.

"The rapid emergence of a large number of NPS on the global drug market poses a significant risk to public health and a challenge to drug policy. [...] The analysis and identification of a large number of chemically diverse substances present in drug markets at the same time is demanding. Monitoring, information sharing, early warning and risk awareness are essential to respond to this situation."

- United Nations Office on Drugs and Crime (UNODC)

What can the Pendar X10 detect?



Toxic Materials

As long as they are liquid or solid, the Pendar X10 rapidly identifies the prominent chemical warfare agents (G-series, mustards, VX), including fourth-generation agents (Novichoks, A-series) as well as pharmaceutical-based and riot control agents. Our underlying technology is particularly well suited to achieve the identification of degraded agents. A wide range of hazardous materials, toxic industrial chemicals, and pesticides are also included.

Hazardous Materials

The Pendar X10 rapidly identifies the prominent chemical warfare agents including fourth-generation agents.



Who are the people behind the Pendar X10's design?

Our team at Pendar is made up of industry experts, and many of us have previously worked on the Raman systems you may currently use. Decades of experience allow our scientists and senior management to continually improve Raman systems while identifying technological gaps and pain points for users.

Our team is intimately familiar with older Raman systems' shortcomings. This is exactly why our scientists and engineers were driven to dig into those challenges, evolve the technology, and innovate a better, faster, safer, easier-to-use system poised to make a lasting impact in the industry for handheld Raman chemical identification solutions. Our team envisioned, designed, and built the Pendar X10 based on proprietary laser and optical systems, software, and spectroscopic technology, allowing us to control and fine-tune all performance aspects for a truly integrated system.



Industry Experts

Our people bring diverse experience in technology and business, and a drive to bring scientific innovation to challenging fields.

Want to know more?

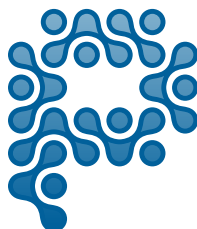
Pendar is committed to leveraging emerging technology and decades of expertise to build intelligent autonomous chemistry systems that safely, quickly, and reliably provide actionable intelligence. Please reach out with any feedback or inquiries about our products.

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