SERSTECH

SIMPLICITY - SPEED - PRECISION

Application Note

Serstech Arx mkII for Presumptive Identification of Hazardous Materials in the Field

Overview

The **Serstech Arx mkII** handheld Raman spectrometer enables first responders, environmental specialists, and hazardous materials (HAZMAT) teams to **quickly and safely identify unknown substances** during field operations. By providing **rapid, non-destructive, presumptive chemical identification**, the Arx mkII improves responder safety, accelerates incident mitigation, and supports evidence-based decision-making in dynamic environments such as transportation accidents, industrial incidents, and emergency response operations.

Principle of Operation

Raman spectroscopy identifies substances by measuring the light scattered from a laser interaction with molecular bonds. Each material produces a unique spectral fingerprint. The **Arx mkII** compares that fingerprint against an onboard spectral library, delivering a **presumptive identification within seconds**—often without needing to open containers or physically handle the sample.

Key Advantages in Field Operations

- **Rapid Presumptive Identification:** Determines chemical composition in under 10 seconds, providing immediate insight into unknown substances during critical decision windows.
- **Through-Container Analysis:** Safely screens liquids, solids, gels, and powders through clear or translucent glass, plastic, and bags—reducing responder exposure to hazardous or volatile materials.
- **Non-Destructive, Non-Contact Analysis:** Preserves evidence and eliminates sample contamination.

- **Comprehensive Material Libraries:** Includes thousands of spectra covering hazardous industrial chemicals, solvents, oxidizers, acids, flammables, explosives precursors, narcotics, and toxic industrial materials.
- **Customizable Libraries:** Users can easily add new or locally significant materials to maintain relevance to specific operations.
- **Ruggedized for Field Use:** Built to **MIL-STD-810G** and **IP65** standards for vibration, drop, dust, and moisture resistance—ideal for challenging incident environments.
- **Simple User Interface:** Glove-compatible touchscreen and guided workflows simplify operation under stress or while wearing PPE.

Applications

- **Hazardous Materials Response:** Identify unknown spills or leaks to determine appropriate protective measures, evacuation zones, and decontamination requirements.
- **Emergency Response & Fire Services:** Rapidly characterize chemical threats during industrial fires, transportation accidents, or facility incidents.
- **Environmental & Public Health Agencies:** Conduct field surveys for chemical contamination or illegal dumping.
- **Law Enforcement & Customs:** Support identification of dangerous or restricted chemicals during inspections or investigations.
- **Decontamination & Verification:** Confirm neutralization or cleanup effectiveness after remediation efforts.

Operational Safety

The **Arx mkII** uses a **Class 1M eye-safe laser**, allowing analysis without direct sample contact. This minimizes exposure risk, particularly when working around corrosive, toxic, or volatile compounds. Responders can operate the instrument while wearing gloves and respiratory protection, maintaining compliance with **NFPA 472/1072** and **OSHA HAZWOPER** standards for responder safety.

Data Management & Reporting

Each scan automatically captures and stores:

- **Substance identification**

- **Spectral data**
- **Operator ID**
- **Date, time, and GPS location (if enabled)**

Data can be securely exported via USB, Wi-Fi, or Bluetooth to **Serstech ChemDash Cloud** for central reporting, archiving, and after-action review. These features support digital chain-of-custody requirements and interoperability across multiple response teams or jurisdictions.

Presumptive vs. Confirmatory Analysis

Field Raman identification is **presumptive**—providing a high-confidence indication of material type for immediate operational decisions. Confirmatory laboratory testing (e.g., GC-MS or FTIR) may still be required for regulatory, legal, or forensic validation. The Arx mkII facilitates this workflow by preserving spectral records and sample traceability for follow-up analysis.

Training & Support

Serstech provides comprehensive training for HAZMAT and emergency response personnel, covering:

- Safe field sampling and scanning techniques
- Library management and customization
- Interpretation of match quality and confidence scores
- Data management and integration with agency systems

Optional refresher and advanced courses ensure ongoing readiness and proficiency for all personnel.

Conclusion

The **Serstech Arx mkII** gives field responders a powerful, portable capability for **safe, rapid presumptive identification of hazardous materials**. By combining laboratory-grade spectral analysis with rugged design and simple operation, it enhances situational awareness, shortens response times, and protects responder health. The Arx mkII ensures that first responders and safety professionals can act quickly, confidently, and safely—whenever and wherever hazardous materials are encountered.