Red X Defense®

EXPLOSIVES, NARCOTICS, AND GUNSHOT RESIDUE DETECTION SYSTEMS

Handheld Detection of Explosives, Narcotics and Gunshot Residue

FAST, RUGGED, SMALL, EASY, MULTI-USE

- Low cost
- Safe for user - no sprays, droppers
- Multi-analyte detection in a single platform
- Reliable & Proven technology
- Highly portable / rugged / small (less than 1 lb)
- Minimum user interpretation (red light/green light)
- Intuitive operation (cop proof)
- Fast – detection in less than 3 minutes.
- Upgradeable
- GSR presumptive test that does not destroy sample
- Trace narcotics detection
- Patent No 9,435,744

NO COMPETITIVE SYSTEMS

Detection of Explosives, Narcotics and Gunshot Residue

- Fielded for over 4 1/2 years
- Used by Agencies in 39 US States & 27 countries

Notable Customers:

- US Army
- Chicago Police Department
- LA Sheriff's Department, CA
- Orange County Sheriff's Department, Orlando FL
- Hyderabad City Police, India
- Dubai Police, UAE
- First Rand Bank, S. Africa
- Over 21 US and International Airports
- SWITCH Corporation (US and abroad)

XCAT Technology

One Step Automated Colorimetric Detection – proprietary inks and card design

- Colorimetric detection inks contained within card
- Inks react with sample within XCAT to produce an optical signal
- XCAT analyzes signal and returns red light/green light result

Inks based on established/accepted chemistries
No radioactive source
No calibration
No hot sample cleanout
Material stays on card; it is not vaporized or ionized
No libraries to update or maintain

Tested and Validated

- Mechanical Stress Testing - Passed MIL-STD-810G testing
- NAVEODTECHDIV – Military institution for testing of explosives detection systems
- National Forensic Science Technology Center – narcotics detection validation
- Virginia Dept. of Forensic Science – narcotics detection validation
- McCrone Associates – accredited lab for GSR analysis
- CE Certified

Rugged for field use

Mechanical Stress Testing

- 1000X life cycle testing completed without any failures
- Detection performance validated across full operating temperature range
- IP52 rated for water and dust ingress
- Passed MIL-STD-810G testing:

  Salt Fog testing
  Low temperature storage (-20C)
  Temperature shock (-20C to 60C)
  Vibration (1 hour truck bed simulator)
  Transit drop (26 drops from 4 feet).

GSR testing

McCrone Associates, Inc.
Wayne D. Niemeyer | Senior Research Scientist

- Initial feasibility studies
- 12- month shelf life study
- SPIE paper
- Case studies resulting from analysis of actual cases

Westmont, IL (November 18, 2014) –The Organization for Scientific Area Committee (OSAC) appointed Wayne Niemeyer to its Subcommittee on Gunshot Residue, one of five Scientific Area Committee areas focusing on Chemistry/Instrumental Analysis. Niemeyer is a senior research scientist for McCrone Associates, Inc., the analytical service division of The McCrone Group. OSAC is part of an initiative by the U.S. Commerce Department's National Institute of Standards and Technology (NIST) and the Department of Justice (DOJ) to strengthen forensic science in the United States.

GSR Detection

GSR is TRACE Evidence

Trace Evidence Law & Legal Definition

Trace evidence is a very small piece of evidence left at a crime scene that may be used to identify or link a suspect to a crime. Trace evidence analysts may use a variety of instrumentation and visualization tools in their analysis of evidence. **Trace evidence, though often insufficient on its own to make a case, may corroborate other evidence or even prompt a confession.**

The following types of evidence, among others, may be analyzed:
Hairs and Fibers
Paints (automotive and architectural)
Explosives
Glass
Headlamp Filaments
Footwear and Tire Impressions
Physical Matches

GSR Detection

Investigators need "on-the-scene" gunshot residue (GSR) test results – actionable intelligence - significant and worthy trace evidence in investigating a crime.

GSR Detection results often sought to build the case and charge the suspect.

Presumptive tests are usually avoided to allow confirmatory Scanning Electron Microscopy/ Energy Dispersive X-ray (SEM/EDS).

Previous Presumptive tests:

- Colorimetric tests target propellant residue (nitrates)
- High false positive rate from environmental nitrates (e.g. fertilizer, food preservatives)
- Usually use strong acid that destroys sample

Confirmatory (SEM/EDS) test:

- Identification of GSR-characteristic (Pb-Ba-Sb) particles confirm presence of GSR
- Court-approved method
- Expensive (~$400-$2000 / suspect)
- Time consuming (weeks to months depending on lab backlog and priority)

XCAT GSR Detection

The XCAT performs "on-the-scene" presumptive GSR testing on a sample that can subsequently be used for confirmatory SEM analysis. No other system can do this.

- XCAT adhesive analyzed by SEM.
- GSR-characteristic particles as small as 0.8 microns detected
- SEM detects particles on sample cards exposed to presumptive test solution twelve months prior. High stability of residue collected.
- GSR particles retain a morphology consistent with characteristic particles.
- XCAT detects lead from the primer thereby reducing false positives.

The GSR-confirmatory SEM/EDS analysis of processed XCAT sample cards conforms to the ASTM E-1588 guideline, and therefore is expected to withstand the rigorous standards for accepted scientific evidence in legal proceedings.

XCAT GSR case studies

Niagara Falls Police Department, NY

Suspect shot at officer. 3 ft. snow. Shot taken thru pants. XCAT GSR presumptive test used on hands resulted in a negative. XCAT GSR presumptive performed on pants resulted in positive. XCAT sampling card sent to lab for SEM confirmatory resulted in a positive for GSR. Eye witness and GSR on pants, suspect took plea. Use of XCAT not challenged.

Orange County Sheriff's Office, FL

Suspect shot victim. XCAT GSR presumptive resulted in positive. Suspect confessed. Between eye witness and confession, suspect received 40 years. Use of XCAT not challenged in court. No SEM confirmatory test performed.
Case: OCSO # 14-098993

Highlands County Sheriff's Office, FL

Suspect broke in the home of the female victim in the early morning hours and shot her twice, got into car, went home, showered, changed clothes. Later apprehended. XCAT GSR presumptive on hands resulted in negative. Crime Scene investigators found clothes suspect was wearing, XCAT GSR presumptive on sweatshirt resulted in positive. XCAT GSR presumptive on steering wheel resulted in positive. SEM confirmatory performed on both samples resulted in positive for GSR (7 months later). Suspect took a plea for 40 years.
10th Judicial Circuit, Case number 14000911CFAXMX

Testimonials

"**The XCAT is one of the most valuable tools we've recently received**. We had the demo sent to us and tested it in the lab. After seeing the results we started using it in the field. Within days we had used it on several cases and got great results. **This is such a great investigative tool!** We are so pleased that there is finally a reliable presumptive GSR that can also be retained and later tested on a SEM for confirmation. We didn't want to send the demo back until we had our own in the lab! The folks at RedXDefense were fantastic and worked hard with us to help us justify and ultimately purchase the system. Thanks again RedXDefense!"

Kelly Donaldson A2559, CLPE, CFWE
Senior Crime Lab Analyst
Maricopa County Sheriff's Office, Arizona
Crime Lab Unit

Testimonials

"… I have personally used this kit (XCAT) in teaching shooting reconstruction in several dozen courses across the country as well as tested it within my own laboratory, and could not be more pleased with the results. ...**Any agency that is tasked with investigating shooting cases should have this weapon in their arsenal of solving shooting scenario cases...**Try the XCAT and see how you develop more investigative leads and save personnel time by using this powerful weapon in real time to guide your investigation."

Jan Johnson
Forensics Expert
President/Owner
Forensic Pieces, Inc.

Testimonials

"Just to let you know, we've used the machine on our past two homicides and it has worked perfectly! Suspects in both cases stated that they have not fired a gun and came back positive. One of the suspects ended up confessing to killing a 15 year old female and we charged him with murder." Tommy

Detective Tommy Hudson
Little Rock Police Department
Homicide Unit
700 W. Markham
Little Rock, AR 72201
(501) 371-4784 (desk)
thudson@littlerock.org (email)

Testimonials

"I ordered some of these units (XCATs) and as with any new technology there was some skepticism. However, we conducted controlled field tests using explosives, GSR and several different forms of narcotics. Our tests were nothing short of rigorous, testing several known positives and known negatives. All test results were accurate. We've since implemented the use of the XCATs with much success. I highly recommend these units to investigative teams who are in search of a presumptive testing system that is very user friendly, durable and most importantly accurate!"

Major Gerald Savoy
Bureau of Investigation
Iberia Parish Sheriff's Office

I would recommend all airports get an XCAT. It is an effective, yet inexpensive tool for you to use to clear unattended bags without having to ask TSA.

Captain Steve Johnson, ACE
Richmond Co. Marshal's Office
Airport Division

Hyderabad City, India
CLUES team

Sampling Cards

Sampling Cards

Peroxides **PER-700**	TATP, HMTD
Nitramines & Nitrates **NTR-300**	C4, RDX, PETN, Semtex, Det. Cord, Deta Sheet, Nitroglycerin, Nitrocellulose, Ammonium Nitrate, ANFO, Urea Nitrate, Black Powder
Nitroaromatics **NTA-400**	TNT, DNT, Tetryl, Ammonium Picrate, Picric Acid, Comp B
Amphetamines & Bath Salts **AMP-500**	Amphetamines, Methamphetamines, Crystal Meth, MDMA (Ecstasy), 'Bath Salts' (incl. Cathinone, Mescaline, 2C-I, Mephedrone, Pyrovalerone, Methylone, Methedrone, Butylone, TFMPP, BZP)
Heroin **HER-150**	Heroin, Heroin hydrochloride
Cocaine & PCP **COC-220**	Cocaine (Crack), Cocaine hydrochloride, PCP, Flakka (alpha-PVP), Acetylfentanyl, Fentanyl, Carfentanyl
GSR **GSR-600**	Gunshot Residue

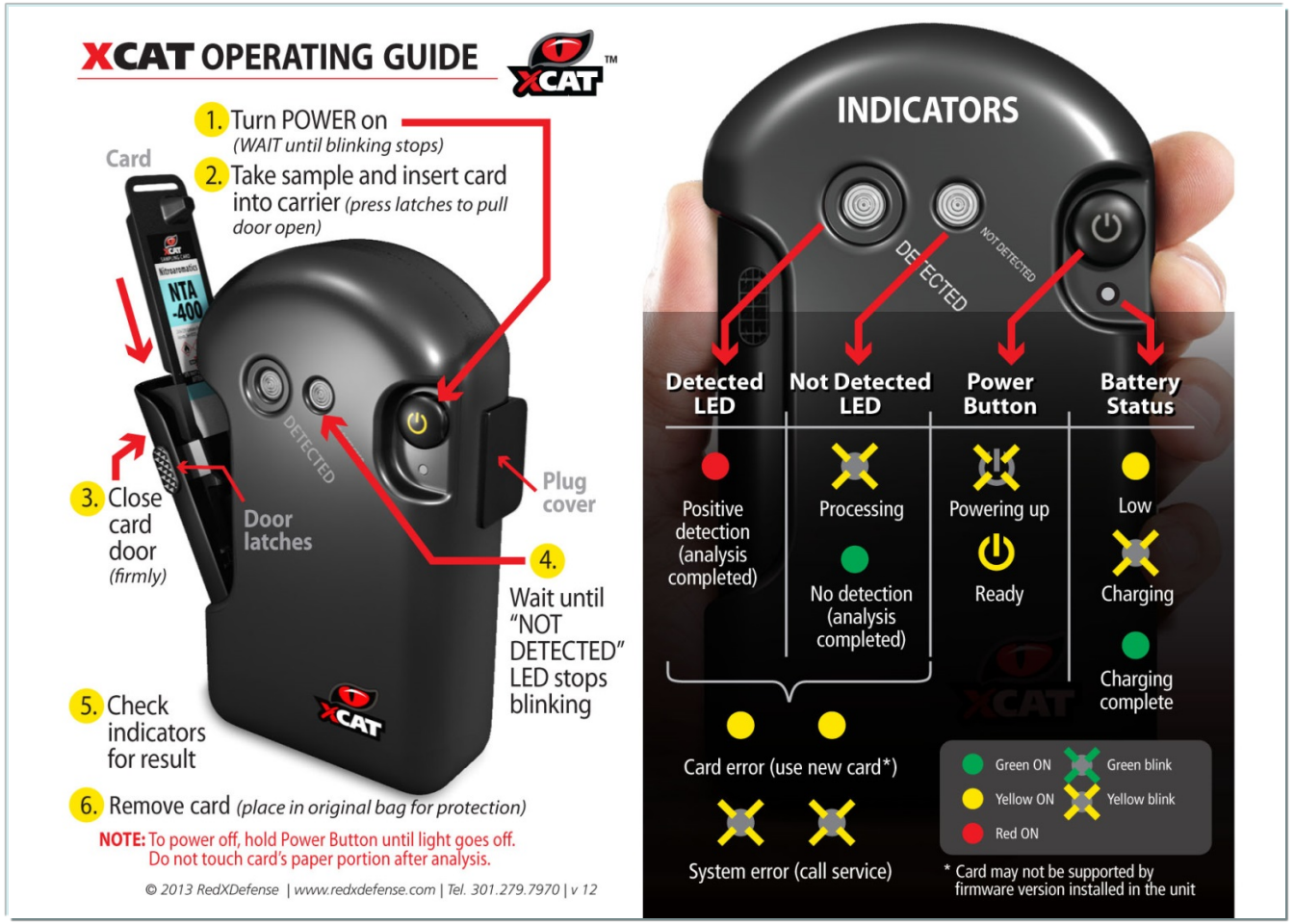
* Additional capabilities may be available. Sampling card kits may be customized based on specific user needs.

Specifications

Detection Principle	Optical Detection
Time to Analyze	Narcotics: 40-120 sec. GSR/Explosives: 15-180 sec.
Calibration	None required
Power-up Time	30 seconds
Consumables	Sampling Cards
Power Source	Rechargeable Li-ion battery (car and wall charger)
Battery Life	10 hours (continuous use)
Operating Temperature Range	32°F to 120°F (0°C to 49°C)
Dimensions	3.6"x 1.7"x 6.0" (Length x Width x Height)
Weight	Under 1 lb.

Operating Instructions

30 min auto shut off



Taking Samples

TAKING SAMPLES

EXPLOSIVES or **NARCOTICS** sampling methods *(follow label instructions on each card type)*:

NOTE: Do not touch sampling paper with your hand. Make sure crystals are powderized. Shake off excess/loose powder.

a) direct method - grinding
*(grinding the card's **sampling paper** directly into the sampled surface)*

b) direct method - swiping*
(hand or surface swipe)

c) indirect method *(use cotton swab or glove)*

* Swipe must be **FIRM**. Not all cards may be used for hand sampling; check card label. Avoid excess dirt on sampling paper.

GUNSHOT RESIDUE (GSR) sampling procedure:
The GSR sampling card can be used to sample hands, clothes or surfaces. Follow STEPS as shown.

NOTE: Do not sample wet hands or surfaces, blood, or materials containing red particles (e.g. fibers). Do not contact sampling paper or adhesive with your own hands.

IMPORTANT: Confirmatory SEM testing may be performed on used GSR-600 cards.

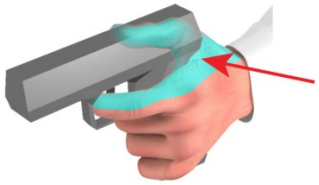
After analysis, package each GSR-600 card in a separate card transport tray (purchased from RedXDefense).
After analysis in the XCAT, remove the card, fold the liner back, and secure the liner with the tape (supplied with the tray).

NOTE: Purpose of this step is to lift the sampling adhesive off of the paper.

Place the card in the tray and close the tray tightly.

GSR Sampling

Collect gunshot residue **(GSR)** samples using the following procedure:



GSR contamination is typically concentrated in the blue area shown.

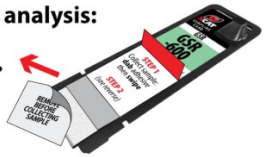
Instruct subject to open up one hand and support it with the other as shown below. *Inform subject you will be applying fairly strong pressure. Collecting GSR requires applying a very firm pressure with the sampling card in order to gather particles for successful detection.*

Sample each hand with a different sampling card. Follow the STEPS as shown.

NOTE: Do not let your own hands contact the sampling paper or adhesive when sampling. Subject's hands should not be wet.

STEPS for GSR sample collection and analysis:

1. **Remove the protective liner.**

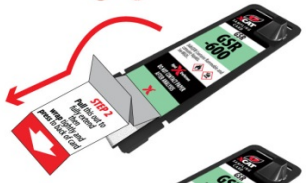


2. **Dab adhesive over area marked in blue. Be sure to sample the webbing between thumb and forefinger.**

3. **Flip the hand and dab adhesive over marked area.**

4. **Continue sample collection by swiping the sampling paper over the same areas.**

5. **Lift and pull red tab to fully extend the liner.**



6. **Press the adhesive down over the sampling paper firmly and tightly wrap the liner around the sampling card.**

Analyze in XCAT, then repeat these steps on the other hand with another card.

Note: Other materials may also be sampled (e.g. clothes, vehicles, objects). Do not sample blood or red fibrous materials.

Sampling Card Storage

Shelf Life

▪ Cocaine (COC – 220) card	24 months
▪ Heroin (HER – 150) card	24 months
▪ Amphetamines (AMP – 500) card	24 months
▪ Nitroaromatics (NTA – 400) card	24 months
▪ Nitramines & Nitrates (NTR – 300) card	24 months
▪ Peroxides (PER-700) card	24 months
▪ Gunshot residue (GSR – 600) card	24 months

Storage Temp

- Sampling cards should be stored between (40 – 80 F)
- Short term (~2 weeks) storage at high temperature does not affect performance.

Red X Verification Cards

System verification cards provide a simple means to check the performance of your XCAT.

Power on the XCAT.
Open the door.
Insert the verification card.
Close the door firmly.

The “NOT DETECTED” light will flash an amber color while the card is being processed. Processing time should be no more than 3 minutes. The result should be a red “DETECTED” light for each card.

If a green “NOT DETECTED” light results, check the verification card for damage ensuring the colored sampling area is not worn, faded, scratched or damaged in any way. Rerun the card. If a green “NOT DETECTED” light results, contact RedXDefense.

Verification cards are specific for each card type.
Verification cards are reusable. Retain for multiple use.

Do not use the verification cards to sample live substances. Verification cards cannot detect live substances.

Do not simulate swiping of surfaces with verification cards. Swiping may damage the colored sample area.

If the colored sample area becomes damaged, DO NOT USE. Contact RedXDefense for a replacement.

For best results, store in original bags and box. Do not store lose cards in direct sunlight.

Verification cards contain no hazardous materials or substances.

XCAT Discriminators

FAST, RUGGED, SMALL, EASY, MULTI-USE

- Affordable
- Fast
- Automated detection: red light/green light
- No user exposure to chemicals or broken glass ampoules
- Less than 1 lb.
- Mil-STD-810G tested and CE certified
- Trace narcotics detection – pills, powders, residue, liquids
- GSR presumptive with follow-up SEM confirmatory
- Verification Standards
- No training needed, YouTube videos available
- No charge for field updates, Micro-SD
- Rechargeable Li Ion battery, 10 hour battery life
- Fielded since March 2013
- Used in over 39 states and 27 countries
- Sampling card shelf life 24 months
- No calibration necessary, No wait between cards