VIRGINIA DEPARTMENT OF FORENSIC SCIENCE

EVIDENCE HANDLING & LABORATORY CAPABILITIES GUIDE

TRACE EVIDENCE: GENERAL CHEMICAL

Contact Information

If you have any questions concerning the Trace Evidence laboratory examination capabilities or evidence handling procedures, please call the Training Section or the Trace Evidence Section at the Forensic Laboratory that services your area.

Laboratory	Section Contact	Phone Number
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GENERAL CHEMICAL OVERVIEW

Trace Evidence examiners conduct analysis on a wide variety of materials including, but not limited to, those involving:

Acids and bases (alkalis)	Inhalants
Automotive fluids	Inks
Bank dyes	Lithium
Bleach	Lubricating oils/greases
Clandestine laboratory precursors	Metal compositions
Condom lubricants	Paint balls
Crayons and other waxes	Pepper spray and tear gas
Drug excipients	Plastics and rubbers
Dyes and pigments	Sugar or salt
Fire extinguisher materials	Tapes
Glues and adhesives	Tar and asphalt

The examinations conducted may provide an identification of a questioned sample or may include comparison of a questioned sample to a known sample to determine if the questioned may have originated from the known. The investigator must provide as much information about the questioned sample as possible including the location from which the substance was recovered, the original condition of the substance, the use/application method (e.g., brushed, poured, sprayed), and the properties of the substance (e.g., odor, burns/irritates, greasy/oily texture). The investigator also needs to document any injuries incurred by a victim, if the material was ingested and what effect this had on the victim, and what type of medical treatment the victim received.

CAPABILITIES AND SERVICES

Identification of specific chemicals (e.g., capsaicin, sugar/salt, iodine, Lithium) or chemical types (e.g., acids/bases, greases)

Comparison of questioned materials to known sources

COLLECTION GUIDELINES

ITEM - Acids (such as certain drain cleaners and muriatic acid) or Bases (alkalis/caustics such as lye and some household cleaners like Drano or Red Devil Lye)

METHOD - Household products may be submitted in their original containers if the container is not leaking and is no larger than one pint. If sampling is necessary, carefully pour no more than one ounce of the material into a plastic bottle or small glass jar making sure that the lid contains no metal. The container can then be packaged in a non-metal container with packing material to keep the bottle or jar secure.

DISCUSSION - Use extreme caution when handling acids or bases. Be careful to package acids or bases correctly using proper plastic containers (e.g., polyethylene, polypropylene, Haz-Mat collection containers) and no metal.

ITEM - Pepper spray/tear gas

METHOD - The spray canister can be placed in a plastic bag, unless there is a request for latent print processing; if so, use a cardboard box, securing the evidence to eliminate friction within the container. Any clothing which needs to be analyzed for the presence of pepper spray needs to be wrapped in paper and placed in a paper bag. Clothing being analyzed for tear gas (CS or CN) needs to be packaged in a clean, unused, lined metal paint can. Gauze squares moistened with isopropyl alcohol (rubbing alcohol) can be used to collect pepper spray/tear gas residues from skin. Also, submit a control gauze square.

DISCUSSION - Package the questioned evidence in a separate container from the known (source) container (e.g., pepper spray or tear gas canisters).

ITEM - Inhalants (e.g., glue sniffing, huffing)

METHOD - Place the questioned sample in a clean, unused, lined metal paint can. Submit any known containers/sources for use as comparison samples. The original containers can be packaged in a plastic or paper bag.

DISCUSSION – Inhalants are volatile materials which will evaporate readily upon exposure to air. Placing this evidence in an airtight container - a clean, unused, lined metal paint can - as soon as possible is very important.

ITEM - Adhesive tapes

METHOD - <u>If tape is on roll</u> and a fracture match exam is desired, the end of the tape MUST be protected. Package the tape in a plastic bag or plastic container, unless there is a request for latent print processing; if so, use a cardboard box, securing the evidence to eliminate friction within the container.

<u>If tape is loose or wadded,</u> do not mark, warp or distort the tape evidence. If the tape must be cut to remove it from a victim, deceased or living, ensure that the cut ends are marked accordingly. If the tape is generally flat and has exposed adhesive surfaces, press the adhesive side of the tape onto a heavy grade plastic bag or plastic sheet (e.g., acetate). Place this evidence in an envelope or paper

bag. Wads of tape may be placed in a clean, unused, lined metal paint can or plastic, "Tupperware®" type container for submission.

DISCUSSION – Generally, a fracture match will always be attempted. If a fracture match is not possible then comparison of the physical and chemical properties of the known and questioned tapes will be conducted. It is important to handle the tape as little as possible and to ensure that the tape does not come in contact with paper surfaces which will contaminate the tape with paper fibers.

ITEM - Unknown powders/liquids/solids

METHOD - If the powder is dry, collect in a paper evidence fold for submission. If the powder is damp or moist and no volatiles are suspected, allow the powder to dry and then package in a paper evidence fold. Plastic containers (pillboxes) or small glass vials are also acceptable for packaging powders. If volatiles are suspected, package in a clean, unused, lined metal paint can. If a known source is present, also submit a sample of the known source for comparison purposes.

For liquids, package the liquid in a plastic or glass container. Submit comparison samples of known liquids as available.

If the powder is sugar/salt in a gas tank - Collect any crystals which may be present near the fill spout opening and place in a paper evidence fold. If the gas tank has been removed as a part of the investigation, solids or aqueous liquid which may be present in the bottom of the tank should be collected in a glass jar or plastic container and submitted. Many solids such as sugar or salt that are soluble in water are not soluble in gasoline. The fuel or oil filter may also be collected for testing as needed.

DISCUSSION – Any unknown material may be very HAZARDOUS and should be handled with extreme caution. If the material is suspected of containing a biological or chemical agent, the investigating agency needs to submit the material directly to the Division of Consolidated Laboratory Services (DCLS). The Department of Forensic Science cannot accept suspected biological or chemical agents.

DCLS main switchboard: 804-648-4480

DCLS afterhours emergency number: 804-335-4617

ITEM - Bank dye packs or articles suspected of containing bank dye

METHOD – Place expended bank dye packs in a plastic bag which is then packaged in a separate container such as a paper bag. Wrap clothing or other articles suspected of containing bank dye in paper and then place in a paper bag.

SUBMISSION REMINDERS

As not every type of physical evidence which may be collected from a scene can be addressed, assess the evidence to be submitted and use common sense when packaging. Protect all evidence from loss,

contamination or deleterious change. Refrigerate materials that may degrade prior to laboratory analysis. Place materials that are volatile (evaporate readily) in clean, unused, lined metal paint cans. If the material could possibly be an acid or a base, do not package it in metal or allow it to come into contact with any metal. Collection of evidence with cotton-tipped applicators is not recommended. Do not hesitate to call the lab to discuss your particular evidence and circumstances.

Assume that any unknown material is hazardous and make personal safety the highest priority. General chemical materials may be CAUSTIC, TOXIC OR POISONOUS and MUST be handled with EXTREME CARE.

Avoid metal containers for collecting unknown substances (especially acids/bases) since these containers may be destroyed by the unknown chemical. A possible explosive mixture containing hydrogen gas may be generated by the reaction of the acid/base with the metal container. Be careful if packaging unknown chemicals in plastic containers as some chemicals can react with and dissolve the plastic. Glass jars can also be used as packaging containers. Collection of evidence using swabs is not recommended. Potential volatiles need to be packaged in air-tight containers like paint cans. Ensure that the containers are leak proof.