



ATF-LS-LP13 Iodine Fuming	Published Online: March 2018
Authority: Technical Leader	
Unofficial Copy; May Not Be Most Current Version	Page: 1 of 2

- I. Scope:** Iodine is a sensitive indicator of various fatty oils which are often present in latent print residue. Iodine is absorbed by the oily material which assumes the reddish-brown color. While absorption is quite rapid and can be most pronounced, no chemical change occurs to either substance. When exposure to the iodine ceases, the oily material releases the iodine molecules slowly. The color begins to fade and after several hours, the iodine may be completely dissipated. Return exposure will most often repeat the process while maintained exposure prevents dissipation. Generally iodine dissipates with no trace of exposure or damage to the article.

Iodine is effective with relatively fresh oil deposits, but for those older than two weeks, the reaction may not occur or be too faint for recognition. A chemical breakdown of the oily material appears to inhibit absorption. Iodine is normally not destructive and may detect deposits with insufficient amino acids for effective ninhydrin reaction. The applications of 7, 8-benzoflavone may be used to intensify weak iodine discolorations of latent print residue.

Iodine is toxic and very corrosive to nearly all metals. It can be used to process nearly all types of surfaces, but is normally used with porous items.

II. References:

Cowager, James F. *Friction Ridge Skin Comparison and Identification of Fingerprints*; Boca Raton: CRC Press, 1993.

Lee, Henry C.; Gaensslen, R.E., eds. *Advances in Fingerprint Technology*; Elsevier Science Publishers: NY, 1991.

Kent, Terry, ed. *Fingerprint Development Techniques*; Heanor Gate Publisher: Derbyshire, England, 1993.

Olson, Robert. *Scott's Fingerprint Mechanics*; Charles C. Thomas Publisher, Springfield, IL, 1978.

III. Apparatus/Reagents:

- Fuming Cabinets
- Iodine Gun

- IV. Safety Precautions:** This procedure involves the use of hazardous materials. This procedure does not purport to address all of the safety problems associated with its use. It is the responsibility of the user of this procedure to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use. Proper caution should be exercised and the use of personal protective equipment should be utilized to avoid exposure to dangerous chemicals. Consult the appropriate MSDS for each chemical prior to use.

V. Procedures:

Iodine is most effectively utilized with vapors from sublimating crystals. Direct contact of iodine crystals to actual items should be avoided. Sublimation occurs at low temperature, but heat accelerates the action. Confined vapors provide for the best reaction and the least health risk.

1. **Fuming Cabinet:** Cabinets which permit adequate space for evidentiary items, fume containment, and gentle heat to accelerate sublimation are sometimes used. While there are commercially available cabinets, one can be easily constructed of wood and glass which may be more effective and less susceptible to the corrosive nature of iodine vapor.
2. **Iodine Fuming Gun:** Large or immobile items can also be processed with direct iodine vapor from a source most commonly called an iodine fuming gun. This device creates vapors within a tube which are directed toward the surface to be examined by forced air movement. This can be accomplished by using a compressed air source. Because the residue is exposed to the vapors for a brief duration, any iodine absorbed is released immediately demanding prompt preservation. Iodine fuming guns are readily available from nearly all suppliers, but also may be simply assembled using Gooch or thistle tubes, rubber stoppers, and tubing.
3. **Zip Lock Plastic Bag:** A highly practical alternative to a fuming cabinet is a zip lock transparent plastic bag. A small amount of iodine crystals are poured into the bag, the item is inserted and the bag sealed. The bag containing the crystals are held between the fingers or grabbed by the hand to provide additional heat to hasten sublimation. The bag may be periodically shaken to improve the distribution of iodine vapors, but close contact of crystals to the item should be minimized. Oily latents will discolor within minutes.
All iodine developed latent print impressions are transitory and once removed from exposure to the iodine fumes must be preserved as quickly as possible using appropriate photographic preservation techniques. Procedures to increase stability have been devised, but these require a chemical reaction which can inhibit subsequent processing procedures. Photography is the primary means of preservation when other processing will be attempted on the items of evidence. Chemical means of preservation are very limited in their benefit and application in routine evidence processing. These chemical techniques also require photographic preservation. The use of stabilizing agents, such as 7, 8-benzoflavone, are primarily confined to instances where increased contrast with the substrate is required.

VI. Quality Assurance/Quality Control: For each new application of the Iodine process, an oily impression should be placed on a paper test strip and exposed to the iodine fumes using the appropriate application device. If the test impressions are visualized, indicated by a reddish-brown discoloration, the crystals/application technique may be used to process evidence. All control tests should be documented using the appropriate reagent log.