



## TECHNICAL INFORMATION

### 1,2-Indanedione Catalog Nos. LV508, LV5081

<b>Application</b>	Detection of latent fingerprints on wood/paper materials using alternative light sources.	
<b>Hazards/Safety Info</b>	<u>HMIS</u>	<p><b>Danger!</b> 1,2-Indanedione itself is not flammable, but flammable solvents are used in this procedure for preparation. Do not mix the solution or use a solution near an open flame or ignition source.</p> <p><b>Caution!</b> All chemicals in this procedure can irritate skin and eyes. Use in well-ventilated area or open space only. Use chemical resistant (rubber) gloves and safety glasses when handling these products. <i>In case of exposure, refer to the MSDS for treatment at <a href="http://www.sirchie.com/support">www.sirchie.com/support</a>.</i></p>
	H 1	
	F 0	
	R 0	

### INTRODUCTION

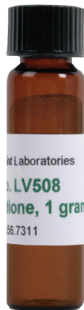
First introduced by University of Pennsylvania researchers and work done by the U.S. Secret Service, 1,2-Indanedione is a fluorescing agent used in the development of latent fingerprints on porous cellulosic (wood, paper) surfaces. It has fluorescent properties that Ninhydrin does not have, and is more

economical than DFO (1,8-Diazofluoren-9-One). Like both Ninhydrin and DFO, 1,2-Indanedione reacts with amino acids contained in latent fingerprints. The treatment is intended for when analysis can be done with a blue (455nm) or cyan (505nm) light source and orange or red filters, as treated fingerprints are not always visible to the naked eye, and when visible, they are light pink.

### PREPARATION INSTRUCTIONS

**Caution!** 1,2-Indanedione is light sensitive. The powder and all solutions should be stored in a dark dry place when not in use. Always store in a light-blocking container, preferably in an amber glass bottle.

**Warning!** All solutions should be mixed in a well-ventilated area or laboratory hood. Solvents used in these solutions are flammable. Do not mix in presence of open ignition sources or flames.



*No. LV508 working solution is carefully sprayed on suspect document for latent prints. No. LV508 should be applied in a well-ventilated area such as a fuming or ducted exhaust hood.*

Prepare a working solution by measuring and adding the following ingredients to a 1000ml (1 liter) amber/brown chemical resistant (glass) container with a lid:

<b>Working Solution</b>	<b>Volume</b>
1,2-Indanedione	2g
Ethyl acetate	70ml
Acetic Acid	30 ml
3M Novec™ HFE7100	900ml

Mix the 1,2-Indanedione with the ethyl acetate first by adding to the bottle and gently swirling or shaking until the powder is at least partially dissolved. Add the 3M Novec™ HFE7100 to dilute and bring volume to 1000ml.

### APPLICATION INSTRUCTIONS

Best Known Method:

**Warning!** Solvent fumes used in this solution are irritants. This solutions should be applied in a laboratory hood or well-ventilated environment. In addition, solvents can cause irritations to the skin and eyes. User should wear chemical resistant (rubber) gloves and if a hood shield is not in use, safety glasses.

1. Add working solution to an 8 oz. (or 250ml) amber/brown glass/plastic chemical resistant bottle with a pump spray nozzle.
2. Place the material to be treated in a vented hood. Recommend hanging paper objects from a rod for easier saturation.
3. Spray the solution from left to right and work down the object until it is saturated.
4. Allow to air dry for 2-3 minutes.
5. If a document or paper, reverse the face and apply the solution to the opposite side, same as step 3.
6. Remove document and dry in an oven at 100°C (or 212°F) for approx. 20 minutes.

Alternatives:

1. If object to be treated is a low acidity, such as archival paper, it is suggested to add 10ml Glacial Acetic Acid when making the working solution and reduce the 3M Novec™ HFE7100 to 920ml for a standard 1000ml volume.

After-Treatment:

A zinc-chloride fixing solution can be applied to reduce the fading inherent in prints developed with 1,2-Indanedione, much like Ninhydrin.

<u>Solution</u>	<u>Volume</u>
Zinc Chloride	30g
MTBE (Methyl-tert-butylether)	500ml
Petroleum Ether	500ml

Dissolve 30g (3 tsp.) zinc chloride in 500ml of MTBE by adding to a 1000ml (1 liter) amber/brown chemical resistant (glass) container with a lid and rolling or shaking for 20 minutes or until the powder is dissolved. (An easier alternative is to add the 500ml MTBE and zinc chloride to a beaker or glass container and mix with a magnetic stir rod on a laboratory mixer for 20 minutes.) Add the petroleum ether to bring the volume to 1000ml (1L).

1. Add working solution to an 8 oz. (or 250ml) amber/brown glass/plastic chemical resistant bottle with a pump spray nozzle.
2. Place the material to be treated in a vented hood. Hanging paper objects from a rod for easier saturation is recommended.
3. Spray the solution from left to right and work down the object until it is saturated.
4. Allow to air dry for 2-3 minutes.
5. If a document or paper, reverse the face and apply the solution to the opposite side, same as step 3.
6. Remove object and dry in an oven at 100°C (or 212°F) for 20 minutes.

### Notes:

- Treated articles are light sensitive and will fade. Store treated articles in a dark, cool, dry place.
- The alternative solution with acetic acid should **ONLY be used on low acid items**. Acetic acid has been shown to make the working solution break down quickly, and therefore has been removed in most recommended formulations.
- In order of treatment, 1,2-Indanedione should be used before Ninhydrin or DFO.

### INTERPRETATION INSTRUCTIONS

Latent prints developed with 1,2-Indanedione may appear as light pink to the naked eye, or may not appear at all. All interpretation **MUST** be done using an alternative light source in the blue (455nm) or cyan (505nm) (No. MMX100, MMX300) and orange filter glasses (No. BMS300). The evaluation should be done with minimum ambient light as possible.

For items that are tan or brown in color (i.e. brown bags, cardboard), red filter goggles (No. FAL207) should be used.

Photography of resulting prints should be done using an orange or red filter based on the object.

### Possible Reasons for Poor or No Results

1. No fingerprints are present:
  - 1.1. The material may be of low acid content. Either make a new working solution with acetic acid and retreat or proceed to the next reagent, either Ninhydrin or DFO.
  - 1.2. There may be no amino acids present, treat with an alternative non-amino acid method, such as iodine or silver nitrate.



*RESULTS EXPECTED: No. LV508  
fluorescent latent fingerprint.*

#### Other Similar Products

- Ninhydrin (Nos. NPR01A, NSI609, NFS200, NHT609)
- DFO (Nos. LV500, LV5001, DFS200P)

#### References

1. Chesapeake Bay Division International Association of Identification, “1,2-Indanedione”, Reagents, <<http://www.cbdi.ai.org/Reagents/br28.html>>, 12, January 2009.
2. Chesapeake Bay Division International Association of Identification, “Zinc Chloride”, Reagents, <<http://www.cbdi.ai.org/Reagents/br28.html>>, 12, January 2009.
3. Kasper, S.P.; Minnillo, D.J.; Rockhold, A.M.. “Validating IND (1,2-Indanedione)”, Forensic Science Communications 2002, Vol. 4 No. 4.< <http://www.fbi.gov/hq/lab/fsc/backissu/oct2002/kasper.htm>>
4. Ramotowski, R.; Cantu,A.A.; Joullié, M.M.; Petrovskaia, O.; “1,2-Indanedione: A Preliminary Evaluation of a New Class of Amino Acid Visualizing Compounds,” Fingerprint Whorld 1997,Vol. 23, No. 90, pp. 131-140.



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