

Ninhydrin

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Ninhydrin

1 INTRODUCTION/SCOPE

- A. Ninhydrin is used by FBI Laboratory Friction Ridge Discipline personnel to develop prints on porous and semi-porous surfaces.
- B. It reacts with the amino acids that are present in perspiration.

2 STANDARDS AND CONTROLS

See *Processing Overview* ([FRD-300](#)).

3 LIMITATIONS

None

4 EQUIPMENT

- Humidity chamber or steam producing device
- Ninhydrin
- Acetone
- Petroleum Ether
- Isopropanol
- Methanol

5 PROCEDURE

5.1 Solution Preparation

Personnel will prepare the solutions as follows. Alternative amounts may be prepared, provided the same ratio of chemicals mixed is retained.

5.1.1 Ninhydrin (Petroleum Ether) Solutions (Large Quantity)

5.1.1.1 *Ninhydrin stock solution*

- A. Combine:
 - Ninhydrin – 700 g
 - Methanol – 3500 mL
- B. Stir until Ninhydrin dissolves.

5.1.1.2 *Ninhydrin working solution*

- A. Remove 1500 mL of Petroleum Ether from the approximately 20 L container.
- B. Combine:
 - Isopropyl Alcohol – 800 mL
 - Ninhydrin stock solution – 700 mL
- C. Add to the remaining Petroleum Ether in the approximately 20 L container.
- D. Agitate container to mix solution.

5.1.2 Ninhydrin (Petroleum Ether) Working Solution (Small Quantity)

- A. Combine:
 - Ninhydrin – 5 g
 - Methanol – 30 mL
- B. Stir until Ninhydrin dissolves.
- C. Add:
 - Isopropyl Alcohol – 40 mL
 - Petroleum Ether – 930 mL

5.1.3 Ninhydrin (Acetone) Working Solution

- A. Combine:
 - Ninhydrin - 6 g
 - Acetone - 1000 mL
- B. Stir until Ninhydrin dissolves.

5.2 Application

5.2.1 Standard Method

- A. Personnel will complete the following steps in order:
 - 1. Apply solution to item.
 - 2. Allow item to dry completely.
 - 3. Place in humidity chamber at 70%-80% relative humidity and 70-80°C for approximately 5 minutes or until desired development occurs.
- B. Capture appropriate friction ridge detail as applicable (digitally or photographically).

5.3 Alternate Methods for Development

- A. Personnel may apply damp heat with a steam producing device (e.g., steam iron) for several minutes.
 - 1. If latent print development is insufficient, continue to apply damp heat for a few additional minutes.
- B. In some circumstances, heat may be detrimental to the condition of the item(s).
 - 1. In these circumstances, the item(s) may be left to dry and then placed in a sealed bag or container at least overnight or until development occurs.
- C. The use of alternate methods must be recorded in the case record.
 - 1. If an alternate method is used to test a reagent, the method needs to be recorded in the reagent log or the case record (if off site).

5.4 Storage

- A. Stock solution must be stored in a dark glass bottle.
- B. Working solution may be stored in any of the following receptacles:
 - Dark glass bottle
 - Metal can
 - Stainless steel container

5.5 Shelf Life

- A. Stock solution has an indefinite shelf life provided the reagent checks are satisfactory.
- B. Working solution has a shelf life of 1 year provided the reagent checks are satisfactory.

6 SAFETY

See [FBI Laboratory Safety Manual](#) for appropriate information.

7 REVISION HISTORY

Revision	Issued	Changes
02	07/15/2021	Replace Latent Print Units with Friction Ridge Discipline. Minor wording changes. Streamline equipment list and generalized steam iron. Re-organization and re-numbering of sections. Section 3.1 - separated into Section 3.1.1 and Section 3.1.3 and added Section 3.1.2 from previous version of Ninhydrin document. Section 3.2.2.1 - generalized steam iron. Section 3.2.2.2 - modified expectations for development. Section 3.2.2.3 - added location. Section 4 - added Preamble reference.
03	07/01/2022	Format Updated.