



## **Latent Print Section**

### **Ninhydrin (NIN)**

Comparative & Analytical Division



## **1. Processing evidence using Ninhydrin (NIN)**

### **1.1 Scope**

1.1.1 This document details the procedure for the mixing and application of NIN on porous and semi-porous forensic materials by the Latent Print Section of the Houston Forensic Science Center (HFSC).

### **1.2 Equipment, Materials, and Reagents**

#### **1.2.1 HFE Method**

- 1.2.1.1 Ninhydrin (5.0 grams)
- 1.2.1.2 Ethanol (45.0 mL)
- 1.2.1.3 3M Novec HFE-7100 (1.0 Liter)
- 1.2.1.4 Glacial Acetic Acid (5.0 mL)
- 1.2.1.5 Ethyl Acetate (2.0 mL)

#### **1.2.2 Acetone method**

- 1.2.2.1 Ninhydrin (6.0 grams)
- 1.2.2.2 Acetone (1.0 Liter)

1.2.3 Equipment: balances, graduated cylinders, magnetic stirrer and stirring bar, funnel, and dark storage bottles

1.2.4 Safety Equipment: fume hood, gloves, safety glasses, lab coat

### **1.3 Safety**

1.3.1 Examiners/Processors shall wear appropriate personal protective equipment (PPE) while preparing and applying NIN.

1.3.2 Fume hood use is required when preparing and applying NIN.

1.3.3 See applicable Safety Data Sheet (SDS).

### **1.4 Preparation of Ninhydrin/HFE-7100**

#### **1.4.1 Working Solution**

1.4.1.1 Using a magnetic stirrer, slowly add 5.0 grams of NIN crystals to 45 mL ethanol, 5 mL glacial acetic acid, and 2 mL ethyl acetate and stir until the NIN is dissolved.

1.4.1.2 Add the dissolved mixture to 1.0 liter of 3M Novec HFE-7100 solvent.

1.4.1.3 Place the appropriate safety label and information on the bottle. Proper labeling should include:

- Name of Reagent
- Date of Preparation
- Date of Expiration (if applicable)
- Preparer's name or initials
- Batch Number

1.4.1.4 The date of expiration for batch solutions of NIN will be one year from the date of preparation.

### **1.5 Preparation of Ninhydrin/Acetone**



### 1.5.1 Working Solution

- 1.5.1.1 Using a magnetic stirrer, slowly add 6.0 g of NIN crystals to 1 L acetone and stir for approximately 20 minutes, or until the NIN is dissolved.
- 1.5.1.2 Place the appropriate safety label and information on the bottle. Proper labeling should include:
  - Name of Reagent
  - Date of Preparation
  - Date of Expiration (if applicable)
  - Preparer's name or initials
  - Batch Number
- 1.5.1.3 The date of expiration for batch solutions of NIN will be one year from the date of preparation.

### 1.6 Procedure

- 1.6.1 NIN may be applied by dipping or spraying.
- 1.6.2 Items that have been processed with NIN may be placed in a humidity chamber at approximately 70° to 80°C and 60% to 80% humidity to accelerate the development of latent prints. Periodic checks on the items for visible prints are required. If a humidity chamber is not available, a common household steam iron can also be used.
  - 1.6.2.1 Heat should not be used on specialty papers (i.e. thermal) which will darken upon application of heat
- 1.6.3 Developed latent prints will appear purple in color and are viewed under white light. Enhanced contrast can be obtained by viewing under a green ALS.

### 1.7 QA/QC

- 1.7.1 A quality control check must be performed when a new reagent is prepared and placed into service.
- 1.7.2 A quality control check of in service reagents must be performed once a week.
- 1.7.3 To test the solution, apply a finger to an Amino Acid Standard Pad and place a test print on a piece of paper (Matrix = amino acid; Substrate = paper). Apply NIN as described above.
- 1.7.4 A successful Quality Control Check is one in which a positive test result is achieved. A positive test result is one in which the test print is visible under white light/LASER/ALS.

### 1.8 Records/Results

- 1.8.1 Processes used are documented in the case examiner's/processor's case notes via the Laboratory Information Management System (LIMS).
- 1.8.2 Reagent test results are recorded in Qualtrax.

### 1.9 Storage

- 1.9.1 Store solution in a dark bottle in a refrigerator to enhance shelf life. However, refrigeration of NIN is not required.

### 1.10 References



Armitage, S., Wakefield, M. "The Development of Latent Fingerprints on Thermal Paper Using a Novel, Solvent-Free Method." *Journal of Forensic Identification* 2005, 55:202-13.

Defense Forensic Science Center, *CILA LP 51.4, Ninhydrin*, 13 January 2014

Stimac, J., "Thermal and Carbonless Papers: A Fundamental Understanding for Latent Friction Ridge Development", *Journal of Forensic Identification*, 53(2), 2003, pp 185-197.

Szatkowski, M., "A Comparison of Techniques Utilized in Latent Print Development on Thermal Paper" Student Research Project – April 2006.