	<p style="text-align: center;"><b><i>Latent Procedure</i></b></p> <p><b>Pitt County Sheriff's Office Forensics Services Unit</b>  <i>Issued by Technical Leader</i></p>	<p><b>Effective Date:</b>  2018/06/29</p>	<p><b>Ver:</b>  <b>3</b></p>
<p>Procedure for Ninhydrin-HFE7100</p>			<p><b>Page #:</b>  <b>1 of 6</b></p>

### **Technical Procedure for Ninhydrin-HFE7100**

**1.0 Purpose** - This procedure outlines how to make the Ninhydrin-HFE7100 solution and apply it to items of evidence.

**2.0 Scope** - This procedure applies to porous items of evidence that are to be examined for the presence of latent prints. Ninhydrin reacts to the amino acids present in fingerprint residue and turns the amino acids purple when the reaction is complete.

**3.0 Definitions** – N/A

**4.0 Equipment, Materials and Reagents-** (Alternatively pre-mixed solutions may be purchased from a commercial forensic supplier).

#### **4.1 Equipment and Materials**

- Laboratory coat and gloves
- Face shield visor and/or safety goggles
- Magnetic stirrer, magnetic follower, and magnetic retriever
- Glass beakers
- Graduated cylinders
- Dark, shatter-proof container
- Forceps
- Fume hood
- Glass tray, paint brush, or aerosol sprayer (for application)
- Camera/scanner
- Dust or mist respirator (for application outside of fume hood)
- Image processing systems

#### **4.2 Reagents**


- Ninhydrin crystals (5 g)
- Ethanol (ethyl alcohol) (45 mL)
- Ethyl acetate (2 mL)
- Glacial acetic acid (5 mL)
- HFE-7100 (1000 mL)

### **5.0 Procedure**

#### **5.1 Chemical Preparation**

##### **5.1.1 Concentrate/Working Solution**

**5.1.1.1** Place five (5) grams of ninhydrin crystals and a magnetic follower into a beaker.

	<p style="text-align: center;"><b><i>Latent Procedure</i></b></p> <p><b>Pitt County Sheriff's Office Forensics Services Unit</b>  <i>Issued by Technical Leader</i></p>	<p><b>Effective Date:</b>  2018/06/29</p>	<p><b>Ver:</b>  <b>3</b></p>
<p>Procedure for Ninhydrin-HFE7100</p>			<p><b>Page #:</b>  <b>2 of 6</b></p>

**5.1.1.2** Add forty five (45) ml of ethanol to the beaker and stir until the ninhydrin crystals have completely dissolved. Do not use heat.

**5.1.1.3** Add ten (2) ml of ethyl acetate while stirring.

**5.1.1.4** Add twenty-five (5) ml of glacial acetic acid to the mixture. Continue stirring until clear yellow solution is produced.

**5.1.1.5** Transfer the concentrate solution to a 1 liter beaker.

**5.1.1.6** Add (950) ml of HFE-7100 and add to the concentrate solution while stirring.

**5.1.1.7** Transfer the resulting working solution to a clean, dark, shatterproof container.

## **5.2 Processing Procedures**

### **5.2.1 Chemical Application**

**5.2.1.1** Examiners shall produce a self-made test print to be processed concurrently with items of evidence (see section technical procedure for Ensuring Quality Control).

**5.2.1.2 Dipping Method** – Completely submerge the item in the working solution for five (5) to ten (10) seconds.

**5.2.1.3 Brush Method** – Dip the brush into the working solution and brush directly onto the item.

**5.2.1.4 Spray Method** – Spray the item with the working solution to completely saturate the item.

**5.2.1.5** Allow the item to dry completely prior to proceeding.


**5.2.2** Latent impressions will develop over time at room temperature. Several methods (listed below) are available to enhance the development process.

**5.2.2.1 Plastic Bag** – Place the item in a sealed plastic bag until latent impressions develop.

**5.2.2.2 Steam Iron** – The iron is used to provide heat and moisture to the item. Hold the iron above the item and steam it, taking care to avoid contact between the item and the iron.

**5.2.2.3 Microwave** – Heat a tray or beaker of water in the microwave to produce steam. Place the item in the microwave for approximately five (5) minutes, or until impressions develop. Do not turn on the microwave with the evidence inside and do not allow the evidence to contact the hot water bath.

***All copies of this document are uncontrolled when printed.***

	<p style="text-align: center;"><b><i>Latent Procedure</i></b></p> <p><b>Pitt County Sheriff's Office Forensics Services Unit</b>  <i>Issued by Technical Leader</i></p>	<p><b>Effective Date:</b>  2018/06/29</p>	<p><b>Ver:</b>  <b>3</b></p>
<p>Procedure for Ninhydrin-HFE7100</p>			<p><b>Page #:</b>  <b>3 of 6</b></p>

**5.2.2.4 Humidity Chamber** – Large items may be placed in a humidity chamber for approximately four (4) to five (5) hours. The chamber shall be checked periodically to ensure adequate moisture is present.

**5.2.3 Preservation of Developed Impressions** – Preserve the developed impressions through photography (see Photographic Equipment procedures) and/or by electronic recording (see section Image Processing procedure and Recording of All Analytical Data).

**5.3 Standards and Controls** – N/A

**5.4 Calibration** – N/A

**5.5 Sampling** – N/A

**5.6 Calculations** – N/A

**5.7 Uncertainty of Measurement** – N/A

## **6.0 Limitations**

**6.1** Ninhydrin solutions shall be stored in dark, shatter-proof containers at all times to avoid direct exposure to sunlight.

**6.2 Shelf Life**

**6.2.1** Concentrate and working solution - one (1) year. (Note) Use may be continued when a positive and negative control test is performed with satisfactory results prior to processing each case. This may be continued until un-satisfactory results are observed during control test.

## **7.0 Safety**

**7.1** The process shall be performed in a fume hood as the fumes may cause some irritation when in contact with the eyes or skin and may be harmful if inhaled or ingested.

**7.2** Protective goggles, gloves and lab coats shall be worn during processing as the solution will stain skin and clothing.

## **8.0 References**

Almog, J. "Reagents for Chemical Development of Latent Fingerprints: Vicinal Triketones – Their Reaction with Amino Acids and with Latent Fingerprints on Paper." *Journal of Forensic Sciences*. Vol. 32, 6: 1565–1573 (1987).