Technical Procedure for Zinc Chloride-HFE-7100

1.0 Purpose - This procedure describes how to make Zinc Chloride-HFE-7100 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. Zinc Chloride-HFE-7100 is applied after processing an item with ninhydrin or a ninhydrin analog. Zinc Chloride-HFE-7100 causes the latent prints to fluoresce under an alternate light source. HFE-7100 is an environmentally safe solvent that is fast drying and generally will not cause inks to run.

3.0 Definitions – N/A

4.0 Equipment, Materials and Reagents

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
- Laser and/or alternate light source with orange filter and goggles
- Dust or mist respirator (for application outside of fume hood)

4.2 Reagents

- Zinc chloride (6 g)
- Ethyl alcohol (ethanol) (50 mL)
- Glacial acetic acid (10 mL)
- 2-propanol (10 mL)
- HFE-7100 (1-methoxynonafluorobutane) (200 mL)

5.0 Procedure

5.1 Chemical Preparation

5.1.1 Place fifty (50) mL of ethanol into a 400 mL glass beaker with a magnetic follower.

5.1.2 Add ten (10) mL of 2-propanol to the solution and continue to stir.

5.1.3 Add ten (10) mL glacial acetic acid to the solution and continue to stir.

5.1.4 Add six (6) g of zinc chloride to the solution and stir until it is completely dissolved.

5.1.5 Add two-hundred (200) mL of HFE-7100 to the solution and continue to stir until a colorless solution is produced, approximately five (5) minutes.

5.1.6 Remove the magnetic follower from the beaker and pour the solution into a dark, shatter-proof container.

5.2 Processing Procedures

5.2.1 Chemical Application

5.2.1.1 Forensic Scientists 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 – Place the working solution into a tray that will allow the item to be submerged completely. Submerge the item 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 saturate the item completely.

5.2.1.5 Allow the item to dry completely prior to proceeding. Purple marks from the use of ninhydrin or one of the ninhydrin analogs will change to an orange/red color when the zinc chloride reaction is complete.

5.2.2 View the item under the laser or alternate light source using the orange goggles and filters. Preferred wavelengths range from 450 nm to 515 nm.

5.2.3 Preservation of Developed Impressions – Preserve the developed impressions through photography (see photographic equipment procedures) and/or by electronic recording (see Section Technical Procedure for Image Processing).

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 Latent prints treated with zinc chloride will fluoresce yellow under an alternate light source. Background fluorescence shall be considered when using this chemical.

6.2 Zinc chloride solutions shall be stored in dark, shatter-proof containers until needed.

6.3 Shelf Life

6.3.1 Zinc Chloride-HFE-7100 Solution - six (6) months.

7.0 Safety

7.1 The process shall always 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 aprons shall be worn during processing.

7.3 Glacial acetic acid and ethyl alcohol are extremely flammable and shall be handled properly.

8.0 References

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9.0 Records – N/A

10.0 Attachments – N/A

Revision History		
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