



Latent Print Section
1,8-Diazafluoren-9-one (DFO)
Forensic Analysis Division



1. Processing evidence using 1,8-Diazafluoren-9-one (DFO)

1.1 Scope

- 1.1.1 This document details the procedure for the mixing and use of DFO 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 DFO (0.25 grams)
- 1.2.2 Methanol (40 mL)
- 1.2.3 Glacial Acetic Acid (20 mL)
- 1.2.4 3M Novec HFE-7100 (940 mL)
- 1.2.5 Equipment: balances, magnetic stirrer and stirring bar, dark storage bottles, funnel, cotton
- 1.2.6 Safety Equipment: fume hood, gloves, orange filtered goggles

1.3 Safety

- 1.3.1 Examiners/Technicians shall wear appropriate personal protective equipment (PPE) while preparing and using DFO.
- 1.3.2 Fume hood use is required when preparing and applying DFO.
- 1.3.3 See applicable Safety Data Sheet (SDS).

1.4 QA/QC

- 1.4.1 A Quality Control check must be performed before use each day and/or when the reagent is made.
- 1.4.2 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 = thermal paper). Apply DFO as described below
- 1.4.3 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 LASER/ALS light.

1.5 Procedure

- 1.5.1 The application of DFO may be applied by dipping or spraying.
- 1.5.2 Items that have been processed with DFO may be placed in an oven set at 100°C for twenty minutes to accelerate the development of latent prints. If an oven is not available, a dry household iron can be used. A dry heat press can also be used.
- 1.5.3 Developed latent prints will fluoresce under a green LASER/ALS and are viewed with orange goggles.

1.6 Preparation of DFO

- 1.6.1 Stock Solution
 - 1.6.1.1 Combine 0.25g of DFO, 40 mL of Methanol, and 20 mL of Glacial Acetic Acid (in order listed) into a dark storage bottle and place on a magnetic stirrer for approximately twenty (20) minutes until the DFO crystals have dissolved.



1.6.1.2 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 and initials
- Batch Number

1.6.2 Working Solution

1.6.2.1 Add 940 mL of 3M Novec HFE- 7100 to the stock solution and continue stirring. If the DFO does not completely dissolve, place cotton in the neck of a funnel and strain out the undissolved DFO particles.

1.7 Records/Results

1.7.1 Processes used are documented in the case examiner's/technician's case notes via the Laboratory Information Management System (LIMS).

1.7.2 Reagent test results are recorded in the Latent Print Laboratory Reagent Log.

1.8 Storage

1.8.1 Store solution in a dark bottle in a refrigerator to enhance shelf life. However, refrigeration of DFO is not required.

1.9 References

Cantu, A., Leben, D. Joulle, M., Heffner, R., Hark, R., "Comparative Examination of Several Amino Acid Reagents for Visualizing Amino Acid (Glycine) On Paper," *Journal of Forensic Identification*, Vol. 1, 1993.

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Grigg, R., Mongkolaussavarantana, T., Pounds, A., Sivagnanam, S., "1,8-diazafluoren-9 one and Related Compounds. A New Reagent for the Detection of Amino Acids and Latent Fingerprints," *Tetrahedron Letters*, Vol. 31, No. 49, pp. 7215-7218.

Masters, N., Morgan, R., Shipp, E., "DFO, Its Usage and Results" *Journal of Forensic Identification* 1991; 41(1)