

Iron Oxide Powder Suspension

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Iron Oxide Powder Suspension

1 INTRODUCTION/SCOPE

Iron Oxide Powder Suspension (IOPS) is used by FBI Laboratory Friction Ridge Discipline personnel for the development of latent prints on the adhesive side of duct, vinyl/electrical, and packing tape. [Note "IOPS" and "IOP" are approved abbreviations for this process.]

2 STANDARDS AND CONTROLS

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

3 LIMITATIONS

- A. IOPS should be applied to the following rubber-backed tapes only: duct, vinyl/electrical, and packing tape.
- B. If heavy background develops, alternative processes are recommended.

4 EQUIPMENT

- Sigma-Aldrich iron (II/III) oxide powder (50 nm – 100 nm)
- Tween® 20
- Camel hair brush or similar small brush
- Distilled Water

5 PROCEDURE

5.1 Mixture Preparation

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

5.1.1 10% Tween 20 stock solution (detergent solution)

- A. Combine:
 1. Tween 20 – 10 mL
 2. Water – 90 mL
- B. Stir and ensure thorough mixing.

5.1.2 Iron Oxide Powder Suspension (IOPS)

- A. Inside a fume hood, combine:
 1. Iron (II/III) oxide powder (50 nm – 100 nm) – 1 g
 2. Detergent solution – 2 mL
- B. Mix until a smooth paste is formed.

5.2 Application

- A. Personnel will complete the following steps in order:
 1. Paint the IOPS onto the adhesive surface with a camel hair brush or other similar small brush.

2. Let item sit for approximately 10 seconds.
 3. Rinse with a slow stream of water.
 4. Allow to dry.
- B. Digital capture and photography, as applicable.

5.3 Storage

- A. Detergent solution must be stored at room temperature and in any type of laboratory acceptable receptacle.
- B. IOPS must be stored at room temperature and in a closed container.

5.4 Shelf Life

- A. Detergent solution has a 12-month shelf life provided the reagent checks are satisfactory.
- B. The shelf life for IOPS is unknown but the suspension may be used provided the reagent checks are satisfactory.

6 SAFETY

- A. Iron (II/III) oxide powder must be handled in a fume hood until in suspension.
 1. Application may occur outside a fume hood.
- B. Items processed with IOPS do not have special handling requirements.
- C. Replace PPE when soiled with iron (II/III) oxide powder or significant amounts of dried IOPS.
- D. See [FBI Laboratory Safety Manual](#) for appropriate information.

7 REVISION HISTORY

Revision	Issued	Changes
00	05/16/2022	New Document Issued.