



ATF-LS-LP9 Ardrox	Published Online: March 2018
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Unofficial Copy; May Not Be Most Current Version	Page: 1 of 3

- I. **Scope:** Ardrox P133D is an industrial penetrant manufactured by Ardrox, Limited of Canada, as 970-P10, and available in the United States from Radiatronics, Inc., of Overland Park, Kansas. The stain was developed to detect small fractures in construction materials and possesses certain properties that can be successfully utilized in latent print processing. Ardrox P133D readily penetrates and remains in minute openings, yet is easily rinsed from surrounding surfaces, and is highly luminescent with long wave, ultra violet light excitation.

Ardrox P133D staining was developed as a means of enhancing cyanoacrylate ester polymerized impressions. The properties of Ardrox are highly complementary to the cyanoacrylate ester process, and may yield results that equal or surpass those of the Rhodamine 6G procedure. However instances have occurred when Rhodamine 6G revealed impressions that were not stained by Ardrox P133D with UV excitation. This lack of consistency currently delegates Ardrox P133D as an additional processing technique, not as a replacement for dye and laser examination.

Ardrox P133D is also luminescent with blue laser or 470nm xenon arc illumination. The effectiveness of Ardrox P133D and UV excitation may justify the omission of dye and laser examination on a case by case basis when the laser is unavailable. However, since the two procedures are compatible, use of Ardrox staining as an additional technique to be utilized in conjunction with the laser dyes, is recommended whenever possible.

II. **References:**

Lennard, Christopher J; Pierre A. Margot. "Sequencing of Reagents for the Improved Visualization of Latent Fingerprints"; Journal of Forensic Identification, September/October 1988, 38, 5, 197-210.
Kent, Terry ed. Fingerprint Development Techniques; Heanor Gate Publisher: Derbyshire, England, 1993.

McCarthy, Mary M. "Evaluation of Ardrox as a Luminescent Stain for Cyanoacrylate Processed Latent Impressions"; Journal of Forensic Identification, 1990, 40, 2, 75-80.

Murbarger, Melissa; Lisa Zaccagnini. Substitute for Freon-Ardrox Formula. Illinois State Police Internal Publication, 1997.

Vachori, G.; J. Sorel. "New Fingerprint Development Process, in Proceedings of the International Forensic Symposium on Latent Prints"; U.S. Department of Justice: U.S. Government Printing Office, 1987.

III. **Apparatus/Reagents:**

Fume Hood
High Intensity Ultra Violet Light Source
Alternate Light Source
Laser

The examiner can choose from four preparations of Ardrox solutions. The preparation chosen is primarily dependent on the reaction of the substrate to the solvent used for dilution of the Ardrox. A 1% or 2% Ardrox in methanol or isopropanol is productive for most surfaces, with 1% Ardrox in methanol being the preferred preparation for most applications.

Substrates that react with the methanol preparation can be treated with either the Freon or Methyl

Ethyl Ketone (MEK) preparation (Freon is expensive and not readily available - MEK can be used when the substrate reacts with the other solvents. MEK based preparations can also be used on items when the substrate does not react with other solvents. Undiluted Ardrex can also be used to process items when the substrate reacts with the solvents.

Methanol/Isopropanol:

1. Mix 5.0 milliliters of Ardrex with 500 milliliters of methanol or isopropanol.

Alternate Formula:

1. Mix 1 milliliter of Ardrex with 40 milliliters of methanol.
2. Add 60 milliliters of petroleum ether. - While the 40% methanol solution may cause some substrate damage, many surfaces, such as semi porous items, benefit from the reduced alcohol mixture.

MEK:

1. Mix 1.0 milliliters of Ardrex in 9.0 milliliters of isopropanol.
2. Add 15.0 milliliters of methyl ethyl ketone.
3. Add 75.0 milliliters of distilled water and mix.

Undiluted Ardrex:

1. No preparation required.

IV. Safety Precautions: All applications should be performed in a fume hood. This procedure involves the use of hazardous materials. This procedure does not purport to address all of the safety problems associated with its use. It is the responsibility of the user of this procedure to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use. Proper caution should be exercised and the use of personal protective equipment should be utilized to avoid exposure to dangerous chemicals. Consult the appropriate MSDS for each chemical prior to use.

Proper safety precautions including avoiding skin exposure and proper eye protection with appropriate optical densities should be utilized when operating ultraviolet light, laser, or alternate light sources. Consult the appropriate users manuals for the safe use and appropriate eye protection for the specific piece of equipment being used.

Isopropanol and Methyl Ethyl Ketone are extremely flammable. Vapors can ignite at room temperature. These chemical solutions should be considered an extreme hazard.

V. Procedures:

Undiluted Ardrex application:

1. Completely cover the item to be processed with undiluted Ardrex by immersion or by squirt bottle.
2. Allow the liquid to remain on the item for about ten minutes.
3. Rinse the item under tap water until no yellow color remains.
4. Allow the item to dry and examine with the appropriate light source.
5. Record any impressions observed, using appropriate film and filters.

Ardrex methanol, isopropanol and petroleum ether formulas application:

1. Apply the solution to the item to be processed by immersion or squirt bottle.
2. Allow the solution to remain on the item for several minutes to insure proper adherence of the Ardrex to the cyanoacrylate developed impressions.
3. Before rinsing, examine the item using the appropriate light source to determine if background staining has occurred. If not proceed with the examination and record all observed impressions.
4. If background staining is observed and prevents adequate photographic preservation expose the item to a light tap water rinse.
5. Allow the item to dry completely and examine with the appropriate light source.
6. Photograph any impressions observed using appropriate film and filters.

As with laser dye visualized impressions, Ardrex P133D developed latents usually appear as light impressions on dark backgrounds that must be preserved photographically. Visible latent impressions can be photographed using black and white films. A Wratten #47 filter may be used to facilitate the proper focus of the image when using UV illumination and a Wratten #2E filter will block reflected UV light that may cause unwanted flare or hot spots.

Quality Assurance/Quality Control: Dye stains such as Ardrex, work by staining latent impressions developed with cyanoacrylate ester. Documentation of control testing of working solutions of Ardrex shall be made using the appropriate reagent log. Test the solution by placing test impressions on a microscope slide, expose the slide to cyanoacrylate fumes, and then rinse with the working solution. Using UV light, see if the test prints fluoresce. If so then the solution is working properly.

Although Ardrex P133D and Rhodamine 6G may be used in any order, Ardrex staining is removed by methanol while Rhodamine 6G will not be removed by a water rinse. Since excessive background staining with Rhodamine 6G cannot be removed, the use of Ardrex staining before Rhodamine 6G may be beneficial.