

**Environmental Health and Safety
Florida Atlantic University**

**SAFETY AND DISPOSAL GUIDELINES
FOR THE USE OF
PHOTOGRAPHIC CHEMICALS**

I. I. Introduction

Both Federal and State government agencies regulate the handling and disposal of photographic chemicals. These agencies are the Environmental Protection Agency (EPA), State of Florida Department of Environmental Protection (DEP) and the Occupational Safety and Health Administration (OSHA). These guidelines address the different types of photo chemicals encountered in the darkroom and provide information on proper safety procedures. There are many hazards associated with photographic chemicals. It is important that personnel involved with photo processing be aware of these hazards and that every effort is made to minimize exposure to these chemicals and to ensure proper disposal. Familiarize yourself with hazards of photo chemicals by reading Material Safety Data Sheets (MSDS) before use. When using any photo chemical, the following safety procedures should always be observed (for more information consult the FAU *Chemical Hygiene Plan*):

MSDS's for chemicals must be readily available in your area

An eyewash fountain and emergency shower facilities should be available where photo chemicals are used or mixed due to their corrosive and/or toxic properties. In case of eye or skin contact, rinse for at least 15-20 minutes

A fume hood should be used when mixing powdered, toxic, volatile or corrosive chemicals

Ensure the dark room has adequate ventilation. At least, 10 air changes per hour

Wear appropriate Personal Protective Equipment i.e. gloves, goggles, and aprons

Keep a spill kit in the darkroom (for spill kit information contact EH&S or refer to Appendix G of the *Chemical Hygiene Plan* (CHP))

Follow the disposal guidelines outlined in the sections that follow. EH&S can supply proper labels and containers for waste disposal

II. II. Developers

Developer solutions and powders are often alkaline with moderate to high toxicity. They are also sources of the most common health problems in photography; skin disorders and allergies. Developers are skin and eye irritants and many are strong allergic sensitizers. Some common ingredients in developers are:

Hydroquinone
Sodium sulfite
Monomethyl para-aminophenol sulfate
Phenidone

Precautions

Avoid using developers containing para-phenylene diamine or diaminophenol hydrochloride (amidol)

Also avoid using toxic developers such as pyrogallol and catechol. Phenidone makes a good substitute

Ensure good ventilation

Wear gloves and goggles

If a splash occurs, flush affected area (15-20 minutes for eyes) immediately with water using eyewash or safety shower

Cover or close all solutions when not in use

Disposal

Spent and un-used developer should be collected and containerized with a Hazardous Waste Label (refer to EH&S *Hazardous Materials and Waste Manual*, Appendix B of the *Chemical Hygiene Plan*). Call EH&S for pickup

III. III. Stop Baths

Stop baths are acidic and can cause dermatitis; skin ulceration and can severely irritate the respiratory system. Contamination of the stop bath by developer components can increase inhalation hazards. Common ingredients in stop baths include:

Acetic acid (dilute or concentrated)

Potassium chrome alum sometimes used as a stop hardener contains chromium, a possible carcinogen that can also cause skin and nasal irritation, ulceration and allergies.

Precautions

Purchase dilute solutions of acetic acid rather than concentrated ones
Use a water rinse step between developer and stop bath to reduce the formation of sulfur dioxide gas

Always add acid to water when diluting

Ensure good ventilation

Wear gloves and goggles

If a splash occurs, flush affected area (15-20 minutes for eyes) immediately with water using eyewash or safety shower

Cover or close all solutions when not in use

Disposal

Spent Stop Bath should be flushed with large quantities of water to the sanitary sewer system.

Un-used/concentrated solutions of Stop Bath or solutions containing potassium chrome alum - should be collected and containerized with a Hazardous Waste Label (refer to EH&S *Hazardous Materials and Waste Manual*, Appendix B of the *Chemical Hygiene Plan*). Call EH&S for pickup

IV. IV. Fixer

Fixer solutions slowly release sulfur dioxide gas as they age. However, when these solutions are contaminated with acid from the stop bath, the sulfur dioxide gas is released at a more rapid rate. Common ingredients in Fixer solutions include:

Sodium thiosulfate

Sodium sulfite

Sodium bisulfite

Potassium aluminum sulfate

Boric acid

Precautions

Ensure good ventilation

Wear gloves and goggles

If a splash occurs, flush affected area (15-20 minutes for eyes) immediately with water using eyewash or safety shower

Cover or close all solutions when not in use

Disposal

Spent fixer, due to the photographic paper releasing silver into solution, should be collected and containerized with a Hazardous Waste Label (refer to EH&S *Hazardous Materials and Waste Manual*, Appendix B of the *Chemical Hygiene Plan*). Call EH&S for pickup

Any un-used fixer can be collected along with the spent fixer

V. V. Hypo Eliminators

Many hypo eliminators are skin and respiratory irritants. Some are corrosive to the skin, eyes, nose and throat. Common ingredients in Hypo Eliminators include:

- Hydrogen peroxide
- Ammonia
- Potassium permanganate
- Bleaches
- Potassium persulfate

Precautions

Hypo eliminators are oxidizers and should be kept away from flammable or combustible substances

Keep away from sources of heat

Ensure good ventilation

Wear gloves and goggles

If a splash occurs, flush affected area (15-20 minutes for eyes) immediately with water using eyewash or safety shower

Cover or close all solutions when not in use

Disposal

Spent and un-used/concentrated Hypo Eliminator solutions - should be collected and containerized with a Hazardous Waste Label (refer to EH&S *Hazardous Materials and Waste Manual*, Appendix B of the *Chemical Hygiene Plan*). Call EH&S for pickup

VI. VI. Intensifiers

Several intensifiers contain extremely hazardous components such as mercuric chloride, mercuric iodide, potassium cyanide, sodium cyanide or Uranium nitrate. The more common intensifier ingredients include:

Hydrochloric Acid
Potassium dichromate or potassium chlorochromate

Precautions

Potassium dichromate and chlorochromate are probable human carcinogens and potassium chlorochromate can release toxic chlorine gas if heated or exposed to acids.

Hydrochloric acid is corrosive

Disposal

Spent and un-used/concentrated Reducers - should be collected and containerized with a Hazardous Waste label (refer to EH&S *Hazardous Materials and Waste Manual*, Appendix B of the *Chemical Hygiene Plan*). Call EH&S for pickup

VIII. VIII. Toner

Toning a print usually involves replacement of silver by another metal, for example, gold, selenium, uranium, platinum, or iron. In some cases, the toning involves replacement of silver metal by brown silver sulfide, for example, in the various types of sulfide toners.

Precautions

Uranium, Lead, Selenium, Gold and Platinum or toxic compounds
Sulfides and

Precautions

Formaldehyde is a sensitizer, so the more a person is exposed to it, the smaller a dose it takes to have an effect on a person.

Ensure good ventilation

Wear gloves and goggles

If a splash occurs, flush affected area (15-20 minutes for eyes) immediately with water using eyewash or safety shower

Cover or close all solutions when not in use

Disposal

Spent and un-used/concentrated Hardener - should be collected and containerized with a Hazardous Waste label (refer to EH&S *Hazardous Materials and Waste Manual*, Appendix B of the *Chemical Hygiene Plan*). Call EH&S for pickup

X. X. Color Processing

Color processing is much more complicated than black and white processing, using a wide variety of reagents and entailing a wide variation in processes. Lab managers are required to notify EH&S before beginning color processing to discuss and incorporate safety and waste disposal procedures based on reagents used. Some common chemicals associated with color processing include:

Solvents –including benzyl alcohol, ethylene glycol, ethoxydiglycol

Various types of amines

Color coupling agents

Hydroquinone

Bleaching which uses a number of chemicals, including potassium ferricyanide, potassium bromide, ammonium thiocyanate, and acids

Precautions

Ensure good ventilation (color processing requires more ventilation than black and white due to solvents and other toxic components used at elevated temperatures)

Wear gloves and goggles

If a splash occurs, flush affected area (15-20 minutes for eyes) immediately with water using eyewash or safety shower

Cover or close all solutions when not in use

Disposal

Color processing material - Contact EH&S to discuss waste collection procedures and as with all hazardous waste disposal (refer to EH&S *Hazardous Materials and Waste Manual*, Appendix B of the *Chemical Hygiene Plan*).

Reference

McCann, Michael. *Photographic Processing Hazards*, Art Hazard News, Published by Safety in the Arts. New York, NY