

Chapter 2 - Cautions

Safety	2.1
ACIDS	2.1
SOLVENTS	2.1
OXIDIZERS	2.2
POISONS	2.2
ULTRA-VIOLET LAMPS	2.3
OTHER	2.3
Hazard Ratings and Storage Recommendations	2.5

Chapter 2 - Cautions Safety

Acids
Solvents
Oxidizers
Poisons
UV
Other

With any chemical process care should be given toward safety at all times. Some of the more important considerations will be reviewed here:

ACIDS:

- Always add acid to water. ["Do as you ough-tah, add acid to wah-tah."]
- Always wear safety glasses and gloves and work in a ventilated area.
- Always keep a supply of baking soda or other neutralizing agent available.
- Always pour used diluted acids into a bucket containing baking soda and water to neutralize (this may be checked with PH indicator paper; a value of 7 is neutral), then dilute with more water, then and only then pour down the drain.

CAUTION: NEVER add the Baking Soda to any strong acid. Doing so can cause a violent spattering. Mix Baking Soda in water, then add acid.

- Acid spills should be cleaned up with an acid spill kit available from most chemical suppliers.
- A good precaution is to store all acid bottles, by themselves, in a large plastic tray. If a bottle leak occurs, the tray can contain the spill.
- Store acids together in a cool and ventilated place away from all other chemicals.

SOLVENTS:

- There is NO reason to use any organic solvents in the processing of film or platinum palladium photographs.

CAUTION: NEVER pour any organic solvent down the drain.

NEVER store any solvents in the darkroom or near any acid (mixing of organic solvents and acids may cause an explosion).

- All used solvents should be recycled which may be a requirement of local codes.

OXIDIZERS:

>>> POTASSIUM CHLORATE <<<

Potassium Chlorate is a very strong oxidizing agent. It can promote combustion with many materials. Be extremely careful not to spill the power, especially into rugs or clothing. If spilled, clean up immediately. When measuring this power, lay down a sheet of plastic on the work area so as to contain any spill.

CAUTION: This material WILL spontaneously ignite when combined with some materials. Keep stored in a tightly sealed glass container. It is best to store the container of power by itself in a metal cabinet.

>>> HYDROGEN PEROXIDE <<<

The 3% solution usually bought at drug stores is fairly harmless. If, however, a stronger solution is obtained from a chemical supplier, typically 30%, take precautions.

- Hydrogen Peroxide is a strong oxidizing agent and it will naturally release oxygen gas.
- Properly store in a metal cabinet with ventilation to avoid oxygen buildup.

POISONS:

>>> POTASSIUM DICHROMATE <<<

>>> AMMONIUM DICHROMATE <<<

The Dichromates have the highest health hazard risk of any material one will likely encounter in platinum palladium printing. They have a rating of 4 on a scale of 0 to 4. Take all precautions to avoid breathing or ingesting the power. (An OSHA approved dust mask must be used for proper protection.)

- Avoid spilling the power. Take precautions by placing a plastic sheet under the weighing and work areas.
- DO NOT get a 0.1% or higher solution on skin or clothing.
- Wear safety glasses and gloves.

- Always wash hands with plenty of water after handling.
- Although the strengths of Potassium Dichromate in the Potassium Oxalate solution are of 0.1% or less and most likely will not cause harm unless ingested or otherwise enters the body, minimize contact with this solution.

CAUTION: Do NOT submerge a cut hand or finger into developer with even a small amount of Potassium Dichromate.

>>> HEAVY METAL SALTS AND FERRIC OXALATE POWDER <<<

- Always wear safety glasses and a dust mask when weighing out the powdered materials.
- Always work in a well ventilated area.
- It is also a good idea to wear a dust mask and have adequate ventilation when blow drying the coating, as some dust may be blown about.

ULTRA-VIOLET LAMPS:

CAUTION: NEVER look at UV lamps or reflected UV light without protective glasses that totally block UV light. This includes around the sides of the glasses as well. Glacier glasses work well for seeing to dodge and burn.

- Be careful to cover the skin, since these lamps can deliver a good quick sunburn.
- UV lamps can also produce a large quantity of ozone and should be used in a well ventilated area.

OTHER:

- Platinum palladium processing requires a good ventilation system in the darkroom (more so than film processing). Make sure there is good air intake as well as venting out.
- All electrical outlets in the darkroom should have ground fault protection.
- Most working solutions are safe enough to touch, but minimizing contact is a good policy. And, always wash hands with soap and water after handling any chemical or solution.

- NEVER have food or drink of any kind in the darkroom. Before eating or drinking, leave the processing area and wash hands with soap and water.
- CLEANLINESS: Cleanliness will make for a safer working environment. It is also a necessity for platinum palladium printing. The slightest trace of hypo or film developer may show itself as brown or purple stains on the print. A little film chemistry in the metal salts will cost a small fortune in lost materials. A little Clearing Bath acid can kill the Enhancing Bath. Be careful and clean. Use separate trays: label each tray, and use each tray exclusively for that function only. Keep film processing trays, graduates, and equipment on the other side of the room from platinum palladium equipment. Do not use the same equipment for both processes. In an ideal situation, separate sinks and sink areas could be used, one for film processing and another for platinum palladium processing.

Hazard Ratings and Storage Recommendations for Stock Chemicals used with the Pt/Pd Process

Hazard and storage recommendations have been standardized by OSHA (Occupational Safety & Health Administration of the US Government). Each chemical is RATED in each of the following four HAZARD categories and provided a STORAGE recommendation.

Material Safety Data Sheets cover and explain more about the use and safety of materials and can be searched and retrieved at several sites including these:

Vermont Safety Information Resources, Inc.
Cornell University

HAZARDS:

- Health - danger or toxic effect if inhaled, ingested, or absorbed
- Flammability - tendency to burn
- Reactivity - potential to explode or react violently with air, water, or other substances
- Contact - danger when exposed to skin, eyes, and mucous membranes

RATING Scale:

- 4 - Extreme
- 3 - Severe
- 2 - Moderate
- 1 - Slight
- 0 - No scientific data in standard references that suggests the substance is hazardous
- ? - Unknown or not rated by OSHA

STORAGE:

- Blue - Store in a secure poison area.
- Yellow - Store separately and away from flammable or combustible materials.
- White - Store in a corrosion proof area.
- Orange - Store in a general chemical storage area.

The following table includes the most likely stock chemicals involved with the Pt/Pd process.

Chemical Name	Formula	HAZARD				STORAGE
		Health	Flammability	Reactivity	Contact	
Ammonium Citrate	$(\text{NH}_4)_2\text{HC}_6\text{H}_5\text{O}_7$	1	1	0	1	Orange
Ammonium Dichromate	$(\text{NH}_4)_2\text{Cr}_2\text{O}_7$	4	1	3	3	Yellow
Ammonium Ferric Oxalate	$(\text{NH}_4)_3\text{Fe}(\text{C}_2\text{O}_4)_3 \cdot 3\text{H}_2\text{O}$?	?	?	?	?
Citric Acid	$\text{HOC}(\text{COOH})(\text{CH}_2\text{COOH})_2 \cdot 2\text{H}_2\text{O}$	0	1	0	1	Orange
EDTA CAS:60-00-4 CAS:64-02-8 CAS:6381-92-6	$(\text{HOCOCH}_2)_2\text{NCH}_2\text{CH}_2\text{N}(\text{CH}_2\text{COOH})_2$	1	1	0	1	Orange
Ferric Nitrate 9-hydrate	$\text{Fe}(\text{NO}_3)_3 \cdot 9\text{H}_2\text{O}$	1	0	3	2	Orange
Ferric Oxalate	$\text{Fe}_2(\text{C}_2\text{O}_4)_3 \cdot 6\text{H}_2\text{O}$?	?	?	?	?
Hydrochloric Acid	HCl	3	0	2	3	White
Hydrogen Peroxide (3%)	H_2O_2	0	0	1	1	Orange
Hydrogen Peroxide (30%)	H_2O_2	2	0	3	4	Yellow
Lithium Chloride	LiCl	2	0	0	2	Orange
Oxalic Acid	$\text{HOCOCOOH} \cdot 2\text{H}_2\text{O}$	2	1	1	3	White

Chemical Name	Formula	HAZARD				STORAGE
		Health	Flammability	Reactivity	Contact	
Palladium Chloride	PdCl ₂	1	0	0	0	Orange
Palladium double salt (Potassium)	K ₂ PdCl ₄	1	0	0	0	Orange
Palladium double salt (Sodium)	Na ₂ PdCl ₄	1	0	0	0	Orange
Phosphoric Acid	H ₃ PO ₄	2	0	2	3	White
Platinum double salt	K ₂ PtCl ₄	3	0	0	0	Blue
Potassium Chlorate	KClO ₃	1	0	3	2	Yellow
Potassium Chloride	KCl	0	0	0	1	Orange
Potassium Dichromate	K ₂ Cr ₂ O ₇	4	0	3	3	Yellow
Potassium Ferricyanide	K ₃ Fe(CN) ₆	1	0	1	1	Orange
Potassium Oxalate	KOCOCOOKH ₂ O	3	0	1	3	White
Sodium Bisulfate	NaHSO ₄	2	0	1	1	Orange
Sodium Chloride	NaCl	1	0	0	1	Orange