

PHOTOGRAPHERS' FORMULARY SAFETY BULLETIN: HYDROXIDES

Hydroxides that are commonly used in photographic practice include Ammonium Hydroxide solution ($\text{NH}_4\text{OH}_2\text{O}$), Lithium hydroxide (LiOH), Potassium Hydroxide (KOH), and Sodium Hydroxide (NaOH)

Each of these chemicals, in solid or liquid form, is extremely caustic. Since caustic materials by definition are capable of dissolving protein, including animal tissue, one should understand the behavior of these materials and the proper techniques for handling them.

Solutions of the hydroxides, if spilled on the skin, will slowly dissolve it, and if splashed in the eye, can cause blindness in a short time. The dry material is hygroscopic, and will absorb water from the air or body to form a caustic liquid very readily.

IF HYDROXIDES CONTACT THE SKIN: Wash the area thoroughly with running water until the slipperiness is no longer present. Slipperiness is due to the hydroxide dissolving the skin. If desired, rinse with vinegar or working strength acid stop bath. Wash thoroughly. Treat damaged tissue as a burn.

IF HYDROXIDES CONTACT THE EYE (dry or wet): Place your head at once under running water (the sink is fine) and wash the eye for 5 to 10 min. Don't bother with eye washes, etc. Time is all-important. **WASH THE EYE FIRST**, then call a doctor at once.

To dissolve the hydroxide, simply stir the pellets into the solvent. It will dissolve very readily. It will not be necessary to pulverize the pellets or flakes. Large amounts of heat are liberated when hydroxides are dissolved, and if care is not taken, glassware may be broken or spattering may occur. It is prudent to dissolve a portion of the hydroxide, allowing the solution to cool before proceeding. Use cold or ice water when dissolving hydroxides.

Be sure to pick up all the pellets that accidentally spill. The solid material will pick up moisture from the air and in time, a very concentrated, very caustic solution forms. Dispose of hydroxide solutions by flushing down the sink or toilet with large amounts of water.

Since damage to flesh or eye can be serious, we strongly suggest the use of safety glasses and gloves when handling caustics. The use of beakers with handles is advantageous, as they are less likely to be dropped. The most important safety precaution is to take the time to move deliberately and carefully. Caustics should not be handled in the presence of children or pets.

All substances can be dangerous. Any material can be handled with safety if the correct precautions are followed. In many years of handling caustic solutions and other potentially hazardous chemicals, we have had no serious difficulty, and with a reasonable amount of care, you need have no problems. We counsel respect, but not fear.

PARAMINOPHENOL FILM DEVELOPER
CAT. NOS. 01-0160 THRU 01-0180

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CAT. NO. 01-0160 TO MAKE 250ML
CAT. NO. 01-0170 TO MAKE 500ML
CAT. NO. 01-0180 TO MAKE 1 LITER

PHOTOGRAPHERS' FORMULARY

FORMULARY PARAMINOPHENOL FILM DEVELOPER (RODINAL TYPE)

Formulary Paraminophenol is a p-aminophenol hydrochloride film developer that is economical and excellent for slower speed films (ASA 32-200). Unless graininess is desired, Formulary Rodinal is not recommended for faster films. Formulary Rodinal produces very good sharpness, high acutance and fine grain when used to develop modern, ultra fine-grain emulsions. The contrast is variable and depends upon dilution and development times. The chemicals in the kit are used to prepare a stock solution, which is diluted 1:50 or 1:100 to yield up to 100 liters of working solution. The shelf life of the stock solution is six months. The working solution is used once and then discarded.

Because the developer is used at very high dilution, it has a compensating action that prevents blocked highlights and brings out shadow detail.

CHEMICALS CONTAINED IN THIS KIT

Your chemicals will contain the following chemicals:

Kit Size

Chemical	1/4 liter	1/2 liter	1 liter
P-aminophenol hydrochloride	12.5 g	25 g	50 g
Sodium Metabisulfite	37.5 g	75 g	150 g
Potassium Hydroxide	53.7 g	107.0 g	215.0 g

CHEMICALS SAFETY

All chemicals are dangerous and must be treated with respect. One chemical in this kit needs special attention:

POTASSIUM HYDROXIDE, like sodium hydroxide, is a dangerous chemical, since it is a corrosive and if spilled on the skin will cause a chemical burn. Its action is insidious because the burn occurs without pain. Wash your hands frequently without soap, so that if you detect a soapy feeling while washing potassium hydroxide is present. If so, wash thoroughly with soap and water. Pellets of potassium hydroxide

are easily spilled during solution preparation. If spillage occurs outside of a sink, all of the spilled solid must be cleaned up. Use a damp disposable towel. If the solid is not cleaned up it will absorb the moisture from the air and form a puddle of very caustic hydroxide that will not evaporate.

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The proper technique for preparing your solution is described in the mixing section. We strongly urge you to wear both safety glasses and rubber gloves when working with this particular chemical and its solutions.

The user assumes all risks upon accepting these chemicals. IF FOR ANY REASON YOU DO NOT WISH TO ASSUME ALL RISK, PLEASE RETURN THESE CHEMICALS WITHIN 30 DAY FOR A FULL REFUND.

MIXING THE SOLUTIONS

Two initial solutions will be prepared then combined to make the stock solution. The working solution is prepared by dilution of the stock solution just prior to use.

To mix these solutions you will need two mixing containers (one of which should be plastic), a plastic spoon and a graduated cylinder or other volume-measuring device. Both initial solutions will be combined into one of the mixing containers to make the stock solution; therefore, be sure that one of the containers is large enough to hold the combined volumes of both solutions.

Initial Solution A

Kit Size

Chemical	1/4 liter	1/2 liter	1 liter
Distilled Water (120°F/49°C)	156 ml	312 ml	625 ml
P-aminophenol hydrochloride	12.5 g	25 g	50 g
Sodium Metabisulfite	37.5 g	75 g	150 g

Boil the water just prior to use in order to degas it and minimize the initial oxidation of the p-aminophenol, or use distilled water. The water should be allowed to cool to 120° F/49° C before mixing is attempted.

Place the warm water in the larger of the two mixing bowls and add a pinch of sodium Metabisulfite. Like boiling, a pinch of the Metabisulfite minimizes the initial oxidation. Add the p-aminophenol hydrochloride and stir the solution to dissolve the solid. After the solid has dissolved, add the bulk of the sodium Metabisulfite and, again, stir the solution to dissolve the solid. DO NOT add additional water to this solution.

Initial Solution B

Kit Size

Chemical	1/4 liter	1/2 liter	1 liter
Water (16° C/61° F)	125 ml	250 ml	500
Potassium hydroxide	53.7 g	107.0 g	215.0 g

Initial Solution B must be prepared in a sink and in a well ventilated area. Place a dry, wide-mouth plastic mixing container of the appropriate size in a sink and place the solid potassium hydroxide in the container. Measure the proper volume of cold water and carefully add the water to the plastic container.

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DEVELOPMENT TIMES

Develop the film at 20°C/68°F. Regardless of film type, for normal contrast, develop the film for 12 minutes. For increased or decreased contrast, develop for 12-15 minutes.

Typical Processing Run

- Develop: 12 minutes for normal contrast or
12-15 minutes for increased or decreased contrast
- Stop: 30 seconds
- Fix: 2-4 minutes with Formulary TF-4 Rapid Fix (Cat. No. 03-0141).
- Wash: 30 seconds
- Clear: 2 minutes using Formulary Hypo Clear (Cat. No. 03-0165).
- Wash: 5 minutes in running water.



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FORMULARY INC.

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For Reduced Contrast		
Stock Solution	5 ml	10 ml
Water	500 ml	1000 ml
Working Solution	505 ml	1010 ml

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