

PHOTOGRAPHERS' FORMULARY

FORMULARY WINDISCH PYROCATECHIN FILM DEVELOPER

TO MAKE 25 TO 40 LITERS OF WORKING SOLUTION

The Windisch Pyrocatechin developer was formulated by Hans Windisch to develop film-containing scenes of extreme high contrast and at the same time provide negatives with excellent sharpness. A 15-stop scene can be reproduced when using this developer.

The unusual range of contrast for this developer may be obtained by the combined effects of (1) using a very dilute working solution; (2) using a tanning developer, catechol (Pyrocatechin); and (3) the release of bromide ions from the film during development.

By using a very dilute working solution, the development of the highlights is retarded by the local exhaustion of the developer. Therefore, the shadow areas develop to a greater extent than do the highlight areas.

Catechol (Pyrocatechin), a tanning developer, caused the emulsion in the highlighted area to become hard, which inhibits exchange of the exhausted developer in the emulsion with the fresh developer, thus retarding development in the highlight areas while allowing development to continue in the shadow areas.

As development proceeds, bromides are released from the emulsion. The highlights produce more bromides than do the shadows, thus highlights are restrained to a greater degree than are the shadows. In addition, there is also a slight local diffusion of the released bromides resulting in a narrow underdeveloped line in the shadow area surrounding the highlights. The result is increased contrast at the boundaries and consequently increased acutance.

The tanning action of catechol will cause the negatives to turn brown. The extended contrast range will reduce the emulsion speed 1/2 to 1 f-stop. For example, Plus X (ASA 125) should be exposed at ASA 64. However, different films will vary in their response to Windisch Pyrocatechin. Therefore, make careful tests before using this developer extensively.

Your kit contains the following chemicals:

CHEMICAL	AMOUNT
Sodium sulfite	12.5 g
Catechol (Pyrocatechin)	80 g
Sodium hydroxide	100 g

FOR YOUR CHEMICAL SAFETY:

All chemicals are dangerous and must be treated with respect. Please read the warning label on each package. There are two chemicals in this kit that need special attention.

CATECHOL: As a solid, vaporizes readily. Avoid smelling the vapor because it has the potential to burn membranes. When mixing a solution containing catechol, work in a well-ventilated area. This chemical is also corrosive and can cause skin burns. If you should spill a solution of catechol, wash the area (or skin) with soap and water. Use rubber gloves whenever possible.

SODIUM HYDROXIDE: As a solid or in solution, is a dangerous chemical. It is corrosive and, if spilled on the skin, will cause a chemical burn. The burn occurs without pain. When working with

sodium hydroxide wash your hands frequently and without soap. If you detect a soapy feeling while washing, sodium hydroxide is present. In such a case wash thoroughly with soap and water. Beads or pellets of solid sodium 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, which will not evaporate. The proper technique for preparing sodium hydroxide solutions is described in the mixing section. We strongly urge you to wear both safety glasses and rubber gloves when working with solid sodium hydroxide and its solutions.

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

MIXING THE SOLUTIONS:

You will need one dark brown and one plastic bottle each with a capacity of one liter. To prepare Stock Solution B (sodium hydroxide solution), you will also need a one-liter plastic beaker or other suitable plastic container, a plastic funnel and a plastic spoon or stirring rod. Two stock solutions will be prepared. The working solution is obtained by mixing and diluting a portion of each of the stock solutions just prior to use.

Stock Solution A

Chemical	Amount
Water (38° C/100° F)	750 ml
Sodium Sulfite	12.5 g
Catechol (Pyrocatechin)	80 g
Cold water	To make 1000 ml

Prepare this solution in a well-ventilated area. Initial oxidation of the catechol can be minimized if the water is first degassed by boiling then cooled. Place the water in the glass storage container and add the sodium sulfite. Stir or swirl the solution until the solid has dissolved. Add the catechol and again stir or swirl the solution to dissolve the solid. After all of the catechol has gone into solution, add a sufficient amount of cold water to bring the final volume in the container up to 1000 ml.

Stock Solution B:

Chemical	Amount
Cold water (16° C/60° F or less)	750 ml
Sodium Hydroxide	100 g
Cold water	To make 1000 ml

Stock 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 sodium hydroxide in the container. Measure 750 ml of cold water and carefully add the water to the plastic container. Stir the mixture with a plastic spoon until the solid has gone into solution. Stir gently and avoid splashing the solution. After the solid has gone into solution, let the solution sit in the sink until it reaches room temperature.

When sodium hydroxide goes into the solution, considerable heat is generated. If your water is not cold enough, the solution may start to steam. If this should occur, add some ice to cool the solution. If the solution starts to steam and if you can't cool it, leave the room and let it cool off by itself. After the solution is cool, then proceed. DO NOT BREATHE THE VAPOR--it contains entrapped sodium hydroxide.

While still in the sink and with the aid of a plastic funnel, transfer the sodium hydroxide solution into its plastic storage container. Use a little cold water to wash the residual sodium hydroxide solution in the mixing container into the storage container. Add sufficient cold water to the storage container to

bring the final volume up to 1000 ml. Cap the storage container and wash the outside of the container before removing it from the sink.

LIFE OF THE SOLUTIONS

Stock Solution A has a shelf life of about 6 months in a full and stoppered bottle. Solution B will have an indefinite life if stored in a filled plastic container. When opened, the sodium hydroxide will absorb atmospheric carbon dioxide and lose its potency. Depending upon the frequency of exposure, the actual shelf life can be considered to be from 1 to 6 months.

USING THE DEVELOPER:

There are two different dilutions for Windisch Pyrocatechin Film Developer-the Windisch Dilution and the Ansel Adams Dilution.

Most negatives can be developed using the Windisch Dilution. For extremely high contrast scenes, the Ansel Adams Dilution is recommended.

Windisch Dilution		Ansel Adams Dilution	
Solution A	25 ml	Solution A	40 ml
Solution B	15 ml	Solution B	10 ml
Water to make 1 liter		Water to make 1 liter	

Depending upon which dilution is used, a one-liter kit will make either 25 or 40 liters of working solution. The working solution should be used immediately after mixing then discarded.

Windisch recommended that all solutions should be used at 18°C/65° F. He felt that colder temperatures resulted in finer grain. We have tested at 68°F.

A typical developing sequence is:

Develop: 12-15 minutes using the Windisch Dilution or 15-20 minutes using the Ansel Adams Dilution.

Stop: 30 seconds (a water rinse may be desirable between the developer and the stop to prevent reticulation.)

Fix: 2-4 minutes in Formulary TF-4 Archival Rapid Fix.(cat. no. 03-0141)

Wash: 30 seconds in running water

Clear: 2 minutes in Formulary Hypo Clear Agent (cat. no. 03-0165)

Wash: 5 minutes in running water.



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