

**Brown to Black Tones**

Solution A

Ammonium 28% 10 ml  
Water 1000 ml

Solution B

Tannic Acid 20 grams  
Water 1000 ml

Mix both solutions. This is a two step immersion process. Immerse the print in the ammonia solution until the color has been bleached out. Wash in cool water for approximately 10 minutes. Then immerse the print in the tannic acid solution until the desired color is achieved. Wash under running water for 15 minutes and dry.

**Green Tones**

Prepare a 1% solution of Sulfuric acid. Since our sulfuric acid is 48% for shipping purposes, to get a 1% solution take 2 ml of acid the 100 ml of distilled water. (Always add the acid to the water, not vice versa).

Immerse the print in the acid solution until the desired color is achieved. Wash for 15 minutes and dry.

**Violet Tones**

Prepare either a mild borax solution to prepare a warm 5% solution of lead acetate (5 grams of lead acetate to 100 ml of distilled water). Immerse the print in either solution until the desired color is achieved. Wash in running water for 15 minutes and dry.

**TROUBLESHOOTING**

Problem	Explanation
Areas of the coated surface were Pre-exposed even before printing	Areas where the support was dried is too humid, or the chemicals are too old.
The emulsion on the negative was eaten away during exposure.	The support was still damp when exposed.
The print started to develop in sunlight	Coated surface too damp and started to activate the chemicals prematurely
Entire print turned blue and overexposed	It was not washed enough while drying. To prevent this wash well and dry in a darkened room.
Stains remained in the skin after Washing and would not come out.	Stains can be removed by Scrubbing with strong soap. Rubber gloves prevent skin stains.

# PHOTOGRAPHERS' FORMULARY INC.

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**CYANOTYPE KIT**

This kit contains the chemicals to prepare 1000 ml of sensitizer solution to do approximately 24 8x10's

The popular and inexpensive cyanotypes have a long full scale and distinctive blue color. The process can be used to produce a pale white image on a blue background of a blue image on a white background. Cyanotype is an ultraviolet contact printing process that requires a negative the same size as the print you wish. The image can be transferred to a variety of media: paper, cloth, leather etc.

The blue color of the print is due to the Prussian blue formed from the reaction of ferrous ions (from photo reduction of the ferric ammonium citrate) and potassium ferricyanide. Under most conditions the image is permanent; however, Prussian blue will fade when alkaline. Since perspiration is alkaline a cyanotype print can be permanently damaged if it is touched. Cyanotype prints tend to fade in strong light. The color will return if the print is stored in a dark damp area. A faded Cyanotype can also be treated with a hydrogen peroxide oxidation bath to restore its color.

**CHEMICALS CONTAINED IN THIS KIT**

Chemical	Amount
Arrowroot Starch	20 g
Potassium Ferricyanide	40 g
Ferric Ammonium Citrate (green Scale)	100 g
Potassium Dichromate	1 g

**Chemical Safety**

All chemicals are dangerous and must be treated with respect. Please read the chemical warnings on each package. The chemicals in this kit needing special attention: Potassium ferricyanide and Potassium Dichromate.

## Stock Solution B

Chemical	Amount
Water (20°C/68°F)	400 ml
Potassium Ferricyanide	40 g
Water to make	500 ml

Prepare this solution using the directions given for Stock Solution A

### 1% Dichromate Solution (optional)

Chemical	Amount
Water (20°C/68°F)	100 ml
Potassium Dichromate	1 g

Place the solid potassium dichromate in the storage container and add the 100 ml of distilled water. Stir or cap and shake the solution to dissolve the solid.

### Mixing the Sensitizer Solution

The sensitizer should be mixed in subdued light and be used as soon as feasible. The sensitizer solution is stable for about 2-4 hours after mixing.

**Standard Sensitizer**, mix together equal parts of the two stock solutions. For example, use 10 ml of Stock solution A and 10 ml of stock solution B or 25 ml of both A and B.

**Lower Contrast Sensitizer**; dilute the mixed standard sensitizer with water. The greater the dilution the softer your print.

**Higher Contrast Sensitizer**, The addition of 1% potassium dichromate solution to the standard sensitizer solution will increase the contrast of the final print. The following sensitizer solution is designed to contain 6 drops of the dichromate solution per 2 ml of standard sensitizer solution. At this level you should expect a loss of about 2 steps using Kodak No.2 step tablet.

### SENSITIZING THE PAPER

The paper can be coated with the sensitizer by floating on the solution (Sized side down) for 3 minutes or by applying the solution with a brush. If the solution is brushed on the paper, the brush strokes should be from top to bottom and from side to side.

Dry the paper in the dark. A hand held dryer can be used to speed the drying process, provided that an excessive amount of heat isn't used. The paper can be dried either on a flat surface or by hanging. Excessively wet paper will streak when hung up to dry. It has been recommended that excessively wet paper be periodically rotated from top to bottom during the drying period.

The dry sensitized paper should appear greenish-yellow. It is blue, ferrous salts are present either by exposure or through chemical contamination.

Do not touch the surface of the dried paper.

## Exposure

Cyanotype is sensitive to ultraviolet light. Therefore either sunlight or a sunlamp must be used for exposure. For consistent results a sunlamp is recommended.

When you first set up your exposure stand it will be necessary to calibrate your apparatus with a test strip. For an initial apparatus set up, select a General Electric 275 or 300 Watt sunlamp. Glass absorbs ultraviolet light; therefore it is best to contact print without a glass plate if at all possible. In the darkroom, tack the sensitized paper to a board, position the negative on it and pin it down. Place the board directly beneath the sunlamp (12-18 inches away). Considerable heat is generated by the lamp; therefore do not place the lamp to close the negative. Cyanotype is extremely slow. Exposure will take 10-20 minutes. The exposed print will have an olive-green appearance prior to washing.

Cyanotype prints-out during exposure. If you can check your print with out loss of registration, the extent of exposure can be determined by inspection. Expose until the high values have considerably more tone that you desire in the final print and the shadows have begun to reverse. The highlights will lighten upon washing; therefore an apparent overexposure is necessary. Some authors suggest that a Kodak No. 2 step tablet be used to calibrate the exposure. Steps will be lost during the washing.

### Washing

Washing the print for 5 minutes in softly running water, the iron salts in hard water can alter the prints appearance. A short washing period will leave ferric salts in the paper that will cause the print to fade. Prolonged washing will lighten the image, particularly if the wash water is slightly alkaline.

### SIZING OF THE PAPER

Arrowroot starch is included in your kit should you wish to size your paper. The extent of sizing will determine the porosity of the paper and thus the degree to which the image will be embedded in the fibers of the paper. You may not wish to use any sizing at all.

### Prepare and applying the Sizing Solution.

Your kit contains 20g of arrowroot starch. Place this starch in a 1-liter container that you can heat (such as a sauce pan) and add a small amount of hot water (about 20 ml) Stir the mixture into a thick cream. Be sure that no lumps remain. Add 1 liter of hot water with constant stirring. Boil the mixture for 5 minutes, then let it cool to room temperature. Skim off any scum or decant the clear solution into a storage container.

Pin the paper to a board and apply the sizing solution to the surface with a clean brush. Brush the solution onto the paper, first across, then up and down, until the paper is completely wet. Using another brush (like a clean shaving cream brush), work the surface until it loses its gloss. Allow the paper to dry either hung or still pinned to the board.

**Potassium ferricyanide:** In spite of the fact that this compound contains cyanide, it is not particularly toxic. The reason is that the cyanide groups are bound to the iron atom and are not free to act as a poison. The cyanide groups can be released as hydrogen cyanide gas if the potassium ferricyanide is placed in a strong acid solution; however, strong acid is not used in the cyanotype process.

**Potassium dichromate:** Are both toxic and an oxidizer. To dispose of excess solid potassium dichromates always wash the solid down a drain with copious amounts of water. Never dispose of the solid in a wastepaper basket.

Spillage of a dichromate solution on the skin will cause a chemical burn, which will appear as ulceration. In addition, all chromium salts are potential carcinogens

The user assumes all risks upon accepting these chemicals.  
**IF FOR ANY REASON YOU DO NOT WANT TO ASSUME ALL RISKS, PLEASE RETURN THE KIT WITHIN THIRTY (30) DAYS FOR A FULL REFUND.**

**MIXING THE STOCK SOLUTION  
 FOR BEST RESULTS USE DISTILLED WATER**

You will need at least three dark brown storage containers; two with a capacity of 500 ml and one with a capacity of 100 ml. If you wish to pre-mix the hydrogen peroxide oxidation bath, you will need an additional 500 ml dark brown bottle. For consistent results all solutions should be mixed using distilled water.

**Stock Solution A**

Chemical	Amount
Water (20°C/68°F)	400 ml
Ferric Ammonium Citrate	100 g
Water to make	500 ml

Place the water in a mixing bowl or the storage container and add the solid. Stir or cap and shake the solution till the solid has dissolved. Add water to bring the final volume up to 500 ml.

**Stock Solution B**

Chemical	Amount
Water (20°C/68°F)	400 ml
Potassium Ferricyanide	40 g
Water to make	500 ml

Prepare this solution using the directions given for Stock Solution A

**Contrast Increase,** a more contrasty print can be obtained if an initial was bath consisting of a 0.2% solution of potassium ferricyanide is used. This bath can be prepared by dissolving 2 grams of potassium ferricyanide in 1000 ml of distilled water. After this initial bath, the print is then washed in running water as described above.

**Peroxide After-Bath:** After drying, a cyanotype print will slowly air oxidize to its final deep blue. To speed the process place the well-washed Print in the hydrogen peroxide-oxidation bath. (See mixing the solutions) for a few seconds, then rinse with water. Hang the print to dry (or dry it with a hand-held hair dryer).

**Hydrogen Peroxide Oxidation Bath (optional, chemistry not included in the kit)**

Add 50 ml of 3% hydrogen peroxide to 500 ml of water. Stir the solution gently to obtain a homogeneous solution. Hydrogen Peroxide solution will slowly de-gas; therefore it should be stored in a tightly capped container. In addition, the solution will slowly lose its potency. For consistent results the solution should be fresh when used.

3% hydrogen peroxide is not included in this kit. It may be obtained from your local drug store.

**After Treatment:** A spot application of a 5% solution of oxalic acid (5 grams per 100 ml) can be used to clear the whites of blue. Wash the print after its use. A Prussian blue water color can be used for spotting the areas.

**OTHER SURFACES**

Soak the material, such as cloth containing at least 50% cotton, in the Standard sensitizer solution, then hang it up to dry in the dark.

Stretch the material, position the negative and then hold the negative in place with a glass covering. Expose as described for paper. If you wish the cloth to have a white background you will have to mask it from the ultraviolet light. We suggest you develop the technique using inexpensive cloth.

**NEW IDEAS AND SUGGESTIONS FOR USING CYANOTYPE**

There are several good books at your public library in the photography section that will help you on this process.

Quilts are covering the country so to speak-using the cyan process. Let your imagination go to work on pillows, jackets and wall hangings! It isn't just a picture on paper process any more.

One book we found interesting was Jan Arnow's book entitled "Handbook of Alternative Photographic Processes". In it she gives the following ideas to change the color of the Cyan prints from the normal blue to several other colors. The process is done as toning after you have completed the cyan process entirely.