We strongly advise you to use disposable rubber gloves when handling this compound or its solutions. Clean all trays and containers thoroughly with water followed by soap and water. Please consult with local sewer and water authorities regarding the proper disposal of darkroom chemicals in your area.

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 FOR A CREDIT OR EXCHANGE.

MIXING THE STOCK SOLUTIONS

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 premix 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
Distilled water (20°C/68°F)	400 ml
Ferric ammonium citrate	100 grams
Distilled water to make	500 ml

Place the water in a mixing container or the storage container and add the solid. Stir the solution until the solid has dissolved. Add water to bring the final volume in the container up to 500 ml. Stir (or cap and shake) to ensure that the solution is homogeneous

Solution B

Chemical	Amount
Distilled water (20°C/68°F)	400 ml
Potassium ferricyanide	40 grams
Distilled water to make	500 ml

Mix as was described for Solution A

1 % Potassium Dichromate Solution (optional)

Chemical	Amount
Water (52°C/125°F)	100 ml
Potassium dichromate	1 gram

Place the solid potassium dichromate in the storage container and add 100 ml of water. Stir the solution to dissolve the solid. Store in a bottle with plastic cap. (Do not use a metal cap; the dichromate will corrode it.) Since potassium dichromate is toxic, we recommend that you mix this solution in a sink and, after mixing, wash all the utensils before removing them from the sink.

We strongly recommend that you wear rubber gloves when mixing and handling this solution.

WASHING

Wash the print for about 5 minutes in running, soft water. The iron salts in hard water can alter the appearance of the print. A short washing period will leave ferric salts in the paper causing the print to fade. Prolonged washing will lighten the image, particularly if the wash water is slightly alkaline.

Contrast Increase. A higher contrast print can be obtained if an initial wash bath consisting of a 0.2% solution of potassium ferricyanide is used. (The bath can be prepared by dissolving 2 g of potassium ferricyanide in 1000 ml of 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 this 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).

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

Other Surfaces:

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

Stretch the material, position the negative, and then hold the negative in place with a glass covering. Expose as described for paper. If you desire 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 in 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 anymore.

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

TONING SOLUTIONS

Brown to Black Tones

Ammonia 28%	10 ml
Distilled Water	100 ml

AND

Tannic Acid	10 grams
Distilled Water	500 ml

Mix both solutions separately. 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 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 add 2 ml's of acid to 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 mins and dry.

Violet Tones
Prepare either a mild borax solution OR prepare a warm 5% solution of Lead Acetate (5 grams of lead acetate in 100 ml of water). Immerse the print in either solution until the desired color is achieved. Wash in running water for 15 minutes, then dry.

TROUBLESHOOTING

Problem	Explanation
Areas of the coated surface were pre-exposed even before printing	The area 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.
Entire print turned blue and overexposed while drying.	It was not washed enough. To prevent this, rinse well, and dry print in darkened room.
Stains remained in the skin after washing and would not come out.	Stains can be removed only by scrubbing with strong soap. Rubber gloves will prevent skin stains.

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Cyanotype Kit

Contains chemicals to make approximately 24 8 x 10 prints

The popular and inexpensive cyanotypes have a long scale and distinctive blue color. The process can be used to produce a pale white image on a blue background or 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 desire. The image can be transferred to a variety of media; paper, cloth, leather, etc.

The blue color of the print is due to 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 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

This kit contains the following chemicals:

Chemical	Amount
Arrowroot starch	20 grams
Potassium ferricyanide	40 grams
Ferric ammonium citrate (green)*	100 grams
Potassium dichromate	1 gram

* Ferric ammonium citrate (green) is somewhat light sensitive and should be stored in the dark.

CHEMICAL SAFETY

All chemicals are dangerous and must be treated with respect. Please read the chemical warnings on each package. This kit contains two chemicals that need special attention: potassium ferricyanide and potassium dichromate.

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 chemically bound to the iron atom in the compound and not free to act as a poison. Potassium ferricyanide is not the insidious poison that sodium cyanide is. 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 is 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.

Hydrogen Peroxide Oxidation Bath (optional, not included in 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 degas; therefore, it should not be kept 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.

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 volumes of the two stock solutions. For example, use 25 ml of stock solution A and 25 ml of Stock Solution B.

Lower Contrast Sensitizer: Dilute the mixed sensitizer with water. The greater the dilution, the softer the 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 can expect a loss of two steps using Kodak No. 2 Step Table.

Chemical	Volume	Sensitizer
Total Volume of Sensitizer	**11.5 ml**	**28 ml**
Stock Solution A	5 ml	12 ml
Stock Solution B	5 ml	12 ml
Potassium dichromate	30 drops*	4 ml

*Since 20 drops is approximately 1 ml, you may find it more convenient to add 1.5 ml.

THE NEGATIVE FOR CYANOTYPE PRINTING

Cyanotype is a contact print process and you will need a negative the same size as the size of the print you desire. A cyanotype with a blue image on a white background is obtained using a negative transparency. In order to obtain a pale white image on a blue background, a positive transparency must be used.
The cyanotype process has a long exposure scale. Consequently the best cyanotype prints are obtained when the negative has a large density range. In general, if your negative will give a good print using grade 0 paper, it will give an excellent cyanotype print using the Standard cyanotype Sensitizer Solution. If your negative has a smaller density range (prints well on Grade 1 or 2 paper) then we recommend that you use the Higher Contrast Sensitizer.

PAPER

Almost any paper can be used. We suggest you start with one of the Crane's papers that we stock at the Formulary. The use of other surfaces, such as cloth, as cyanotype materials will be described at the end of these instructions. Although not imperative, for best results the paper should be sized. The procedure for sizing using arrowroot starch follows.

SIZING OF THE PAPER

Sizing fills the pores of the paper with starch and provides a uniform surface for the image. Sizing may or may not be needed depending on the quality of the paper you choose.

Preparation of 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, and then let it cool to room temperature. Skim off any scum or decant the clear solution into a storage container.

Application of the Sizing Solution:

Pin the paper ton 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.

SENSITIZING THE PAPER

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

Dry the paper in the dark. A hand-held hair dryer can be used to speed the drying process, provided that excessive amounts of heat are not 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. If 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 another UV light source must be used for exposure. For consistent results a UV light box 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). The lamp generates considerable heat; therefore, do not place the lamp too close to 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 without loss of registration, the extent of exposure can be determined by inspection. Expose until the high values have considerably more tone than desired in the final print. And the shadows have started to reverse. The highlights will lighten upon washing; therefore an apparent overexposure is necessary.