

**PHOTOGRAPHERS'
FORMULARY**

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Van Dyke Brown Printing Kit**Contains chemicals to make approximately 100 4 x 5 prints**

As the name implies, this process produces beautiful brown images. The process is similar to the Kallitype process in that the image is formed from silver metal. The Van Dyke process, however, uses ferric ammonium citrate as the sensitizer while the Kallitype process uses ferric oxalate.

CHEMICALS CONTAINED IN THIS KIT

This kit contains the following chemicals:

Chemical	Amount
arrowroot starch	20.0 grams
ferric ammonium citrate (green)*	9.0 grams
tartaric acid	1.5 grams
silver nitrate	3.8 grams
sodium thiosulfate, pentahydrate	100.0 grams
potassium dichromate	5.0 grams

Ferric ammonium citrate (green) is somewhat light sensitive. It should not be stored in bright light.

CHEMICAL SAFETY

All chemicals are dangerous and must be treated with respect. This kit contains two chemicals that need special attention: silver nitrate and potassium dichromate.

Silver Nitrate is both an oxidizer (can supply oxygen to a fire) and a caustic (can cause skin burns). Clean up any spilled solid silver nitrate with water and dispose of any excess down the drain. Never dispose of solid silver nitrate in a wastepaper basket.

If solid silver nitrate comes in contact with the skin, a chemical burn may result. Wash the area with cold water followed by soap and water. Treat any wound in the same manner you would treat a heat burn.

When dilute solutions of silver nitrate are spilled on the skin a brown to brown- black stain results. The color is due to silver metal bound to the protein of the skin and cannot be washed off. While there are chemical methods to remove these brown stains, the best procedure is to just let them wear off.

Potassium dichromate is both toxic and an oxidizer. To dispose of excess solid potassium dichromate 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 an ulceration. In addition, all chromium salts are potential carcinogens. 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. Dispose of all excess dichromate salts and their solutions down a drain with a large volume of water.

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 SOLUTIONS

The Sensitizer

The sensitizer is prepared by first mixing three solutions (called A, B, and C) and then combining these three solutions in the order given below. You will need three mixing containers and a brown glass storage container for the final sensitizer solution.

To prepare these three solutions you will need either distilled or demineralized water, which can be purchased at any drugstore.

The separate solutions are not light sensitive, therefore they can be mixed in strong light. However, when they are combined, the resulting solution is light sensitive. Therefore, the final step should be carried out in very subdued light, or better, a darkroom with a red safety light.

Solution A

All of the sensitizer will eventually be combined into Solution A's container. Therefore, be sure the capacity of this container is greater than 100 ml.

Chemical	Amount
distilled water (20°C/68°F)	33 ml
ferric ammonium citrate	9 grams

Place the water in a mixing container (such as a common drinking glass) and add the solid. Stir the solution to dissolve the solid.

Solution B

Chemical	Amount
distilled water (20°C/68°F)	33 ml
tartaric acid	1.5 grams

Mix as was described for Solution A

Solution C

Chemical	Amount
distilled water (20°C/68°F)	33 ml
silver nitrate	3.8 grams

Mix as was described for Solution A

The Working Solution

In a darkroom using a red safety light, add Solution B to Solution A Stir to ensure it is homogeneous. Slowly add Solution C to the combined mixture of Solutions A and B. Stir the mixture while Solution C is being added. A precipitate may or may not form. If a precipitate should form, disregard it. Store the resulting sensitizer in a brown bottle in a darkroom. It will remain active for months.

The 10% Potassium Dichromate Solution for Contrast Control

Chemical	Amount
water (52°C/125°F)	50 ml
potassium dichromate	5 grams

Place the water in a mixing bowl and add the solid. Stir the mixture with a glass or plastic rod until the solid goes into solution. Store the solution 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.

The Fixing Solution

Chemicals	Amount
water (52°C/125°F)	2000 ml
sodium thiosulfate, pentahydrate	100 grams

Place the warm water in a mixing bowl, add the solid, and stir the mixture until the solid dissolves. Store the fixer in any convenient container.

PAPER

Almost any paper can be used. however, the final impact of the print is dependent upon the type of paper and sizing that you choose. You will have to experiment with different types of paper and sizing to obtain the effects you wish. We suggest you start with one of the Crane's papers that we stock at the Formulary.

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.

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, 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 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.

THE NEGATIVE

The Van Dyke Brown process is a contact print process and you will need a negative the same size as the size of the print you wish. Van Dyke Brown is capable of an extremely long tonal range. Negatives with a density range up to 1.85 can be used.

The final print contrast can, to some extent, be increased by adding potassium dichromate to the developer (not to the sensitizer; see below).

SENSITIZING THE PAPER

Using a good brush and working in very subdued light or in a darkroom under a red safety light brush the sensitizer solution onto the paper pinned to a board. The brush strokes should be from top to bottom and from side to side.

It is not necessary to use a measured amount of sensitizer solution because the amount of sensitizer needed will depend upon the porosity of the paper. In general, you can expect to use about 1 ml for a 4-by-5 sheet of paper (4 ml for an 8-by-10)

Since this kit makes about 100 ml of sensitizer solution, you can expect to be able to make up to 100 4-by-5 prints (or about 25 8-by-10 prints).

Allow the sensitized paper to dry in the dark. Using a hand-held hair dryer can speed up the drying of the print. **DO NOT OVERHEAT THE PRINT.**

EXPOSURE

The ferric ammonium citrate used in the Van Dyke Brown process is sensitive to ultraviolet light. Therefore, sunlight, a photoflood lamp or a light box will have to be used for exposure. For consistent results, we recommend a photoflood or light box.

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 500 or 1000 watt photoflood lamp. Glass absorbs ultraviolet light; therefore, it is best to contact print without a frame if at all possible. In the darkroom, tack the sensitized paper to a board, position the negative onto it and pin it down. Place the board directly beneath a lamp (24"-30" away). Considerable heat is generated by the lamp; therefore, do not place the lamp too close to the negative.

The length of time required for correct exposure will depend upon your apparatus and will have to be determined by trial and error using test strips. The process is slow - you can expect the optimum exposure to be in the 10-30 minute range. Van Dyke Brown is a printing -out process. Consequently, if you can inspect your print without loss of registration, expose until the shadows and middle tones show detail.

FINAL STEPS

The quality of the final print will be determined by the care taken in the final steps of the process. If the iron salts and the silver salts are not both removed, the print will fade with time. These two salts are removed in separate wash steps. In addition, the excess silver salt is removed by a sodium thiosulfate bath (hypo), which in turn will cause the paper to darken in time if it is not removed in the final step of the wash procedure.

CONTRAST INCREASE

The contrast of the print can be increased by adding 10% potassium dichromate to the initial wash and development" water. About 9-10 drops of the 10% dichromate solution added to 500 ml of water will give an increase in contrast equal to about the loss of 1 step of a Kodak No 2 Step Table. You will need to determine the exact amount by trial and error.

Initial Wash and Development

Wash the print for about 1 minute in running, soft water at 20°C/68°F. During the initial wash the print will darken and become yellowish.

The water quality is important. If your wash water is slightly alkaline, the iron salts will not be removed. Hard water is not satisfactory; it usually contains dissolved iron salts which will contaminate the print. If you are faced with a water quality problem, wash the print using three separate trays of either distilled or demineralized water. Wash about one minute in each tray.

Fixing Bath

The fixer is a dilute solution of sodium thiosulfate that will remove the excess silver ions. Soak the print in the fixing solution at 20°C/68°F for 5 minutes. If a longer period is used, the print will fade. The print will darken and become brown during this fixing period. Use just enough fixer to cover the print and discard it after 2-3 prints have been fixed. Do not use a standard photographic fixing bath; the very finely divided silver metal of the Van Dyke print will be etched off the paper

Final Wash

The thiosulfate just introduced onto the print must be completely removed to ensure print stability. Wash the print for 40 minutes in running water (20°C/68°F). A more effective procedure is to first wash the print in running water for 24 minutes to remove the bulk of the thiosulfate, then use Hypo-Clear (Catalog no. 03-0165), followed by a 15-20 minute water wash.