

Photographic Sensitizer for Cloth and Paper

AJ-5

You can print black-and-white photographs on cloth or paper when you coat the surfaces with one of the sensitizers described in this pamphlet. The images you obtain should range from recognizable to good, but they won't have the high quality you can obtain with photographic printing papers sold commercially.

Since fabrics and papers vary considerably in the basic materials and additives they contain, it's impractical to predict how good or how permanent the images produced by the sensitizers will be. You should consider the techniques described here as an experiment for photo hobbyists and not as a procedure for producing long-lasting, highquality results, or one that should be used for commercial purposes.

Formulas for two sensitizers are provided. The first sensitizer is easier to use, but does not offer as much control over the image as the second. You can obtain the chemicals you'll need to make the various solutions from chemical supply houses which sell laboratory chemicals.

VANDYKE SENSITIZER FORMULA

	Avoirdupois		Metric	
	U.S. Liquid			
Ferric Ammonium Citrate	3	ounces	90	grams
Tartric Acide	$\frac{1}{2}$	ounce	15	grams
Silver Nitrate*	1 $\frac{1}{4}$	ounces	37,5	grams
Distilled water to make	32	fluidounces	1	liter

*See CAUTION on page 3.

MIXING: Dissolve each of the chemicals in a separate container, using about 8 fluidounces (237 milliliters) of distilled water at 65 to 75°F (18.5 to 24° C). You can use stainless-steel, glass, or plastic containers and a stainless-steel spoon for stirring. The container for the ferric ammonium citrate should be large enough to hold 32 fluidounces (about 1 liter).

Mix the ferric ammonium citrate and the tartaric acid solutions, and then add the silver nitrate solution slowly while stirring. Add distilled water to make 32 fluidounces (about 1 liter). If you keep the resulting solution in a brown glass bottle away from direct light, it should remain in good condition for several months.

APPLYING THE SENSITIZER: You can apply the sensitizer at 65 to 75°F (18.5 to 24°C) to the fabric or paper in artificial room light, but it's best to work under a yellow safelight. Equip the safelight with a KODAK, Safelight Filter 00 (light yellow), a KODAK Safelight Fitter 0A (greenish yellow), or an equivalent filter, and a 15-watt bulb. Use the safelight at a distance of no less than 4 feet.

Silver nitrate will produce brown stains on your hands or clothing and these stains are very difficult to remove. See CAUTION on page 3. You can avoid staining your hands by wearing rubber gloves. A plastic darkroom apron such as the KODAK Darkroom Apron, sold by photo dealers, will help keep stains off your clothing.

The easiest way to sensitize the material is to dip it in the solution and then hang it up to dry in a dark room. If you prefer, you can swab the sensitizing solution onto the surface with a tuft of absorbent cotton or a soft brush. To be certain of an even application, first spread the sensitizing solution with vertical strokes of the brush and then rework the surface with horizontal strokes. Then press the paper or fabric between two blotters to remove any excess sensitizer, and allow it to dry in a dark, dust-free place.

You can make a good brush or swab for spreading the sensitizer by folding several thicknesses of soft, clean cotton cloth around the end of a piece of glass about 2 inches wide by 6 inches long. Secure the cloth to the glass by wrapping a rubber band around it. If the "handle" end is sharp, put tape around the end so that you won't cut yourself.

To sensitize only one side of a garment or other cloth item that has two layers of fabric, put a piece of glass between the layers while you apply the sensitizer. After you've applied the sensitizer, put a piece of blotter between the layers of fabric until the sensitized area dries. The unexposed parts of the sensitized area may possibly show some coloration after a time, so when you want to confine the sensitizer to a limited part of the cloth, you should outline the area with masking tape. This will help keep the perimeter of the sensitized area from being irregular. Apply the sensitizer sparingly near the edge of the tape.

PRINTING: After it is dry, hold the sensitized cloth or paper in close contact with the negative you wish to print by placing a piece of clear glass over the negative. Then expose it to sunlight or very strong artificial light, such as a reflector photolamp, until details are visible in the highlight areas of the image. If you use a hinged printing frame, you can examine part of the print to determine when the exposure is adequate. Exposures require several minutes. Try an exposure of 2 minutes to 10 minutes or longer until you determine the best time to use.

DEVELOPMENT: Wash the exposed print in running water at 65 to 70°F (18.5 to 21°C) for about 1 minute. The image will be yellow, but will change to brown when you immerse the print in hypo solution. Fix the print for 5 minutes at 65 to 70°F (18.5 to 21°C). To make the hypo solution, dissolve 1 ounce (28 grams) of sodium thiosulfate (hypo) in 20 fluid ounces (591 milliliters) of

water at room temperature. Do not use other hypo solutions recommended for film and conventional photographic paper, because these solutions are too strong and may bleach the image produced by your sensitizer.

The hypo solution tends to reduce the density of the image, so make the print darker than normal to begin with by exposing longer during the printing step. You can sometimes use the hypo solution to save an over-exposed print. When the print has reached the desired tone or density in the hypo solution, wash it for 30 minutes in running water at 65 to 70°F (18.5 to 21° C), and then allow it to dry. When the print is dry, the image will be black.

KALLITYPE SENSITIZING

The Kallitype process is more complex than the procedure just described, but it provides better control of the contrast and tone of the print image. For Kallitype printing, use the following sensitizer:

	Avoirdupois U.S. Liquid		Metric	
Distilled Water	16	fluid ounces	473	millilitres
Ferric Oxalate	2 3/4	ounces	78	grammes
Oxalic Acid*	80	grains	5,2	grams
Silver Nitrate*	1	ounce	31	grams

*See CAUTION on this page.

MIXING: In a stainless-steel, glass, or plastic container, dissolve the ferric oxalate and oxalic acid in the water at a temperature of about 100°F (38° C). Then add the silver nitrate to the solution and stir until dissolved. Pour the solution into a brown glass bottle, fit the bottle with a tight stopper, and allow the solution to ripen for a few days before you use it.

CAUTION: Oxalic acid may cause local skin irritation or burns if you come in contact with the crystals or solutions. Avoid contact with the skin and eyes.

Silver nitrate in either the dry chemical or solution form can cause burns of both the skin and the eyes. In handling dry silver nitrate, be careful not to inhale the dust.

In case of contact with the skin or eyes, both the dry chemicals and solutions described above should be immediately flushed from the area of contact with water. If the eyes are involved, flush for at least 15 minutes and get medical attention.

After you have mixed the sensitizer solution and left it to ripen, crystals will form in the solution. When you're ready to use the sensitizer, warm the container in a water bath at 100°F (38° C) in order to redissolve the crystalline material. Apply the solution at 100°F (38° C) to the cloth or paper as described previously. Use the sensitized cloth or paper as soon as possible, because the sensitized coating will begin to deteriorate within a day or so. Expose the material as descri-

bed on page 2. A correctly exposed print will appear as a faint brown image on a yellow background.

DEVELOPMENT: To produce black tones, treat the print for about 2 to 8 minutes in the following solution at 100°F (38°C). To mix the solution, dissolve the borax in water at 100°F (38°C) while stirring, then add the Rochelle salts. If you're not going to use the developer soon after it's mixed, you'll have to warm it up to the temperature recommended for mixing and development to redissolve crystalline deposits that may have formed.

	Avoirdupois		Metric	
	U.S. Liquid			
Borax	2	ounces	57	grams
Sodium-Potassium Tartrate (Rochelle Salts)	1 1/2	ounces	43	grams
Water	20	fluidounces	591	millilitres

You can control the contrast of the image and enhance the highlight areas by adding a small amount of a 10 percent solution of potassium dichromate. If the negative you used was of normal contrast, add only a drop or two of the dichromate solution; but if your negative was flat-lacking in contrast-use 6 to 10 or more drops. For prints from very contrasty negatives, don't add any dichromate to the developer.

If you want purplish-brown tones in your print, change the proportions of the developer to 1 ounce (28 grams) of borax and 2 ounces (57 grams) of Rochelle salts. For a sepia or brownish effect, omit the borax and use only 1 ounce (28 grams) of Rochelle salts. Without the borax, you can mix and use the solution at 65 to 75°F (18.5 to 24°C), but at the lower temperature, you'll have to develop your print for about 15 minutes. You can control the darkness of the print to some extent by removing it when the desired density has been obtained. For richer, black tones use a different developer consisting of 3 ounces (85 grams) of sodium acetate to 20 fluidounces (591 ml) of water at 65 to 75°F (18.5 to 24°C). Mix the solution at the same temperature.

CLEARING AND FIXING: Clear the print in a solution of 1 ounce (28 grams) of potassium oxalate in 8 fluidounces (237 ml) of water at 65 to 75°F (18.5 to 24° C), and then fix for 3 to 5 minutes in the following bath at the same temperature. When mixing the solutions, dissolve the chemicals in the water at 65 to 75°F (18.5 to 24° C).

	Avoirdupois		Metric	
	U.S. Liquid			
Water	20	fluidounces	591	millilitres
Sodium Thiosulfate (Hypo)	1	ounces	28	grams
Household Ammonia	about 1/4	fluidounce	7	millilitres

After fixing, wash the print thoroughly for 30 minutes in running water at 65 to 70°F (18.5 to 21°C). Then dry in the usual way.

MORE INFORMATION

If you have any questions about photosensitizing cloth and paper, write to Eastman Kodak Company, Photo Information, Department 841, 343, State Street, Rochester. New York 14650.

Your photo dealer can show you a wealth of helpful darkroom ideas and techniques in KODAK Photo Books. Of particular interest to the darkroom enthusiast are *Enlarging in Black-and-White and Color* (AG-16), 95¢; *The Here's How Book of Photography* (AE-100), \$10.95; the *KODAK Color DATAGUIDE* (R-19), \$6.70; and the *KODAK Darkroom DATAGUIDE* (R-20), \$6.20. If your photo dealer can't supply you with the books you want, you can order them by title and code number directly from Eastman Kodak Company. Department 454, 343 State Street, Rochester, New York 14650. Please enclose your remittance including state and local sales taxes.

Prices are subject to change without notice.

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