



# Edwal

INFORMATION  
BULLETIN:

EDWAL "FOUR AND ONE"  
Super Hypo Eliminator

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EDWAL "FOUR AND ONE" is the first, and at present the only, hypo eliminator that removes hypo, silver hypo complexes, polythionates, excess silver ions, and **gives protection to the silver image itself** during storage. There have been many brand name products marketed under the name of Hypo Eliminator, Clearing Agent, and Neutralizer, but none of these solutions have provided complete control of all the factors affecting permanence as specified in the American National Standards Institute, standards PH 4.32-1974 (image stability), PH 1.28-1973 (archival records), PH 1.43-1976 (safety film storage), and PH 1.41-1973 (archival records).

EDWAL "FOUR AND ONE" improves the permanence of photographic films, prints, and microfilms in the following ways:

1. It takes the waiting out of washing, speeding up the removal of silver thiosulfate complexes in the wash bath.
2. Reverses the formation of insoluble polythionates, converting them to thiosulfates which are easily washed out. (Some of the present "hypo eliminators" on the market do not do this, and are, in effect, nothing but washing aids.) The unremoved polythionates can break down under humid storage conditions to form silver sulfide stains in the emulsion.
3. Prevents the oxidizing effect of air and chlorine in the wash water from causing further polythionate formation. It also protects the image against changes in tone in case of treatment with a hydrogen peroxide bath.
4. Helps remove excess silver ions which can react with atmospheric pollutants to cause background stain.
5. Coats the silver image with a compound that protects the silver particles from attack by pollutants as in city atmospheres, giving protection exceeded only by expensive gold treatments.

Hence the name "FOUR AND ONE" — purity plus protection.

## STANDARD HYPO ELIMINATION PROCEDURE

In this simple procedure, Edwal "FOUR AND ONE" eliminates hypo, polythionates, etc., to a level equal to the results produced by the best of the previous brand name eliminators, clearing agents, etc., now on the market. It produces prints suitable for dye-toning and normal commercial use.

**For Films:** Use Edwal "FOUR AND ONE" at 1:31 dilution (4 oz. concentrate to make 1 gal.). After fixing, films should be rinsed in running water for 30 seconds to remove excess fixer. Treat the film for 2 minutes in the Edwal "FOUR AND ONE" working solution. Use mild agitation. Wash the film for 5 minutes in running water and dry as usual. A final 20 second rinse in Edwal **Kwik-Wet** is recommended to prevent spotting. Capacity: 7500 to 8000 square inch per working gallon.

**For Papers:** Use "FOUR AND ONE" at 1:31 dilution (4 oz. concentrate to make 1 gal.). After fixing, rinse prints in running water for 30 seconds to remove excess fixer. Treat single weight papers for 2 minutes and double weight papers for 4 minutes in Edwal "FOUR AND ONE" working solution. Wash for 15 minutes in an efficient print washer and dry on a clean dryer with a freshly washed blanket. Capacity: 40 to 50 d.w. or 75 to 100 s.w. prints per working gallon.

## PROCEDURE FOR TRUE ARCHIVAL PERMANENCE

This accomplishes the maximum degree of permanence, and makes it unnecessary to use the customary hydrogen peroxide wash for prints for museum standards.

### For Films and Microfilms:

1. Use Edwal "**FOUR AND ONE**" at 1:15 dilution (8 oz. to make 1 gal.). After fixing, rinse the films or microfilms in running water for 30 seconds to remove excess fixer. Treat the films for 2 minutes in a fresh Edwal "**FOUR AND ONE**" bath and wash for 5 minutes.
2. Treat again in a second **fresh** Edwal "**FOUR AND ONE**" bath for 2 minutes and wash for another 5 minutes. The second bath insures that the film is treated with solution that is as fresh as possible. Dry as usual. For maximum protection, treat with Permafilm, which toughens the emulsion and removes all excess moisture usually held by the so-called "dry" emulsion.

### For Papers:

1. Use Edwal "**FOUR AND ONE**" at 1:15 dilution. After fixing, rinse for 30 seconds to remove excess fixer. Soak single weight paper for 2 minutes, double weight paper for 4 minutes in Edwal "**FOUR AND ONE**" working solution with mild agitation. Then wash in an efficient print washer with running water for 30 minutes.
2. Treat again in a **fresh** Edwal "**FOUR AND ONE**" bath for the above time and wash for another 30 minutes.

For archival processing, the print dryer, drainboards, squeegee, clips, and tongs should be washed in Edwal "**FOUR AND ONE**" (1:15), rinsed with water, and wiped with a clean cotton cloth before handling the paper. Dryer blankets should be washed well with lukewarm water, then soaked in the 1:15 Edwal "**FOUR AND ONE**" for one hour and then laundered in warm water and a little Tide (not soap) and dried on the drum. Hard surfaces such as drums should be washed with straight Edwal "**FOUR AND ONE**" and rinsed thoroughly with clean water.

It is best to test your own print wash system to determine the best washing time for that particular equipment. Our tests were made with a Kodak tray siphon to simulate average wash conditions. Test prints made by this method on double weight papers should have no detectable hypo content when tested by the American National Standards Institute silver nitrate test PH 4.8-1971.

**Miscellaneous Uses:** Edwal "**FOUR AND ONE**" is excellent for removing dye toner stains from hands and clothing. Edwal "**FOUR AND ONE**" at a 1:15 dilution can be used as a neutralizer for developer tray cleaning solutions such as Edwal Single Solution Tank, Tray, and Rack Cleaner to insure complete elimination of the cleaning agents.

**Precautions:** Working solution should be made up fresh just before use. Working solution will gradually oxidize if left in an open tray, but can be kept up to a month in a stock bottle or tank with floating lid. Contains sulfites and glycols. Harmful if taken internally. **KEEP OUT OF REACH OF CHILDREN.**

For more information, write for the Edwal bulletin, **Tests for Print and Film Permanence.**



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TESTS FOR PRINT  
AND FILM PERMANENCE

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## TRUE ARCHIVAL QUALITY

To make a film or print "permanent" (archival quality) it must be resistant to staining, fading, or discoloration of the image or background during many years of use or storage. The degree of permanence can be predicted by a series of quick chemical tests which indicate the degree and kind of deterioration the print will undergo.

**1. Deterioration Due to Presence of Silver Ions** (non-complexed silver salts of bromide, iodide, etc.), caused by incomplete fixation. Such silver compounds will react with sulfur compounds in the air or gelatin during storage or use, to form brown silver sulfide, both in the background and image.

### Test for Silver Ions with Sodium Sulfide

A. Make a stock solution of 2 g. sodium sulfide and 100 cc. distilled water. Store in an amber or pyrex glass bottle with a clean bakelite or styrene cap.

B. Make the working solution just before use by diluting one part A with nine parts distilled water and place in a clean glass or plastic tray. Submerge a 4x5 print halfway under the surface. Hold it there for 2 minutes with slight agitation. Any brown silver sulfide that forms will show the approximate maximum brown color that will appear on prolonged storage in industrially polluted air. This test can be used on the white border of a print. If the print is not acceptable, it can be re-fixed with a fresh fixer, processed in "**FOUR AND ONE**", and re-tested.

**2. Deterioration Due to Presence of Thiosulfate [Hypo].** Films (not prints) may be tested for freedom from thiosulfate by the Methylene Blue test described in the American National Standards Institute (ANSI) PH 4.8-1971. The procedure is rather complicated and **does not** test for polythionates. It has, however, been given considerable publicity in connection with a certain commercial "hypo removing solution".

**3. Deterioration Due to Presence of Hypo or Polythionates.** A film or print may be washed free of thiosulfate (hypo), but not have archival quality because the emulsion will still contain polythionates, which are caused by too long a time in the fixer or use of an overworked fixing bath. A chemical test for the presence of both hypo and polythionates is provided by use of an acetic acid — silver nitrate solution as follows: (See ANSI — Ph 4.8-1971).

A. Make a stock solution by dissolving 30 cc glacial acetic acid and then 10 g. silver nitrate in 750 cc distilled water. Mix well and dilute with distilled water to make 1 liter. Store in a clean brown glass bottle with bakelite or styrene cap.

B. To make the test, use a little of the above solution full strength without dilution in a clean glass or plastic tray. Use an unexposed 4x5 sheet of film or paper that has been developed and fixed and washed in the same manner as the regular prints. Dry the test sheet and then submerge halfway into the acetic acid-silver nitrate solution for 4 minutes with gentle agitation. Avoid strong light. Any stain that appears will show approximately the maximum possible yellowing after long storage. If the test print shows any yellow, the other prints from this batch should be treated with Edwal "**FOUR AND ONE**" according to the directions in the "**FOUR AND ONE**" bulletin and re-washed.

**4. Resistance to Oxidizing Agents [Ozone, Peroxides, etc.].** This test is unique to Edwal "FOUR AND ONE" and is given mainly for those who are interested in the protective properties of "FOUR AND ONE" against oxidizing agents in the air or aqueous solutions.

A. Use two exactly equal size pieces of film (approximately 1"x1"). Expose both to room light and develop, stop, and fix as usual. Treat one strip with Edwal "FOUR AND ONE" and the other with the other brand of hypo eliminator that you wish to use as a comparison. Wash both strips as usual and dry.

B. Make the test solution by dissolving 10 cc of 28° ammonia solution in 700 cc distilled water, adding 250 cc of 3% hydrogen peroxide, and enough distilled water to make 1 liter. This solution should be made fresh just before the test. It cannot be stored. It should not be put in a bottle with a cap on it because the gas that may be evolved may break the container.

C. Put the solution in a tall beaker or measuring graduate. Mark the two strips and submerge them in the solution at the same time and force them to the bottom. The black silver on the strips will react with the peroxide, forming small gas bubbles on the surface of the film. The amount of time it takes for enough bubbles to form to float the two equal strips is a measure of the oxidation resistance of the strip. Edwal "FOUR AND ONE" coats the image and protects it from oxidation. Strips treated with Edwal "FOUR AND ONE" react very slowly and usually take ten to twenty times longer to float than the identically processed strip that has been treated with the other brand of hypo eliminator. There will be a greater comparative effect when using slow speed fine grain films for the test than will be the case with high speed coarse grain film. Fine grain films are more susceptible to oxidation than the course grained films.

## "MUSEUM" QUALITY FILMS AND PRINTS

The directions given in the Edwal "FOUR AND ONE" bulletin will give true "archival" quality prints and films meeting American National Standards specifications if the following precautions are observed.

**1. Cleanliness.** Trays, tongs, hangers, table tops, and every surface that the print is likely to come in contact with should be cleaned, including the photographer's hands. Fingers contaminated with grease or chemicals can leave spots that won't show up for years, but will eventually ruin the print. Avoid soap. Clean hands with detergents such as Tide, followed by water, and finally with a little "FOUR AND ONE" full strength.

**2.** Use developer, stop, and fresh fixer for normal times. Don't force development or over-fix, or let prints pile up. Keep dryer temperatures below 150°F. Air drying is preferred. Use Edwal Super-Flat if necessary, but not Super-Flat B or glycerine or glycol flatteners.

**3. Mounting.** Prints should be mounted on acid-free board. Use of a pH pencil obtained from Micro Essential Laboratory, 4224 Avenue H, Brooklyn, NY 11210, is recommended. The pH should be greater than 6.5. Dry mounting a print that has been thoroughly dried ahead of time does not seem to cause cracking on storage. Coda Corp. makes a cold dry mounting adhesive for this purpose, but tests have been running for only eight years as of writing this bulletin. Use a clean sheet of paper between the print and the mounting press to avoid contamination from the press surfaces.