

# PHOTOGRAPHERS' FORMULARY INC.

## FORMULARY RAPID FIX WITH HARDENER FOR FILM AND PAPER

To make 1 liter of concentrate

Formulary Rapid Fix uses ammonium thiosulfate to convert the silver halides to soluble salts. This formula will fix films and papers in about one-half the time required by sodium thiosulfate fixers.

After development, the residual, water-insoluble silver salts in the film (or paper) must be removed. A fixer is used to convert these salts to water-soluble compounds, which can be washed from the film or paper. Permanence depends on the thoroughness of fixing and washing. Excess washing will not compensate for insufficient fixing, nor will excess fixing compensate for insufficient washing.

### CHEMICALS CONTAINED IN THIS KIT:

CHEMICAL	AMOUNT
AMMONIUM THIOSULFATE, 60%	950 ml
SODIUM SULFITE	42 g
BORIC ACID	21 g
GLACIAL ACETIC ACID	30 ml
ALUMINUM SULFATE	28 g
SODIUM BISULFATE	2.6 g

### CHEMICAL SAFETY

All chemicals are dangerous and must be treated with respect. Please read the warnings on each package. Pay particular attention to the warning labels on the bottle of acetic acid and ammonium thiosulfate and to the warning on the package of boric acid.

**Glacial Acetic Acid** is 100% acetic acid. While it is not as dangerous as concentrated hydrochloric acid or sulfuric acid, glacial acetic acid must still be used carefully. It has a strong, almost overwhelming odor and should be used only in a well-ventilated area. If any of the liquid should spill either on the work area or on skin, it should be washed up immediately with cold water.

In spite of the fact that the freezing point of glacial acetic acid is 17° C/63° F, it normally solidifies at a temperature far below this value depending on the amount of trace water present. However, like water, when acetic acid does solidify it expands. Thus, there is the possibility that the container or cap will rupture. It is wise to store a container of glacial acetic acid in a warm room.

**Boric Acid** is used in medicine as a mild antiseptic. However, continual use can cause dry skin, skin eruptions, and gastric disturbances. We recommend that you wear rubber gloves when working with solutions of boric acid.

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 FULL REFUND WITHIN THIRTY DAYS.**

Please consult with local sewer and water authorities regarding proper disposal of darkroom chemicals in your area.

### MIXING THE SOLUTIONS

The chemicals in this kit are used to prepare two concentrated stock solutions, which are then mixed and diluted as needed. A total of 4 liters of film fixer or 8 liters of paper fixer can be prepared. We recommend that you prepare 2 liters of film working solution, which can then be used to prepare the paper fixer or it can be replenished with the unused stock solutions.

To mix the stock solutions, you will need a 1 liter container to store Stock Solution A and a 100 ml container to store Solution B. A wide-mouth glass mixing-bowl with at least a 2 liter capacity will also be needed to mix Stock Solution A.

### Stock Solution A (the fixer)

CHEMICAL	AMOUNT
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AMMONIUM THIOSULFATE, 60%	950 ml
SODIUM SULFITE	42 g
GLACIAL ACETIC ACID	30 g
BORIC ACID	21 g

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Fumes will be formed during the mixing of Stock Solution A; therefore, work in a well-ventilated area.

The order of mixing is **CRITICAL**. Place the ammonium thiosulfate solution in the mixing bowl and then slowly add the sodium sulfite while stirring. Stir until the mixture has completely dissolved. Then, with constant and vigorous stirring, very slowly add the glacial acetic acid. Fumes will be emitted at this point. After all of the acid has been added, slowly add the boric acid with constant stirring. The boric acid takes time (3-5 minutes) to dissolve; therefore be patient. Do not heat the solution as this will not help to dissolve the boric acid.

After all the boric acid has dissolved, transfer Stock Solution A to its storage container.

#### Stock Solution B (the hardener)

CHEMICAL	AMOUNT
WATER (20° C/68° F)	60 ml
ALUMINUM SULFATE	28 g
SODIUM BISULFATE	2.6 g
WATER TO MAKE	100 ml

Place the water in a mixing bowl or in the storage container and add the aluminum sulfate. Stir the solution (or cap and shake the container) until the solid has dissolved. Add the sodium bisulfate and again stir to dissolve. Add sufficient water to bring the final volume up to 100 ml. Be sure to stir the final solution to ensure it is homogenous.

#### WORKING SOLUTION

For film: to make 4 liters of fix, you will need a 1-gallon storage container.

CHEMICAL	AMOUNT
WATER (20° C/68° F)	2,000 ml
STOCK SOLUTION A	1000 ml
STOCK SOLUTION B	100 ml
WATER TO MAKE	4,000 ml

Add Stock Solution A to the water and mix. Slowly add Stock Solution B with constant stirring. Dilute to 4,000 ml, stir to ensure the solution is homogenous, and then transfer the fixer to a storage container.

2 liters of Fixer with Replenishment: you will need a 2-liter (1/2 gallon) storage container.

CHEMICAL	AMOUNT
WATER (20° C/68° F)	1000 ml
STOCK SOLUTION A	500 ml
STOCK SOLUTION B	50 ml
WATER TO MAKE	2,000 ml

Mix as described for the 4 liter solution. For Replenishment, after 20 rolls of film have been fixed, remove 93 ml of the fixer and add 83 ml of Stock Solution A and 10 ml of Stock Solution B. Repeat after another 20 rolls of film have been fixed.

For paper: prepare the Film Fixer Working Solution first, then dilute it with an equal volume of water (1:1 dilution). For example, to prepare 4 liters of Paper Fixer Working Solution prepare 2 liters of Film Working Solution, then dilute it with 2 liters of water.

#### USING THE FIXER

The following fixing times are recommended:

FILMS (at 20° C/68° F)  
thin emulsions 1-2 minutes

(Tech/Pan, etc.)  
normal emulsions 2-4 minutes  
(Plus-X, Tri-X, etc)  
thick emulsions 3-5 minutes  
(Royal-X, etc.)

PAPERS (AT 20° C/68° F)  
single bath method 5 minutes  
two bath method, each bath 3-5 minutes  
RC papers 2-3 minutes

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