

# PHOTOGRAPHERS' FORMULARY INC.

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## **Wimberley Developer #2, Version D+ 1 liter kit (Dry)**

CATALOG NO. 01-0158 TO MAKE 50 LITERS OF WORKING SOLUTION

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***Please read these instructions thoroughly before using!***

WD2D+ is a Pyrogallol/Metol/Sodium Carbonate developer formulated by photographer John Wimberley for spectacular results with current black and white negative films. An update of his classic WD2D formula, this new developer maximizes the beneficial effects of pyrogallol to produce negatives that are easy to print and display the following beneficial characteristics:

- Greatly enhanced acutance due to edge effects at tonal boundaries
- A very smooth, long tonal scale
- Unmatched tonal separation, especially in highlights, even when printed on variable-contrast paper
- Hardening of the film emulsion, reducing susceptibility to scratching
- Fine, unobtrusive grain
- Because of its special spectral characteristics, a WD2D+ negative may be printed on either gelatin/silver or platinum/palladium paper

The emulsion of WD2D+ negatives contains a yellow-orange colored dye mask, traditionally called "stain", that is proportional to the density of the silver image. This mask has the effect of raising the contrast of the negative beyond the level produced by the silver image alone. This means that negatives can be developed to significantly lower silver densities, resulting in finer grain and higher sharpness than is possible with conventional developers. The yellow-orange color of the mask is also more effective at adding density to the negative than the greenish mask produced by some other pyrogallol developers. The full color density of the mask is achieved during development, making an alkaline after-bath and extended washing time unnecessary.

WD2D+ consists of two Stock Solutions, "A" and "B", which are diluted with water just before use to make the Working Solution. It is a one-shot developer, meaning that each batch of Working Solution is used only once, and is then discarded.

After seven years of research, John Wimberley published his noted article on WD2D in the October 1977 issue of *PhotoGraphic Magazine*. WD2D was the first pyrogallol developer formulated for the modern generation of films, and it single-handedly sparked a revival of interest in this classic developing agent that continues to this day. WD2D+ continues and refines this tradition. An article on WD2D+ appeared in the March/April issue of *Photo Techniques*.

### **CHEMICAL SAFETY**

***Keep all photographic chemicals out of the reach of children. They are potentially hazardous and must be treated with respect. Please heed all cautions and warnings.***

**PYROGALLOL: Warning: Poison!** When mixing or handling Stock Solution A, the Working Solution, or when developing film, wear rubber gloves. Avoid contact with the skin. If contact does occur, immediately wash thoroughly with soap and water.

**METOL:** Some people develop a skin allergy to Metol, another reason for wearing rubber gloves when handling the developer.

*IF FOR ANY REASON YOU DO NOT WISH TO ASSUME ALL RISKS IN USING THESE CHEMICALS, PLEASE RETURN THEM FOR A FULL REFUND.*

## **WD2D+ FORMULA**

### Stock Solution A

Metol, Sodium Bisulfite, Pyrogallol, EDTA, Tetrasodium Salt

### Stock Solution B

Sodium Carbonate

The pH of the WD2D+ Working Solution is approximately 9.85.

## **Capacity**

A 1-liter kit of WD2D+ produces 51 liters of Working Solution. This is sufficient to develop more than 125 rolls of 35 mm film, or 125 sheets of 4x5 film when individually tray developed.

*Note: Pyrogallol developers are particularly sensitive to seasonal and other variations in water quality. Thus, the use of steam-distilled water is essential. Purchase containers of water at least 4 days before use to allow time for excess oxygen to leave the water.*

*If tap water must be used, filtering is recommended. Fill clean, covered containers at least 4 days before use to allow excess oxygen to escape the water.*

## **MIXING THE STOCK SOLUTIONS**

Materials needed:

- Two amber glass, narrow mouth bottles of 1-liter capacity. Label one bottle "Stock Solution A, and the other "Stock Solution B".
- A graduated mixing vessel of sufficient capacity.
- A funnel to transfer the Stock Solutions from the mixing vessel to the bottles.
- A stirring rod or paddle.

*Note: Always thoroughly clean all utensils and containers before and after using.*

### **Mixing Stock Solution A:**

To 800 ml of distilled water at room temperature, slowly add the contents of the packet labeled "Packet A" with continuous stirring. When the chemicals are completely dissolved, add distilled water to bring the total volume to 1000 ml (1 Liter). Transfer to the amber glass storage bottle.

*Note: Emptying the contents of the packet under the surface of the water, then rinsing the packet clean can help minimize the dispersion of airborne particles.*

### **Mixing Stock Solution B:**

*Note: Before opening packet "B", break up any lumps that may have formed by gently kneading the packet between the fingers. Also, with both stock solutions, stir carefully to minimize the introduction of oxygen into the solution.*

To 800 ml of distilled water at room temperature, very slowly add the contents of the packet marked "Packet B" with continuous stirring. If small hard lumps form in the mixing vessel, crush them with the stirring rod or paddle; they will normally dissolve within a few minutes. Next, add distilled water to bring the total volume to 1000 ml (1 liter). Transfer to the amber glass storage bottle.

#### MIXING THE WORKING SOLUTION

- A graduated mixing vessel of sufficient capacity.
- Two graduated cylinders of sufficient capacity labeled "A" and "B".
- A stirring rod or paddle.

The two stock solutions are mixed with distilled water *immediately* before use in the following proportions:

Distilled Water:	50 parts
Stock Solution A:	1 part
Stock Solution B:	1 part

*Note: To avoid complex calculations, it may be easier to round off the total amount to a volume slightly greater than needed. For example, if a final volume of 1500 ml is desired, divide 1500 by 50 to obtain the volumes of Stock Solution A and Stock Solution B, then mix as follows:*

<i>Distilled Water:</i>	<i>1500.0 ml</i>
<i>Stock Solution A:</i>	<i>30.0 ml</i>
<i>Stock Solution B:</i>	<i>30.0 ml</i>

*Note: While pouring, mixing and stirring, be careful to minimize the introduction of bubbles. Also, measure the water and Stock Solutions as accurately as possible.*

Pour the desired quantity of water into the mixing vessel. Next, measure the appropriate amounts of Stock Solution A and Stock Solution B in the 2 graduated cylinders. While stirring, pour the contents of graduated cylinder "A" into the water, then add the contents of "B". As the "B" solution is added, the color will change from clear to orange/brown. Stir for 10 more seconds. The Working Solution is now ready for immediate use. It must be used within 3 minutes of mixing to ensure consistent results.

*Note: When tray developing, it is acceptable to let the Working Solution sit in the developer tray during the 2 minute Pre-bath time. When tank developing, mix the Working Solution while the film is in the Pre-bath. For information on the Pre-bath, see "Processing the Film".*

#### DEVELOPMENT TIMES

WD2D+ may be used to develop both roll and sheet film in tanks or, in the case of sheet film, in trays. The following development times are approximate. Due to the many technical and aesthetic variables affecting film development, it is not possible with any film developer to specify exact times. Therefore, they should be considered as starting points for experimentation to determine exact personal times.

As a rule of thumb, if when printed the results are of lower than desired contrast, increase the development time. If of higher than desired contrast, reduce the development time.

*Note: It's helpful to keep accurate records of times, temperatures and other variables for future reference.*

<b>Agfa Films</b>	<b>TIME</b>
Agfapan 25	8 minutes @ 68°F/20°C
Agfapan 100	9
Agfapan 400	10

<b>Ilford Films</b>	<b>Time</b>
Pan-F +	7 minutes @ 68°F/20°C
Delta 100	7
FP4 +	7
HP5 +	9
Delta 400	9
Delta 3200	9

<b>Kodak Films</b>	<b>Time</b>
Plus-X	8 minutes @ 68°F/20°C
T-Max 100	9
Tri-X	10
T-Max 400	10

<b>Bergger</b>	<b>Time</b>
200 Sheet Film	10 Minutes

<b>Forte</b>	<b>Time</b>
100	8 Minutes

### **Temperature Compensation**

Development temperatures of 68°F/20°C - 76°F/24.4°C may be used. For temperatures above 68°F/20°C, the developing time must be shortened by 4% per degree F. to compensate. Convert the development time to seconds (multiply the number of minutes by 60). Then multiply the number of seconds by the appropriate factor:

70°F/21.1°C: .92                      74°F/23.3°C: .76  
72°F/22.2°C: .84                      76°F/24.4°C: .68

Finally, divide by 60 to convert back to minutes.

### **Zone System Use**

WD2D+ was designed to accommodate the wide development flexibility required by Zone System users. Because the dye mask adds significant density, contrast expansions to levels unobtainable with conventional developers are possible.

Once the "Normal" development time has been determined as described above, the following adjustments may be used as a basis for determining personal "-" and "+" times. Convert the "Normal" development time to seconds, and then multiply by the appropriate factor:

-1: 0.8                      +2: 1.5  
+1: 1.2                      +3: 2.0

Finally, divide by 60 to convert back to minutes.

### **PROCESSING THE FILM**

A Pre-bath (Presoak) is recommended to help ensure even development and to minimize the presence of air bells (bubbles) on the film. The Pre-bath consists of a working solution of wetting agent such as Formulary Forma-Flo or Edwal LFN in distilled water.

To help dissolve anti-halation dyes present in the film emulsion, 1 level teaspoon of Sodium Carbonate, Monohydrate *and* 1/2 level teaspoon of Sodium Bisulfite per liter of distilled water may be added to the Pre-bath.

Presoak the film for two minutes, agitating vigorously for the first 30 seconds and intermittently thereafter.

*Note: A water bath is recommended to help maintain a constant developer temperature during processing. Place the tanks or trays in larger trays filled with water at the same temperature as the developer. All processing solutions, including wash water, should be within 5°F/2.5°C of the developer temperature.*

### **Developer**

When developing sheet film in a tray, agitate continuously by rocking the tray. Raise each side in turn at 2-second intervals. Although possible, it is not recommended to develop more than one film at a time in a single tray, as scratches and uneven development may result. Use trays one size larger than the film and fill with a sufficient quantity of Working Solution to ensure a depth of at least ¼"/6mm. For tank development, agitate continuously for the first 30 seconds. Thereafter, agitate for 15 seconds out of every 30 seconds. Agitate by lifting the tank and inverting it with a twisting motion. If uneven results are obtained, increase the amount of agitation. Ensure that the tank is as full of Working Solution as is practical.

### **Stop Bath**

After development, transfer the film to an acid stop bath, such as Formulary TS-4 Odor-Free Stop Bath. Agitate continuously for 30 seconds then place the film in the fixer.

*Note: Unlike some other pyro developers, the dye mask (stain) of WD2D+ is fully formed during development, and isn't sensitive to pH variations after development. For this reason, it's not necessary to use a water bath and alkaline fixer to eliminate the possibility of dye mask reduction by an acid stop bath and fixer. If a water bath and alkaline fixer are used, it is recommended that the wash time be limited to 10 minutes, and the water flow rate to the minimum necessary to fill the washer in 2 minutes. Otherwise, aerial fog may appear during the wash.*

### **Fixer**

Any commercial sodium thiosulfate or ammonium thiosulfate (rapid) *non-hardening* fixer such as Formulary TF-4 may be used. Fix the film for the manufacturer's minimum recommended time. Agitate continuously during the first minute, intermittently thereafter.

### **Hypo Neutralizer**

Do not use hypo neutralizer (washing aid). With film, this step is not necessary to obtain archival permanence. In addition, most hypo neutralizers contain large amounts of sodium sulfite that may weaken the dye mask. Instead, thoroughly rinse the film in water and place in a film washer.

### **Wash**

Wash for 10 minutes in running water, ensuring at least 5 complete changes of water by volume.

*Note: To conserve water, place the film in a clean, water-filled tray or tank. Intermittently agitate for 2 minutes, then empty and refill with fresh water. Repeat 5 times.*

### **Rinse in Wetting Agent**

After washing, place the film in a solution of wetting agent dissolved in distilled water. Agitate intermittently for 1 minute, and then dry the film in a dust-free place. Do not wipe or squeegee the film as scratches may result.

*Note: Consult local sewer and water authorities regarding disposal of darkroom chemicals.*