TRADITIONAL PHOTOGRAPHY;

TALKING ABOUT PHOTO CHEMICALS

FROM THE jbhphoto.com BLOG

Collection #05-A
10/2013

MUSINGS, OPINIONS, COMMENTARY, HOW-TO AND GENERAL DISCUSSION ABOUT TRADITIONAL WET DARKROOM PHOTOGRAPHY TAKEN FROM THE PAGES OF THE jbhphoto.com BLOG.

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Table of Contents

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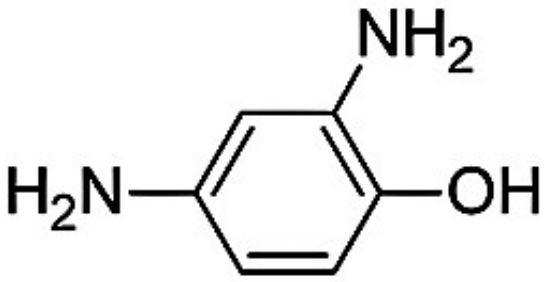
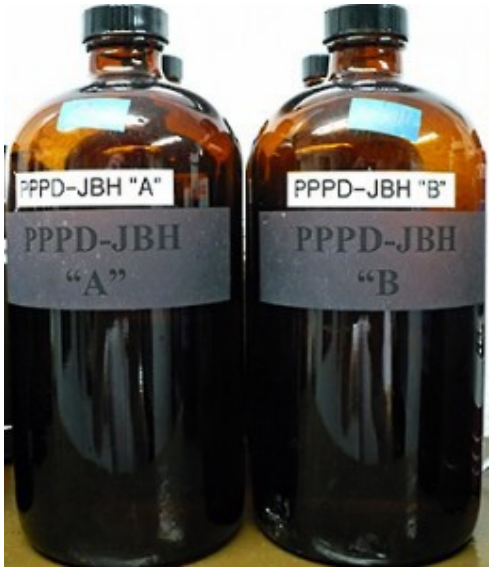
WHAT PAPER DEVELOPER ARE YOU USING THESE DAYS?

This entry was posted on March 15, 2011.

So. . . everyone has their preferred brands, methods, techniques and such. I have mine for sure. As Fred Picker said, "if you have been around for twenty years or more and haven't formed any opinions, what have you been doing?" I miss Fred!



There seems to be a lot of paper developer formulas floating around. My wife and I have tried our share of so-called 'magic' formulas. We have been down the Amidol road, and don't get me wrong, Amidol is a great developer but it is far from magic. Amidol is about the best I have found for Azo. Yes we do print on Azo, in fact, we have a stock of it on hand. I would just like to go on the record as not being a person that subscribes to the idea there are magic bullet formulas. There is what works for you and that can be anything that suits your way of seeing. Anyone that has a one-size-fits-all attitude, usually has something to sell.



We have had our frustrations with Amidol developers. And I am not convinced that it is the best, certainly not the only, developer suitable for Azo or any other paper. In a side-by-side test my wife and I determined that Amidol was our developer of choice several years ago. There is a subtle edge there that is not something you can put into words, but there is a difference we decided worth exploring. But Amidol is expensive and can be frustrating to use at times. Yes, we have tried all of the popular formulas. I have just not been too impressed with the results I have obtained at times. What I was searching for was a cold-tone developer. Not only for Azo, but for the other printing papers we use. At times Amidol was still giving a green cast on Azo. Not bad but annoying and required lengthy toning in selenium to offset. I like a cold, neutral tone for most of what I print and the Amidol formulas just wasn't consistent enough for me. I was not happy with how things were working. It was time to do some research.

I found a lot of interest on the Internet about a Pyro base paper developer formulated by Donald Miller. Mr. Miller named his developer Pyro Plus Paper Developer (PPPD) and after reading about this formulation I was inspired to give it a try. Believe me it takes some inspiration to get me to try something new, but I was frustrated with Amidol and I needed some good news for a change.

From all of the discussions about PPPD I found one thing was clear; there were numerous variations to the formula. The original published formula called for both Pyrogallol and Pyrocatechol. Now this is where things get a little confusing. I don't recall where I found the particular variation that I tried,

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but there was a suggestion from somewhere to replace the Pyrogallol with Citric Acid. Not sure where I found that, but that was the formulation that I first tried.

From what I gathered, adding the Pyrogallol and changing the amount of Potassium Bromide makes a more warm-tone developer. I was not interested in warmer, I wanted a cold, neutral developer. To my surprise the variation I tried worked very well. It more than met my requirements, and so far, has yielded very neutral cold tone results on the Azo we have on hand. No more green tint, just what I wanted! It has also proven to be excellent with all other papers we use. And, for those that are economy minded, Pyrocatechol is much cheaper than Amidol.

PPPD keeps very well in an open tray once mixed, but should be dumped at the end of a printing session. I have never had it to die in the tray from oxidation. It does die from exhaustion, just like most any other developer. I would estimate that after about twenty 8×10 prints per liter, you should start looking to mix some fresh developer.

This particular formula also keeps well as a premixed two-part stock solution. Part 'A' is mixed 1:1 with part 'B' for use. I found that by mixing one liter of both part 'A' and part 'B' and storing it in full brown glass bottles it keeps at least six months. At least at this point in my experiments that is as long as I have stored the stock solutions. I keep three to four one liter bottles mixed and on the shelf in the darkroom. When we go to print, you just dump a bottle of part 'A' and part 'B' into a tray and away you go.

I really like this developer and my wife is using it also. So if I am asked what developer I am using, I say now days it is my variation of Donald Miller's PPPD. My bottles are marked PPPD-JBH for my personal favorite formula.

Oh. . . almost forgot. . . I guess if you have read this far you are interested in the version of PPPD we are using. Here is the formula that we have found to work very well with every paper we use, including Azo. Maybe it will work for you. . . maybe not. The only way to find out is to, as Fred Picker would say, "TRY IT!"

PPPD-JBH Cold Tone Paper Developer

SOLUTION A

Water at 125° F	750 ml	1,500 ml
Phenidone *NOTE	0.3 g	0.6 g
Sodium sulfite	43 g	86 g
Pyrocatechol	10 g	20 g
Citric Acid	5 g	10 g
Potassium bromide	3.5 g	7 g
Water to make	1 liter	2 liter

**NOTE: Dissolve in 5-8ml of Isopropyl Alcohol, then add to water.*

SOLUTION B

Water at 70-80° F	750 ml	1,500 ml
Sodium Carbonate	50 g	100 g
Water to make	1 liter	2 liter

Mix 1:1 (1 part 'A' with 1 part 'B' for use)

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Please note that this developer contains chemicals that could be hazardous. Practice safe handling procedures when mixing chemicals. Wear gloves or use tongs when working with PPPD. In fact, it is a good idea to wear gloves when using any print or film developer.

Keep in mind this is a cold-tone developer. If you search the Internet you will find more information on other variations of the PPPD formula. Supposedly adding Pyrogallol and varying the amount of Potassium Bromide makes this a warm-tone developer, but I have not tried it, since I was not interested in warmer print tone.

I would like to personally thank Donald Miller, and all the others involved for laying the groundwork and publishing this formula, and its numerous variations, for Pyro Plus Paper Developer. Anyone wishing to experiment with PPPD, or seeking more information, try an Internet search for Pyro Plus Paper Developer.

Here you will find the original Pyro Plus Paper Developer formulated by Donald Miller;

http://unblinkingeye.com/Articles/PyroPlus/pyroplus.html

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MIXING YOUR OWN

This entry was posted on February 6, 2012.

I have always been an advocate of vertical integration. The more you can do yourself, the better control you have of the outcome. For many years I used prepackaged photo chemicals and have never had a problem. But, as the traditional darkroom and the materials used become more and more an alternative process, commercially available photo chemicals are getting harder to find. Some favorite chemicals have vanished. An old favorite, the Zone VI line of print developer, fixer and hypo are now gone from Calumet. I recently witnessed 8 bags of print developer and 2 bags of print and film fixer selling for $127.50 on eBay. That is well over double the original cost from Calumet.

The bottom line is, you can mix your own photo chemicals. Sometimes, if you purchase bulk raw chemicals, you can even save a few dollars. Another plus to mixing your own is the fact that you have 100% control. If something goes wrong, you know who to blame. You can also modify the formula and experiment. Mixing your own photo solutions is not hard. It is not rocket science and you do not have to be a chemist. If you can follow a recipe and bake a cake, you can mix your own chemistry for the B&W darkroom.

The first thing you need to understand is that in order to mix your own photo chemistry you will be handling CHEMICALS. If you are not comfortable with this thought, do not even go there. But, remember that you are surrounded with chemicals. . . the entire planet is made of them. If you take proper precautions and are careful, there is nothing to fear. I am not a chemist, so I have little understanding of deep details and I have even less inclination to study chemistry. Do as I do, assume that everything you handle in the way of raw chemicals are toxic. Do all mixing in a well-ventilated area. Clean up spills immediately. Avoid breathing airborne powders. Always wear gloves and purchase a respirator with proper filter. A little common sense goes a long way.

As I said before, for me, mixing photo chemicals is nothing less than following a recipe. When mixing any photo chemistry formula/recipe you need to accurately measure all of the various chemicals. Most formulas call for dry chemicals measured in grams and liquids in milliliters. I have two scales for dry measure. I have a very accurate digital scale for small quantities and an old-fashion triple beam for

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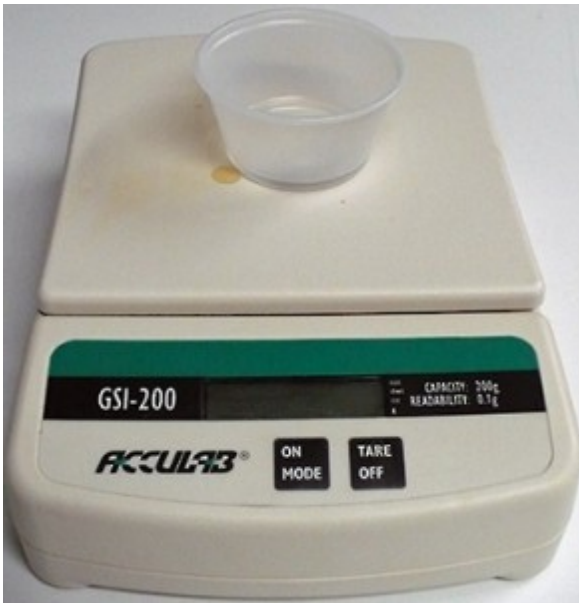
larger amounts. I picked up a box of small serving containers at the local big box store to be used as disposable containers for measuring small amounts of dry chemicals. I also have larger 8oz plastic cups for larger amounts. Be sure to use the tare function to zero the scale with the empty container before measuring. Zero the scale with every new container, they do not all weigh the same. Once used, I toss them in the trash. I never reuse one of these plastic containers. This assures there is no chance of unwanted contamination.



For liquids, I use an appropriate size graduate, and for small quantities, a pipette is the easiest way to make accurate measurements. You can use a pipette pump to make loading and measuring easier, or just dip the pipette into the container and hold your thumb over the end. Remember to always thoroughly wash the pipette after use and always use a clean pipette when going from one chemical container to the next. If the pipette is not properly cleaned, you will cross contaminate your chemicals.

Always follow the chemical formula. Most all formulas are mixed in water and there should be a temperature specified to insure the chemicals dissolve. Always mix in the exact order as called for in the formula. Add each ingredient slowly and continually stir until each is completely dissolved before adding the next. This is where a magnetic stirrer comes in handy. Take your time. Do not rush the process. Some chemicals take some time to completely dissolve.

I use distilled water for all stock solutions. I always use distilled water for stock solutions and processing film. Unless your tap water has known problems, it should be fine for mixing printing chemicals.

Once properly mixed, store each formula in a clean bottle with a plastic cap. Never use metal caps, some chemicals will cause them to rust and contaminate the solution. Brown glass is best for developers and plastic should be fine for most others. Be sure to label each container as to its contents and also include the date mixed. Most all stock chemicals are good for three months, some much longer.

There are many published formulas. Some popular commercial formulas are proprietary, but in many cases there are alternative, similar formulas that are published. By applying a little experimentation, you can tailor your photo mixtures to suit you. Search the Internet for formulas and pick up a copy of "The Darkroom Cookbook" Third Edition by Steve Anchell.

Mixing your own is not that difficult. With a little study, careful handling, forethought and experimentation you can mix your own photo chemistry.

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Here is a list of things you will need or may want to have;

- **disposable gloves**
- **respirator**
- **apron**
- **a selection of required chemicals**
- **accurate scales**
- **disposable plastic cups for weighing chemicals**
- **several sizes of graduates for liquids**
- **stirring rod**
- **magnetic stirrer**
- **pipette**
- **pipette pump**
- **glass storage bottles**
- **plastic storage bottles**

Resources:

Bostic & Sullivan
http://www.bostick-sullivan.com

Artcraft Chemicals Inc.
http://www.artcraftchemicals.com

The Darkroom Cookbook Third Edition by Steve Anchell
http://www.steveanchell.com

Pyrocat HD a semi-compensating, high-definition developer, formulated by Sandy King.
http://www.pyrocat-hd.com

The Book Of Pyro by Gordon Hutchings

Do not forget to search the Internet for more information.

JB

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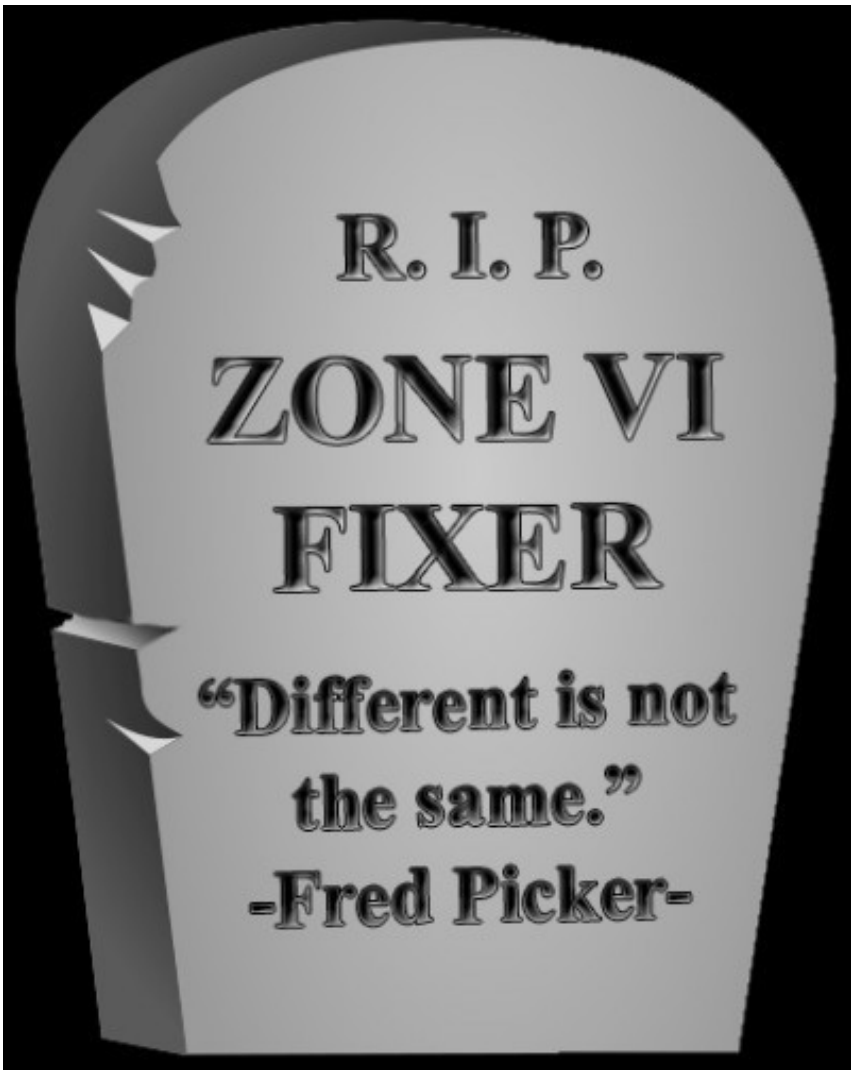
ROLLING YOUR OWN FIXER

This entry was posted on August 26, 2012.

They say the more things change, the more they stay the same. Whatever that means. It seems like only yesterday I standardized my chemicals for printing and started using Zone VI Fixer. That was over twenty years ago. But you know, things do change, and they are not the same. We are down to our last box of the old standard Fred Picker Fixer and it is time to start rolling our own from bulk chemicals.



Actually, I started researching this over a year ago and we have obtained several hundred pounds of Sodium Thiosulfate in anticipation of this day. This is the principle chemical used in fixer and though not difficult to acquire, it is expensive to ship. Sodium Thiosulfate Pentahydrate is used in water treatment to remove chlorine. It is available from many pool supply sources. Also, check the Internet and eBay, there are sellers there that will ship to your door. You will need about two pounds per gallon of fixer. We go through anywhere from half a gallon to a gallon of fixer during a typical printing session, so we need a lot of the raw material. But, this is the price you pay when you work in the wet darkroom and we believe it is more than worth the effort.

The next question is what formula should I use. Since we are only talking about paper fixer, then there is no reason to even consider a formula suitable for film. We just need a good, dependable fixer for processing fiber base papers. Now we get into the discussion about acid vs. alkaline fixer. Boy, does that ever stir the pot. Almost like asking film or digital.

Well, I want to change as little as possible and using a running water stop bath instead of acetic acid is just not what I want to mess with. I did not want to change anything, or at least, I wanted to change as little as possible. So, it was immediately determined that an acid fixer was best for us. There are many formulas out there, and everyone has their favorite. I have tested several and settled on what we intend to use.

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Also, we needed a formula for plain hypo for second fixing bath and pre-selenium toning. I found what I needed there also, thanks Ansel.

So, if you are interested in what we use, I have added our fixer choice to the Formulas Area of this BLOG. Drop by and take a look. The formulas we have chosen work fine, are simple, easy to mix, and does the job as needed. Obviously, I am not a chemist, and I am not into discussing chemical formulas. For me, working in the darkroom and mixing chemicals is only a matter of finding a recipe that reliably works, sticking with it, and getting on with making photographs. I don't care much about the innards of chemistry. . . I'll leave that to the chemists.

Things do change, and they are not the same, but who cares, as long as the results are the same. Fred Picker said, "different is not the same." I miss ol' Fred!

JB

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MY REPLACEMENT FOR ZONE VI PRINT & FILM FIXER

This entry was posted on June 8, 2013.

I had written earlier about the demise of Zone VI chemicals and how it has now become necessary to mix our own chemistry from raw supplies. Take a look at the previous post titled, "ROLLING YOUR OWN FIXER." Since that post I have done quite a bit of research and testing. I am convinced that the fixer formula we chose is not exactly a direct replacement for the old reliable Zone VI product. Not that what we have been using is not a good fixer, it just is not the same. Fred always said, "Different is not the same."

I have mixed up several concoctions, but have always come back to the Looten Acid Fixer for its simplicity and close match of pH. I kept bypassing some of the more well known formulas for some reason, possibly because everyone says they have a very unpleasant odor. I don't believe any could be any worse than the Looten Acid Fixer we have been using. . . this stuff will take the hair out of your nose.

I want to use an acid fixer for paper, because that is what I have used for years. All I wanted to do was find a 100% replacement for the Zone VI Fixer I have used for as long as I can remember. Zone VI Fixer was stable and it had little to no odor. I have searched all over and have never found the exact published formula used by Zone VI.

I looked through all of the old Zone VI Newsletters and finally resorted to watching the Picker videos. Finally in the printing video Fred talks about his fixer being Kodak F-6. The only problem is that the Zone VI Fixer I have used for years always came in a single bag as dry chemical. If you check the formula for F-6 you will find it contains 28% Acetic Acid. I am no chemist, but as far as I know, 28% Acetic Acid only comes in liquid form. Plus, F-6 is a hardening fixer. I have no reason to believe that Zone VI is a hardening fixer, let alone all instructions for F-6 say that the hardener, Potassium Alum, must be dissolved separately and added after all other ingredients have been completely dissolved. Again, the Zone VI Fixer came in one bag containing only dry chemical. So, I really do not believe that F-6 is the correct formula for what was sold as Zone VI Fixer.

There are a lot of guesses, but I do not want a guess. I measured the pH of Zone VI Fixer to be 5.5. None of the other concoctions that I have tried matched this pH, nor did they lack a strong odor. My original choice of Looten Acid Fixer had the closest pH coming in at 5.0, but has a strong odor, where the Zone VI Fixer has little odor at all. I still found myself going in circles.

I finally got tired of having to run the vent fan on high to get away from the smell. Time to put on the apron, roll up the sleeves, and do more research. This time I decided to investigate the Kodak F-24 formula. Why I bypassed this one before is beyond me, but I did, and it was a mistake. There is an alternative mixture that is suppose to be 'low-odor' that substitutes Citric Acid for the Sodium

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Bisulfite of the original Kodak formula. This mixture still had a very strong smell. So much for the alternative, low-odor mixture!

Next, I mixed up a two liter batch of the original F-24 formula, and surprise. . . it smells just like Zone VI Fixer. Next to no odor at all. I measured the pH. . . well whaddya know. . . it was exactly 5.5, just like Zone VI. Next I needed a stability test. I put two liters of F-24 in a four liter jug and let it set for a week. No change! That does it for me. So far as I am concerned, there is no difference.

Wow! Have I solved the great mystery? Could it be that Zone VI Fixer is nothing more than Kodak F-24? I have changed our FORMULAS AREA to reflect the formula for F-24 Fixer since it is now our chosen formula for paper. Note, that the only difference in the new formula is the addition of 10 grams of Sodium Sulfite per liter to the original Looten Acid Fixer formula. Not that difficult, but it does make a difference. Even if F-24 is not the exact same formula as Zone VI, it is plenty close enough for me. I will add that Gordon Hutchings also recommends F-24 for film and paper in "The Book Of Pyro." So, now you know what I have learned about fixer.

There is one more thing to be aware of; be very careful with the temperature of the water when mixing Sodium Thiosulfate. The most common Sodium Thiosulfate is the Pentahydrate (crystalline type) which requires 240 grams per liter. You need water at about 100-125°F, because it is extremely endothermic and will rapidly cool the water as it dissolves. This I knew from experience. What I didn't know is that Sodium Thiosulfate Anhydrous (fine grain like table salt), which requires 152 grams per liter, should never be mixed in water above 90°F, because it will decompose and form a precipitant. Just so you know, if using Sodium Thiosulfate Pentahydrate (large crystals) use hot water. If you are using the Anhydrous (fine grain) type, mix at about 80-85°F.

CASE CLOSED. . . at least for me. I have found what I was looking for. If you were a Zone VI Fixer user and are looking for a suitable, easy replacement, this should work just fine. Now, back to making photographs. . . and. . . I can turn that vent fan down to low again!

JB

Kodak F-24

Water (at about 125°F)……750.0 ml
Sodium thiosulfate, crystalline……240.0 grams
Sodium sulfite, desiccated……10.0 grams
Sodium Bisulfite……..25.0 grams
Water to make……1.0 liter

Note: If anhydrous thiosulfate is used, the water temperature should not be over 90°F (80-85°F) to prevent decomposition.

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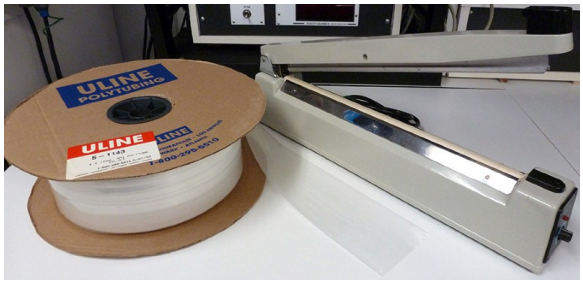
DIY PREPACKAGED DARKROOM CHEMISTRY

This entry was posted on June 23, 2013.

Mixing our own darkroom chemistry has become the established method around here. Since the demise of Zone VI chemistry, we are pretty much on our own when it comes to processing chemistry. Things like PyroCat-HD can easily be mixed by weighing out the necessary materials each time, since you are mixing stock solutions and it is not something you have to do every time you process film. I mix up the print developer as two stock solutions that are combined when a printing session starts. I keep one and two liter bottles of part A and B mixed and ready to go. That is just another element of the process. On the days we are not doing darkroom work, I am in there cleaning and mixing solutions.

One thing you use a lot of when making large prints is Fixer. We go through a lot of fixer, and I do not believe in skimping. The F-24 formula will fix 25 8×10 prints (or equivalent area, 80 sq inches per print) per liter. . . that would be 100 per four liter batch. I never run fixer more than 60% of capacity, so that would be 60 8×10's per four liter batch. Another darkroom rule is, we never pour anything back into the container. . . most of the time. Used fixer is dumped into buckets in the garage and when I get a batch, it goes through the silver recovery unit.



Because we purchase Sodium Thiosulfate in 50 pound bags, this can present a storage problem, let alone a hassle for measuring and mixing. It was obvious that we needed to find some convenient way of storing and measuring large volumes of dry material. The solution is actually not that difficult. We already had an impulse heat sealer, all that was needed was bag material. You can purchase continuous rolls of poly tubing, and 4mil is a good choice. Making a custom bag is easy. Heat seal the end, cut off the length you need, measure the chemical, pour into the bag, squeeze out the excess air, and heat seal the other end. The only other thing you need is a label, or you can write on the bag with a marker.

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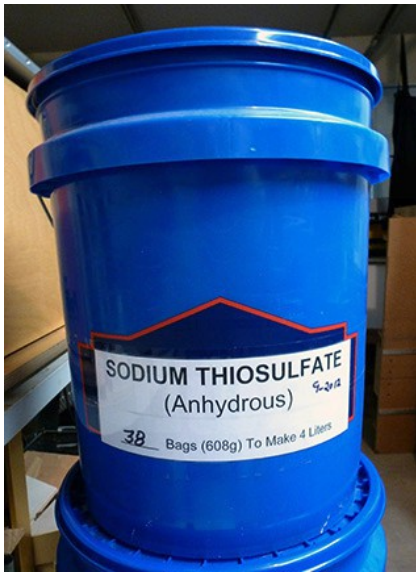
For the F-24 Fixer we use, I measure out the correct amount of all three ingredients and seal them into an appropriate size bag. I use four inch wide 4mil tubing that comes on a 1,500 foot roll. I print off an adhesive label for each bag and store the small bags in plastic shoe containers and the larger bags in five gallon plastic buckets. When I need to mix fixer, just grab three bags, run water into a suitable container at the appropriate temperature, cut open the bags and stir.



You can purchse Poly Tubing from suppliers like ULINE in widths from 1 to 48 inches on large rolls. They also sell Impulse Heat Sealers in various sizes. The unit we have is the 12 inch model and has seen a lot of use over the years. Be sure to order a spare heating element service kit. Pick up some adhesive labels for your computer printer and you have everything you need to make your own prepackaged darkroom chemistry.

JB

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SELENIUM TONING

This entry was posted on September 9, 2012.

Everyone has their personal way of doing most anything. I have sorted through what works for me and it may not be the only way to do things, but it is the way I have refined and standardized my working habits. (I hate the term 'workflow' sounds way too digital for me.) What I have tried to do is explain how I work in the darkroom. You can use my methods as a starting point and determine what works best for you.

Selenium toning of finished prints is a given for what we do. Every print is toned in selenium, for permanence, a slight shift in print color, and to enhance tonal range. We have used numerous dilutions of toner and what works for one paper and developer combination, may not work for another. When it comes to the dilution and time, you have to experiment.

Here is how we selenium tone prints. Not sure exactly where all of this came from. Some from Ansel Adams, others from Fred Picker. Never the less, here is our standard procedure.

Prints are developed, stopped in acid stop, then fixed in an acid sodium thiosulfate fixer for four (4:00) minutes. The finished prints are rinsed in running water for five (5:00) minutes or so, then transferred to an archival washer. The washer is used as a holding bath during a printing session that may last all day.

Once printing is finished, each print is evaluated and may receive further processing by some selective bleaching. After bleaching, the prints are washed again in running water and again end up in the archival washer for storage.

At this point it is time to start toning. We use three trays when selenium toning. The first contains plain hypo (Hypo), the second selenium toner at some predetermined dilution (Toner), and the third tray is hypo clearing agent (HCA).

Prints are removed two at a time and placed, back to back, in the Hypo tray for about four (4:00) minutes. This is your second fix. The Hypo is an alkaline fix and is necessary to prevent stains, since any acid in the toning solution will result in undesirable stain. If you use an acid first fix as we do, be sure to wash well before placing into the Hypo. You do not want to carry any acid into the alkaline Hypo.

After the plain Hypo, prints are drained and transferred to the Toner tray. Start the timer. . . Toning times vary. We adjust the Toner dilution to yield a Toning time between two (2:00) to about four (4:00) minutes. The Toner tray requires continuous agitation by tipping front to back and side to side. As soon as the prints are in the Toner tray, two more prints from the washer are added to the Hypo tray. The prints in the Hypo tray are used as a reference to judge the amount of change that is happening in the Toner tray.

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When the prints in the Toner tray have reached the desired tone, they are drained and moved to the HCA tray. The prints in the Hypo are moved to the Toner and two new prints are added to the Hypo. When the HCA tray gets its second set of prints, the set that has been in the longest are rinsed in running water, then moved back to the washer.

This is a daisy chain process that continues until all of the prints have been processed and are back in the washer. The idea is to fix the prints for about four (4:00) minutes in the Hypo. . . Tone for two to four (2:00-4:00) minutes. . . then about four (4:00) minutes in the HCA. These times may vary, and is not that critical. You need to second fix, in Hypo, for no less than three (3:00) minutes and HCA for the same amount of time.

Once all of the prints are back in the washer, wash as usual. For us, our tested time is about one hour. Be sure to test your washer for optimum wash time. You will find the mixtures we use posted in the FORMULAS page here on this BLOG.

This is a whole lot more complicated to explain than to actually do. It is a rhythm you pick up as you work through the prints and is really quick and easy. One word of caution; once you begin to selenium tone your prints, you will never be satisfied if you don't.

JB

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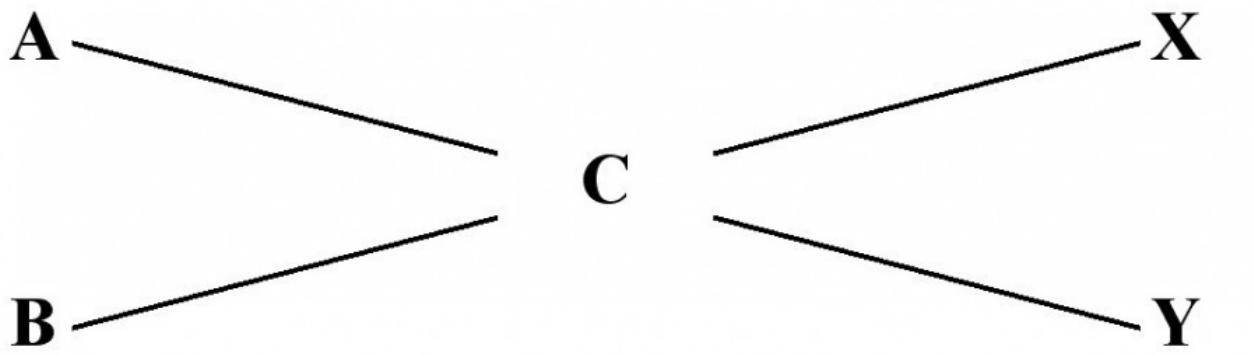
DILUTING PERCENT SOLUTIONS & STOP BATH

This entry was posted on June 17, 2013.

I was thinking about how you calculate percent solutions the other day when discussing Glacial Acetic Acid mixtures to make stop bath. I knew I had seen an easy method, but I could not remember how it worked. Certainly it is fine to just follow directions, but what if you want to know how the process works, or you need to calculate some dilution other than the norm? I thought the equation was called the 'X' System or something similar. A search on the Internet did not turn up what I was looking for though. Seems things always come to me when I take a nap. . . this time I had to sleep on this one for several days before it came to me.

The simple procedure for calculating percent dilutions is called the Criss-Cross method and is really easy, if you can remember how it works. Once I had the right description, it was easy to find more information, and it is really quite simple.

Here is the Criss-Cross formula;



To work the Criss-Cross formula do the following:

A = the % dilution of the solution to be diluted

B = the % dilution of the diluting solution (for Water this value is Zero)

C = the % dilution desired

X = C – B

Y = A – C

Diluting X parts of A with Y parts of B will yield a % solution equal to C.

I know it all sounds complicated and it really is much more difficult to explain than it is to actually work the problem. So, lets go through an example that hopefully will make it more understandable.

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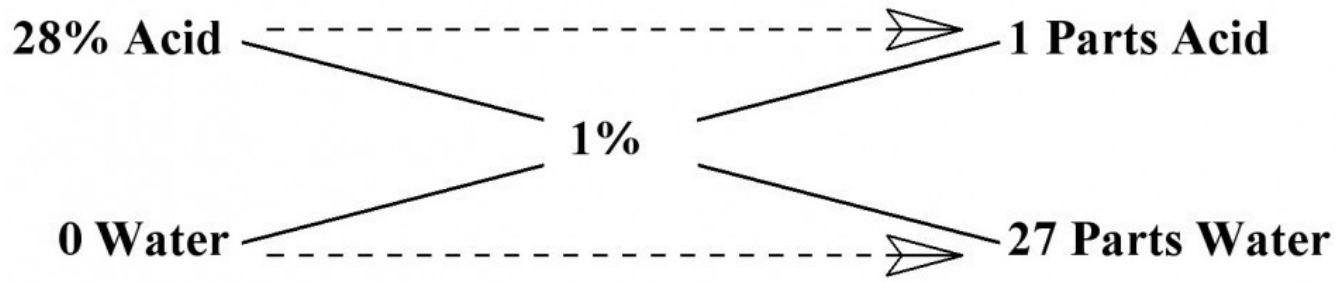
Most all agree that an acid stop bath should be somewhere between a 1-2% dilution of Acetic Acid in water. I have always used a 1% solution and that is what we still use today. For example, let's dilute 28% Acetic Acid stock to a 1% mixture for stop bath. Plug in the correct values, then perform the calculation. Enter 28% for term A, 0 for term B, 1% for term C, then perform the calculation.



You will find that if you mix 1 unit of 28% Acid with 27 units of Water you will get a 1% solution for your stop bath. Remember, we are working with ratios and the Units can be anything desired, as long as they are the same Units. It could be a mixture of 1:27 ounces, gallons, milliliters, liters, whatever units you desire. You can change the values of X and Y if you want. Just keep in mind that you have to change both Units by the same amount. If you multiply the ratio of 1:27 by 2, you would have a ratio of 2:54 Units. You could also divide the Units for smaller volumes.

For the sake of a working example, if you multiply the ratio of 1:27 in the example above by 40, you get a ratio of 40:1,080. This is how I dilute 28% Acetic Acid to a 1% solution for paper stop bath. I use even numbers of 40:1,000 milliliters. Plenty close enough for photography.

Hope this helps. . . it is not difficult if you can remember the formula.

JB

DARKROOM FORMULAS WE USE

We keep a page of formulas that we use in the darkroom on the jbhphoto.com BLOG. If you are interested in mixing your own chemistry, drop by the site to see what we use.

http://jbhphoto.com/blog/formulas-6/

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