Issue #4- JQ9404

User Profile: Bob Mitchell

Darkroom Is Business & Pleasure!

Snoopy

Do you like to snoop? Most people do and so do I. Well, I'm going to give you an opportunity to sneak into my darkroom and look at everything I have. Who knows, you might find something interesting. After all, I have been working there since we built our house, and *that* was in 1955! After all that time, I *must* have evolved something!

Tiny Little Place, My Darkroom

The place measures only eight-by-thirteen feet and it isn't very high. Figure that out in cubic feet and you won't be very impressed. But, what goes on in there is worth reporting, I think.

First, The Shape

The room is laid out like the letter T. Across the top of the T is an eight-foot long stainless steel, custom-made sink. It cost me a hundred bucks back in those days. I shudder to think what it would cost today! That is what I call the "wet-end". Home-made duck boards (redwood and brass screws) look like new after nearly forty years of use.

Nova (JOBO) Processor

Sitting on the duck boards is the lovely little Nova Clubmate print processor (from JOBO). Dip and dunk processing makes life so easy! Expose a print, dip it into the Nova to be developed for fifty seconds and it's ready for a quick five second stop. Then, another fifty seconds in the bleach-fix before going into the final one-minute wash. Heck, it takes a lot longer than that to run my car through the five-minute car wash!

Water Supply, Etc.

At both ends of the sink are hot and cold mixing faucets. Both have inexpensive valves whereby I can adjust tempered water for chemical mixing or a simple line which fits into my film drum for wash. Proper lighting is mounted beneath the cupboards over the sink. One of my favorite darkroom products is the Falcon Print Wringer. It is mounted on the bottom of the cupboard above. This way, I can take a print from the Nova and squeegee it nearly dry before placing it on a flatbed dryer. An inexpensive hair dryer finishes the job in seconds and my print is ready for delivery.

My Durst Enlarger

Let's not forget my enlarger. It is a Durst M605 and is a true sweetheart. It holds all the simple adjustments one would want and it is built like a tank. Not the current model, but I think possibly their best. (Always have to be making new models, you know.) I have several enlarging lenses

which fit the Durst. They are: 12.5mm Soligor TV, 30mm f: 2.8 Computar dl, 50mm Schneider f: 2.8 Componon S, 80mm f: 5.6 Durst Neonon and finally, a 105mm f: 2.8 Durst Neonon.

Cupboards & Counters

Counters and cupboards above run nearly the length of the room and that is where a good bit of the work gets done. For example, one of the lower cupboards holds my 35mm color negative file, which now contains somewhere around 180,000 negatives. They are carefully filed, too.

Colorstar Analyzer Of Course

When it comes to metering a negative, I *know* what I'm doing. I use the JOBO Colorstar 3000 and when it's programmed, I am sure of making a first-class color print - *first time around!* What a great feeling that is. Using my Colorbrator (sold by JOBO), I can quickly and accurately program my Colorstar 3000. Then, color analysis becomes a cinch. Same thing goes for making prints from slides. My brand new Prints-From-Slides version of the Colorbrator makes it so easy that it's actually fun to do it. After all, isn't that what a hobby is supposed to be? *(Currently ColorLine 7000)*

Gray Key

If you haven't heard about the Gray Key, you haven't lived. Another Mitchell innovation right out of the box. This small, indestructible piece of counter top material is a pocket-sized key-chain gray card which can be as close to you as your car keys. It will allow you to record the color of the lighting under which you are shooting. In the darkroom, you simply analyze this special exposure with the Gray Key in the center (it doesn't have to be in focus to work, either). Then, replace that negative with the pictorial negative made under the same light and you *know* what you're doing - every time. It's like having a color temperature meter in your pocket (or on your key chain). Costs about half the price of a standard gray card.

To Sum It Up

Several of the items in my darkroom have been there forever. Others are quite new. When I see something worth trying out, I do so. If I like it, I'm a real fan of this new 'toy'. When I write about products for the magazine (*Darkroom & Creative Camera Techniques)*, I try to say something nice about them. If I don't like them, I shut up. Not a bad idea, I think.

In addition to inventing, writing and travelling, Bob also runs color printing workshops in his home. For more information on Bob's products or workshops, you can call or write him at:

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Feature Article: Color Negatives - The C-41 Process

By Paul Rowe, Technical Manager

For about 20 odd years we have been basking in the warmth of a process that gives us very little problem, and with moderate care, excellent results. Gone are the green underexposed areas of the old C-22. The constant improvement of emulsions by all of the film manufacturers has given us quality results that we could only dream about even 5 years ago.

So why am I sitting here bleating about a process that hardly needs fixing? Because we all need to stop taking the process for granted and understand a little more about what we do when we blindly commit our film.

Beginnings

Let's first look at the C-41 process as it is stated by Kodak, since all of the processes for C-41 are either clones of Kodak, or adaptations. First, Kodak makes their Flexicolor (C-41) chemistry in 1 gallon, 3½ gallon, 5 gallon, and of course larger sizes for the dip and dunk type processors. They offer several options for replenished systems, none of which are practical for small rotary tube processors which are best used as one-shot devices. In addition the Kodak Hobby Pack makes a half liter of solutions for the occasional user. The processing steps for a JOBO Rotary Processor with the Kodak Flexicolor Chemicals are:

Temperature 38.0° C.
Rotation Speed 75 (or "P")
Preheat 5:00
(dry film in tank rotating in water bath)
Developer 3:15
Bleach 6:30
Fixer 6:30 Wash 3:00
(six changes of water-30 sec.each)
Stabilizer* 1:30

*There has been a great deal of discussion about the use of stabilizer on C-41 films, especially since the awareness of formaldehyde as a carcinogen. Kodak has further complicated this debate by stating that in some cases stabilizer is not necessary. When I asked more questions the facts seem to be that especially some of the professional films require stabilizer to prevent deterioration of the magenta dye coupler. The current Kodak films involved are: VPS III, VPS HC, VP-L, Vericolor Copy and ID, Vericolor Slide, Vericolor Print #4111, and Gold 100. Both Konica and Fuji-Hunt have some chemicals, especially for the mini-lab machines, that are claimed to be formaldehyde free. These apparently work better in the washless environment of the mini-lab. Konica also has a version for one-shot use, as with a rotary processor, but it apparently doesn't work with all films. Further, I have not been able to obtain definitive information on the status of Fuji and Konica films--which require and which can skip a stabilizer?

The safest approach, and one I am taking here at JOBO, is to stabilize all C-41 films, regardless of type or manufacturer.

Taking Liberties with C-41

For those of us who can remember back a few years, it was not long after the introduction of C-41 before several chemical producers had not only duplicated it, but were making adaptations for the amateur market. The first was the introduction of Bleach-Fix, which shortened the time a little, and dropped one bath from the process. Not long after that was an amateur mix that offered a bit

more contrast from the developer. This change was a response to complaints that Flexicolor was giving "flat" negatives.

Perhaps the greatest liberty was taken by Photo Technology, the English manufacturer who is represented by JOBO in the U.S. It became readily apparent in the amateur market in Great Britain that the buying and mixing of several different chemical kits, in this case C-41 for negatives and EP-2 for paper, was a hindrance to the customer. They were small users that found the chemical kits going bad on them before they could use it all. The response of Photo Technology was to devise Photocolor II, a two solution kit for C-41 that, with an additive, could also be used for EP-2 paper processing. In the more recent past they have introduced Photocolor FP (stands for film and print) that will process C-41 film and RA-4 paper with the same chemicals, no additive required.

The next step in this evolution was the introduction of certain variations in the C-41 type processes. Prewet of the film was sanctioned by some, a stop bath was championed by others, and a water rinse in lieu of a stop bath has also been used. These variations have spread to all of the chemicals on the market, not by formal introduction from the chemical manufacturer, but by use and word of mouth among the users, especially in the amateur market and small professional market. You do not find the larger labs or professionals playing with the process. The reason for this is obvious--they are using larger quantities of chemicals and the only economic purchase of the material is from the larger chemical producers, as Kodak, Russell, Fuji-Hunt, Konica, Agfa, Trebla, et al. These manufacturers basically clone Kodak, and the times and steps as outlined at the beginning of this article are followed.

JOBO has some responsibility, albeit inadvertent, in contributing to the variations and misunderstandings of the C-41 process. When we first began distribution of Photo Technology materials, and in fact right up to the introduction of Photocolor FP, the preprinted instruction sheets from England suggested a stop bath after the developer and before the bleach-fix. While we knew this was not part of the standard Kodak C-41 process, we had to assume that the manufacturer knew more about his chemistry than we did.

From this point on we observed process variations seemingly arise by spontaneous generation. Following the proliferation of pre-wets, stop baths, rinses, et al, we also observed the increase in calls about C-41 problems. Further, there seemed to be little definitive information available on the effect of these variations on film.

Testing

The only course left was to do our own testing. We wanted to know the effect of the following on film: 1) pre-warm, 2) pre-wet,

3) acid stop bath, 4) water rinse in lieu of stop bath, and 5) the effect of combinations of these variations.

Three films were chosen, Kodak Gold 200, Fuji G-100, and Agfa Optima 125. These were exposed to a JOBO Color Control Card by bright sunlight with a Nikon F-3 set on automatic.

The chemicals of choice were Kodak Flexicolor, and the processing was done in a JOBO ATL-3.

Lastly, densitometer readings were made of the images of the grey squares of the control card, and analysis of these readings give us our conclusions. (Just a little aside here--if you think this sounds like a lot of work for the few lines of conclusions that will follow, you are absolutely right.

There was a total of 24 rolls of film exposed, and over 400 densitometer readings had to be made, recorded, and compared.)

Conclusions

1) Pre-warm (no water in tank), *no* stop bath vs. pre-warm *with* stop bath: No significant differences were observed.

2) Pre-wet (with water in tank), *no* stop bath vs. pre-wet *with* stop bath: No significant differences were observed.

3) Pre-warm vs. pre-wet: Films with pre-wet were 1/6 to 1/3 stop more dense. It is notable that the Fuji film seemed least effected.

4) Pre-*warm* with stop bath vs. pre-*wet* with stop bath: Films pre-wet were 0 to 1/6 stop more dense. (I would consider this insignificant.)

5) Pre-warm, *no* stop, *no* rinse vs. pre-warm, *no* stop, *with* rinse:

Films with the rinse between developer and bleach were 1 to 2-1/2 stops more dense.

While there are a few other comparisons which can be made, the evidence only builds further. *Our goal is consistent and predictable processing*. The following conclusions can be inferred from the tests:

1) Pre-wet of the film introduces unpredictable variations.

2) Acid stop bath introduces unpredictable variations.

3) Rinse (using water instead of acid stop) after the developer introduces unpredictable variations.

It should be noted that Kodak says that the introduction of any step between the developer and the bleach in their chemistry does not allow the bleach step to work properly. The carry-forward of residual developer creates the proper pH condition for the bleach.

To assure yourself of consistency, you need to follow the processing steps outlined. If you are using Kodak Flexicolor, follows the steps and times at the beginning of this article. If you are using Photocolor, proceed as follows:

Photocolor II

Pre-warm 5:00

Developer 3:15

Bleach-Fix 10:00

(Note: If using Universal Bleach-Fix II, this step is 6:00)

Final Wash** 3:00

Stabilizer*** 1:30

Photocolor FP

Pre-warm 5:00

Developer 3:15

Bleach-Fix 6:00

Final Wash** 3:00

Stabilizer*** 1:30

**Final wash can be extended. The 3:00 represents six changes of water-30 seconds each.

***Stabilizer can be either Master Class E-6 Stabilizer from JOBO, part#303627, or Kodak Flexicolor stabilizer and replenisher, Process C-41 AR, Catalog #159-7475.

For other chemical manufacturers I can only suggest that you follow the instructions packed with the kit. There are no variations necessary to accommodate a JOBO rotary processor with any C-41 chemistry that we know of.

We suggest that you analyze your processing in the light of this information, and certainly try these suggestions. The result can only be more predictable than it has ever been before.

Article II: Fujimoto Maintenance Guide

To preserve optimum print quality using Fujimoto processors, a regular maintenance schedule should be implemented. Following is our suggested routine.

Daily Maintenance:

Turn the CP51 processor off. Slowly lift the second rack straight up if you own a CP51, or the third rack if you own a CP31. Raise it until it is completely out of the solution. Tip one end higher so the excess solution drips off the opposite end. When the dripping stops rinse the rack with warm running water. Be sure to turn the main gear while rinsing. Turning the gear will allow you to thoroughly rinse all the rollers.

Remove the subsequent racks and rinse as described above. Be very careful not to contaminate one solution with the other. After rinsing all racks, wipe the processor down with a damp cloth.

If a Wash/Dry Module is in use, turn the water off. Remove the wash racks. If water was not running for at least 10 minutes since the last print, rinse the racks in running water. Hang the wash racks up to dry.

*Always turn off the water before removing the wash racks. This prevents the water level in the wash tanks from increasing.

If a Stabilize/Dry Module is in use, carefully remove the racks and rinse as described above.

For the Wash/Dry Module and the Stabilize/Dry Module, remove the dryer rack and hang it up.

If you own floating lids for your processor, place them on the chemical baths now. Replace the covers on all modules, then open the in-feed lid on the Main Body (this reduces condensation).

Rack Storage: If the processor is used daily, we recommend the racks for any chemical module be allowed to soak in water overnight. This procedure allows a thorough rinsing.

Note: Never wash the entrance rack with water because damage to the circuit board could occur. Simply wipe down the rollers with a cloth. Always keep the entrance rack dry.

Wipe up any dripped chemistry from the processor, table and floor using damp and/or dry paper towels.

Check the chemical overflow containers and empty if needed.

If the chemistry in the replenisher uptake containers is exposed to air, you may wish to put the chemistry in a container better suited to chemical storage. In this case, the replenisher containers should be rinsed. Leave a small amount of water in the bottom of the replenisher container. Reinsert the uptake tubes into the replenisher containers for the night.

Weekly Maintenance:

When the Fujimoto processor will not be in use for several days, such as over the weekend, the following steps should be taken.

After completing the daily maintenance, drain all tanks. If the chemistry will be used again it is best to store it in air-tight containers, with floating lids to minimize oxidation. Wash tanks should be drained to prevent the formation of algae.

Fill the replenishment uptake bottles with water.

Lift the entrance rack off the gear and lay it on the right so it will not turn once power is restored. Slip two sheets of 8 x 10 paper side-by-side into the entrance rack so the paper feed sensors will trigger the replenishment system.

Fill all the chemical tanks with water, less than 50 degrees C, until water is coming out the overflow hoses. Be sure there is plenty of room in the overflow containers.

Turn the machine on and allow it to run for 5 or 6 minutes. The purpose is to take up enough water to flush out the replenishment system. This precaution prevents small amounts of chemistry left in the system from crystallizing and damaging the unit.

Turn the unit off. Drain all the tanks. Put fresh water in the replenishment uptake bottles and repeat the cleaning process outlined above.

Note: When storing the processor be sure the replenishment uptake lines are primed with water. This step will prevent the check valves on the replenishment pumps from drying out.

Note: If a Stabilize/Dry module is in use, replace the stabilizer weekly regardless of use. Before pouring fresh chemistry into the tank, remove the rack, wash it thoroughly and wash the racks.

Monthly Maintenance:

In addition to the maintenance described above the following steps should be taken at least once a month:

Use a non-abrasive scrubbing pad to scrub all the transport rack rollers. Be sure the scrubbing pad does not contain any soap. Dishwashing pads that are safe for use with Teflon pans are best. Rinse racks and inspect them closely. Use a small tooth brush for hard to reach places. With use it is normal for some or all the rollers to become discolored. As long as the rollers are kept clean, this discoloration has no effect on performance.

After draining the chemistry and flushing the tanks and replenishment system one time, drain the rinse water and scrub the tanks with the scrubbing pad. Pay special attention to the area around the top of the tank where the chemistry meets the air. Use paper towels to mop up any loose particles.

Refill the tanks and run for 5 or 10 minutes. Drain the unit again and clean the processor using Processor Clean II. Complete directions are on the package.

Replace all filters. Use damp towels to wipe off the polished surfaces and paper guide on the in-feed lid. Dry the unit completely.

Inspect and clean all parts of the processor that need attention. Be sure to check between modules.

Inspect the dryer rack rollers and wipe down with a damp sponge if needed. Apply silicone grease to the worm gears in the dryer module. This lubrication will prevent the gears from drying out.

Pull the filter drawer out of the bottom of the dryer module and wash the filter under warm running water. Pat the filter dry with clean paper towels and reinstall.

If the equipment is used heavily, you may want perform the monthly cleaning routine more often.

Attention to these procedures will prolong the life of the machine and keep service visits to a minimum.

Tips & Techniques

Compiled By JOBO's Customer Service Department

Water Streaks On Prints

Recently a customer using his JOBO CPP-2 was experiencing the light colored streaks that many of us have seen. This result is normally caused by water drops getting on the paper before the full dose of prewet water, or before the developer. In his case he was sure that drum and lid were bone dry, and he continued to have intermittent streaking.

In a desperate attempt to correct the condition, he added 2 drops of Photoflo to a liter of water that he would use as a prewet of the paper. The report is that this technique cured his streaking problem.

Processor Clean II

We have had several inquiries over the past months regarding the use of Processor Clean in the JOBO processors. The information on the instruction sheet does not seem to be clear, and we are repeating the instructions here for just the JOBO Rotary units:

Processor Clean II Chart:

Machine Volume

ATL-3 14 Ounces
ATL-2 Plus (CPP/A) 7 Ounces
CPE-2 Plus 4 Ounces

These quantities mixed in a full water bath and allowed to remain in the operating processor overnight will clean the machine well. If you want to use Processor Clean II for the cleaning of tanks/drums, or bottles and reels, a more concentrated solution can be made of 4 ounces of powder to 4 liters of water.

Chemical Volumes For 1500 Series Tanks & Drums

Recently it has come to our attention that there is some confusion regarding the 1500 series, especially chemical quantities. I took a tank from inventory, and as soon as I compared the instructions in the box with the information on the side of the box, I found a discrepancy!!! Since this product is printed and packed in Germany there is little we can do to immediately make a correction. However the following chart, which is a reprint in part from the old Journal of Rotary Processing, may be of some help.

1500 Series Tanks for Film Processing:

1510 140ml

1520 240ml

1530 330ml

1540 (1510 + 1520) 470ml

1526 (1520 + 1530) 570ml

1510 + 2-1530* 800ml

1520 + 2-1530* 900ml

1510 + 3-1530* 1130ml

1520 + 3-1530* 1230ml

1500 Series Tanks for Paper Processing:

1526 (1520+1530) 1pc 8x10 61ml

1520 + 2x 1530 1pc 11x14 120ml

For paper processing the assumption is RA-4 processing, and the quantities are the Kodak minimums for the paper sizes involved. In both cases the chemical quantity will provide adequate coverage in the listed tank.

** NOTE: Do not use more chemical volume than that of the bottles originally supplied with the processor. Doing so may over-work the processor's rotation motor.*