



## Issue #1- JQ9401

### User Profile:

## Fred Newman

### **Freelance Photographer, Consultant, Fine-Art Photographer`**

It was inevitable that Fred would become involved with photography as both of his parents were professional photographers at one time in their lives. His mother was an avid amateur photographer during her teenage years and worked in a portrait studio before Fred was born.

By the time Fred was 4 years old he was watching his parents working in the family darkroom and when he was a little older was working with them. This influence didn't make Fred a photographer until the darkroom work in a college astronomy course renewed his photographic interest. After college Fred's career path lead him through various experiences to working with his father in his graphic arts business. At that time Fred spent most of his free time photographing and in the darkroom.

While doing a series of photographs of a friend and her horse 10 years ago, Fred found an avenue for professional photography which lead to him becoming elected to membership to the International Alliance of Equestrian Journalists and to contributing to numerous national and international equestrian publications.

As Fred's business grew he worked with a variety of labs and at one point experienced one of the worst photographic nightmares - when a negative from an important client came back from the lab severely damaged. At that point he decided to do his own color printing. After working with a few different processors and increasing print sales he needed a small reliable replenishable processor capable of handling the large print volumes he had grown to. That processor was the [Fujimoto CP51](#). Fred discovered the added advantage of having a complete in house lab allowed him the speed with which to make tight deadlines and this opened up still more opportunities. He recently purchased a Fujimoto CP31 which was required for the variety of print orders. Around the same time he tried the new MasterClass RA-4 chemistry ([Tetenal RA-4 Chemicals](#)) and with the convenience, consistency and quality results has continued to use it.

Six years ago at the New York photo show he met Ron Wisner, whose influence and enthusiasm helped Fred make the decision to get into large format photography. At the same time after rereading a Paul Schranz article in Darkroom Techniques magazine he decided to get a JOBO [CPP-2](#). Eventually this lead to getting JOBO ATL-3. Fred learned the advantages of rotary processing for sheet film virtually excluding the need for the less precise tray or hanger processing. Also he recently tried the new MasterClass Chrome - Six E-6 chemistry ([Tetenal E-6 Chemicals](#)) and has used it for processing chromes up to 11x14 and was extremely pleased with the results. This chemistry he calls very user friendly because it is very easy to mix in small quantities, is consistent and produces great results.

Fred is moving to Carefree, Arizona where he will be close to the landscapes he wants to photograph. His future will include work with ultra large format photography using his Wisner

12x20 and 20x24 technical field cameras. He is also a regular contributor to Darkroom Techniques magazine. Recently he has begun to conduct workshops and will continue when he moves to Arizona.

All of this experience in the darkroom, especially with modern processing equipment have lead him to enjoy working in the darkroom even more. In fact the only darkroom work done in trays is black and white fiber based prints all the rest is done in processors. What makes working in the darkroom fulfilling is bringing life to exciting images and what makes working in the darkroom fun is finding equipment that works with you and not against you. This goes for all photographic equipment.

## **Feature Article: RA-4 - Switch Now Or Later?**

Since the introduction of [RA-4](#) in late 1989/early 1990 we have been constantly approached by JOBO users who question the process, how it will react, what type of problems to expect, etc.,etc. At this time, with the old favorite EP-2 about to be discontinued by Kodak, we want to go over the process again. Most darkroom workers have a love-hate relationship with new processes, at least for a little while. Perhaps we can increase your love and lessen your hate. It is notable that RA-4 has been with us for nearly four years, and we still get daily calls from JOBO users who have not yet switched to the process, and have questions about it.

When RA-4 was introduced, the apprehension felt by most EP-2 users was heightened by the fact that both the chemistry and the papers were changing, and there was no easy crossover. EP-2 chemistry will not work with RA-4 paper, and RA-4 chemicals will not process EP-2 paper. The initial testing of RA-4 for use in JOBO rotary processors took place in the winter of 1990. Let's examine the process by looking at: 1) the chemistry and its mixing; 2) changeover from EP-2 to RA-4 in your machine; 3) the papers available; and 4) use in a JOBO processor.

### **The Chemistry**

First, RA-4 is more environmentally friendly than its predecessor. This was, of course, by design at Kodak.

Second, RA-4 is more easily mixed. It is true that the developer has three concentrates plus a starter to mix a starting solution, but these are easily handled and there are no long mixing times. The parts go into solution easily. If you can remember, good old EP-2 had four parts for the developer mix, with the benzyl alcohol ingredient in part "A" requiring long mixing times to be sure that it went into solution. The Bleach-Fix for the RA-4 process is composed of three solutions, and again mixes easily.

The keeping properties of the RA-4 solutions is excellent provided the concentrates are kept in full, airtight bottles. Working solutions are best mixed as needed and used that day. Unused working solutions in a full and airtight bottle will last about one week.

Unused working developer solution in partially full bottles, such as in a JOBO processor, will oxidize rapidly. The solution will darken, and in a short time a tar-like residue will form which must be cleaned from the bottle before its next use. This is a messy job, and often it is easier to throw away the bottle; a good argument for not storing unused working developer in part full bottles.

One last caution in mixing: be sure to be ultra cautious about cleaning your mixing vessels between the mixing of the developer and the bleach-fix. RA-4 Bleach-Fix is highly susceptible to contamination with developer. We will talk more about this later.

You have probably noted that all of the conversation has been about Kodak RA-4 and its clones (like Photocolor Master Class (RA). This is RA-4. It can be used as a replenishable solution for tanks and continuous paper processors (like Fujimoto), or it may be used one shot in a JOBO rotary processor. Instructions are given for mixing Starting Tank solutions of both developer and bleach-fix, as well as replenishers for each of these. Be sure to use the starter, and make starting tank developer solution when using the chemistry as a one-shot in rotary processing. The developer and bleach-fix replenisher solutions are only used when you are actually running a replenished system.

Of course there are other chemistry kits available, such as those by Beseler and Unicolor, as well as larger capacity sets from Fuji-Hunt, Russell, and Trebla.

### **The Changeover**

This is a process that is easier than you probably anticipated. Just be sure that the containers and mixing vessels that you used with EP-2 are thoroughly washed, and be sure to inspect for any tar formation. Once this is accomplished you can feel free to proceed with the mixing of the RA-4 solutions.

A word to owners of JOBO Autolabs: run your cleaning program three times to purge both the bottles and the delivery hoses. Our experience is that while bottles may have a tar residual that needs to be cleaned, the delivery hoses do not have that problem, even if they are significantly discolored. The three cleaning programs leave you able to run RA-4 without a problem.

A potential place for lingering tar, especially if you have been processing EP-2 for a long time, is your drums and lids. A cleaning of these might be in order. If, however, there was any real tar buildup, you will notice the results in your EP-2 prints. Happily, RA-4 developer will help to clean EP-2 tar from your drums.

Cleaning of both processors and equipment can be best accomplished with JOBO [Processor Clean II](#).

### **The Papers Available**

It is in this area of available printing material that we really get a perspective of the change that RA-4 represents. We have been used to one or two contrast ranges, depending on the manufacturer. With RA-4 we have three contrast ranges from Kodak, that is Portra, Supra, and Ultra. There are also offerings from Fuji, Agfa, Konica, Mitsubishi, Ilford, and perhaps a few other players that I have not mentioned.

The Kodak papers are rather self-explanatory, with Portra being the lowest contrast, Supra being the general use middle of the road contrast, and Ultra offering higher contrast and super color saturation. These are available in a choice of finishes.

Fuji offers Super FA Type P for Portraits, and Super FA Type 3C for Commercial work. These are both on a regular substrate and are available in a choice of finishes. In addition they offer Fujiflex, which is a high gloss material on a polyester base.

Iford offers Ilfocolor Deluxe (ILRA.1K), a high gloss polyester base with high color saturation and contrast. This paper is meant for exhibition prints and displays.

We should also mention that Kodak, Ilford, and Fuji offer Translucent Display Films ( as Kodak Duratrans ). I have not had an opportunity to use any of the display films other than Kodak Duratrans. The handling of this is slightly different than RA type paper, and we will deal with it more completely in the next portion of this article on using the process in the JOBO processor.

Lest my coverage of all the manufacturers seems a bit cavalier, please bear in mind that all of the manufacturers products are not readily available to me, as I am sure they are not available to you. If we have a chance to run tests on the products of the major manufacturers whose material is readily available in most markets, we have done all that we have time for. For us, that is Kodak, Fuji, and Ilford.

### **Using RA in JOBO Processors**

Lets deal with our suggested times for RA-4 papers first, then we can talk about the deviations from our expected approach to any process.

#### **Rotation Speed:**

CPE-2 - #2

CPE-2 Plus - 75

CPA-2/CPP-2/ATL-1 - "P"

ATL-2, ATL-2 Plus - 75

ATL-3 - 75

#### **Process**

**Temperature: 35° C (95°F)**

**Prewet (this is optional) 0:30**

**Developer 1:00**

**Stop Bath (2% Acetic Acid) 0:30**

**Water Rinse 0:30**

**Bleach-Fix 1:00**

**Final Rinse (3 changes 30 seconds each) 1:30**

#### **Chemical Quantity:**

Kodak recommends a minimum of 110 ml per sq.ft. of paper. This translates to 61 ml/ 8x10" print. This is greater than the minimum quantity which is specified on the JOBO Print Drums, so the Kodak quantity should be used. Revised quantities for the JOBO Print Drums are as follows:

## Drum # Volume

1526 61 ml

2830 122 ml

2840 122 ml

2850 244 ml

3063 367 ml

With JOBO manual processors these quantities can be adhered to. With Autolab processors it is suggested that the fill dial be set to the next higher pumping quantity.

The above information is applicable to both Kodak RA-4 and Photocolor MasterClass RA-4 Chemicals.

Rotation Speed and temperature do not present any problems, but as soon as we start reading the process steps two factors are immediately noted. First, the times for developer and bleach-fix are different than what we had seen in the Kodak literature, and second, the insertion of a rinse step after the stop bath sets off a red light because it is so different from our old EP-2 process we are used to. Lets take these one at a time.

First, consider the times. Autolab processors, and many individuals using the manual processors, start the timing cycle and then introduce the chemistry to the drum. The time of pour reduces the time that the chemical has on the paper. At the end of a cycle the Autolabs, and again many using the manual processors, will start the dump of chemistry 10-15 seconds before the end of the timing cycle. Again, the time the chemical has on the paper is reduced. When I tried using the 45 second developing time recommended by Kodak, the results were inconsistent because I was taking so much fill and dump time out of the short developing time. Extending the developer time to 1:00 minute got rid of the consistency problem. In fact, a 1:00 minute developer time gives us just about 45 seconds on the paper. The same situation is true with the bleach-fix. The validity of this was borne out when control strips run at the 1:00 minute times were in control.

The second area of confusion is the stop bath *and* water rinse between the developer and the bleach-fix. Our experience scarcely allows this option, and Kodak's general information doesn't seem to include this. My first attempts at RA-4 left me with, among other things, a magenta stain on the prints that varied from mild to severe and from slight streaks to an overall cast. The Kodak manual that covers RA-4 is #Z-130 "Using Ektacolor RA Chemicals", and the publication that covers rotary tube and drum processors is #J-39.

The Rotary Tube and Drum publication gives the stop/water rinse information, and delving into the #Z-130 Manual gives us the reasons. RA-4 Bleach-Fix is highly susceptible to changes in the pH of the solution. The amount of carry forward of solutions in a rotary tube system is considerable since there is nothing to act as a squeegee to remove the solution clinging to the print material. Using the process without either a stop or a rinse will result in developer carry forward and a raising of the pH of the bleach. Using only a stop bath will result in a lowering of the pH of the bleach, since an acid stop is a significantly lower pH. The answer is the use of the stop bath to neutralize the developer, and then a water rinse to remove the stop bath so that an essentially neutral print material is submitted to the bleach.

The magenta-red cast or streaking of an RA-4 print is the result of the change of pH in the bleach-fix. Additionally, low pH of the bleach-fix can cause leuco-cyan dye to form. Several users have experienced the magenta cast, but it was so slight that they thought it was a cast that should be corrected with filtration. This approach seems O.K. until the pH of the bleach changes even more, and the cast becomes more pronounced.

Another area that must be discussed is the solution quantity. Kodak has stated that the 61 ml/8x10 print offers the minimum amount of chemical activity needed to process that print (using Kodak chemistry). One of the favorite pastimes of most darkroom workers is to see how far they can reduce the suggested amounts of solutions and still have "acceptable" results. Everyone's experience with EP-2 only contributed to that mindset, because you could make some fairly drastic reductions and still have a good EP-2 print.

Conversations with RA-4 users over the past several years certainly yields a wide range of approaches, and some are using less RA-4 solution than is suggested. I have stayed with the Kodak suggested quantity, but there is really no reason for you not to experiment if you so desire. Keep in mind, however, that if you experience problems, or if you just don't like the appearance of your prints, the FIRST thing to do is increase your chemical quantity to at least the Kodak minimum. You can not make valid judgements from a chemically starved print.

Display materials, such as Kodak Duraclear RA (clear base) and Duratrans RA (translucent base), and Duraflex RA (opaque base for reflection prints) are especially important items in the commercial market. Of course these materials may be processed in the JOBO just as well as the conventional Ektacolor type papers. Duraflex is processed at the same times as the regular papers, however Duratrans and Duraclear require extended times for their proper development. The following chart shows the proper times:

**Prewet 0:30**

**Developer 2:00**

**Stop Bath (2% Acetic Acid) 0:30**

**Rinse 0:30**

**Bleach-Fix 2:00**

**Final Rinse (8x 30-second) 4:00**

Rotation speed, temperature, and chemical quantity remain the same as the Ektacolor papers.

Duratrans and Duraclear have anti-halation backing which must be cleared from the material. Since JOBO paper drums do not allow for a completely free flow of solutions to the back side of the print material, you may see some areas that have an opaque colored area. This is retained anti-halation backing (just as some of you have seen in the processing of sheet film). Place the material in a tray with either used developer, or with a basic solution, such as baking soda in water. (Use 2 to 3 heaping tablespoonfuls to a liter of water.) The object of this exercise is to get the back of the print material exposed to a basic solution (higher pH), which will remove the anti-halation backing. After removal, re-wash the print, then dry.

**Some Final Observations**

All the material above gives you detail on RA-4 and some of the pitfalls. In actual use, and increasing since 1990, we have many fewer calls regarding RA-4 than we ever had for EP-2. Once the user gets past the initial changeover very little is heard from them, unless they decide to cheat on the stop bath/wash sequence between developer and bleach-fix. The large choice of paper and finishes is a pleasure. My own observation is that I have much cleaner and brighter whites with RA-4, and color saturation is excellent.

Make the change. It has to come soon for you anyway, and you won't be unhappy!

## **Article II: Questions & Answers**

*By Paul Rowe*

**Q:** Ever since I switched over to RA-4 for my print processing, I have noticed a magenta/purple staining or swirls on my prints. It doesn't happen all the time--just most of the time and it is driving me crazy!!!! What gives?

**A:** Almost all of us who have done color printing switched over to RA-4 from the familiar EP-2 without doing a lot of study or research on the new RA-4. How could you study--there was precious little written that was available to you, and even less written about RA-4 in rotary processing. The truth is that RA-4 is sensitive to carry forward of even a small amount of developer into the bleach-fix, and even a small amount causes--you guessed it--magenta/purple swirls!! The fix is to institute a 30 second stop bath and a 30 second water wash after the developer and before the bleach-fix. Don't cheat and do just one--you're only dealing with 30 seconds--use both steps. Further, don't use wimpy stop bath. Mix at least the recommended Kodak concentration, or up to 50% greater concentration. This will make your stop-bath between 1.3 and 2.0 % acetic acid, and will STOP the developer action. Once you have used the stop bath, go to the water wash to clean all of the residual away.

**Q:** I have a [Fujimoto CP51](#) to do my RA-4 prints. Just after I have loaded fresh chemicals into the processor every thing works fine. As I continue to process, I begin to see a magenta cast on the prints, and finally an unacceptable overall magenta/pink cast to the entire print. No matter what I do this will not go away until I dump my chemistry and start fresh again. Can you help ?

**A:** Conversation with this customer revealed that they were, of course, using replenisher through the Fujimoto replenisher system. The problem was the setting of the replenisher rate for the developer. An over concentration of developer in RA-4 will cause a magenta/pink overall cast. The fix in this case was to lower the replenishment rate.

**Q:** I just turned my Fujimoto on for the first time after filling it with water, and it is making a terrible screeching noise--what have I done ?? (The phone is then normally held close to the machine so we in Customer Service can be the recipients of the vile noise.)

**A:** The fix to this problem is to read the instruction manual before you try to start the machine. Fujimoto provides long slim necked funnels, and instructs that each bath be filled by inserting the funnel into the filling hole in the bottom of the chemical trough, and pouring the solution through the funnel. In this way the solution is taken by the heater, the circulation pump, and the replenishment inlet, and then into the trough through the spray bar. Failure to follow these instructions may result in an air lock in the hose to the pump and heater. The noise you hear is

the pump, complaining because it has no solution to pump. If you find yourself in this predicament, insert the funnel and pour solution through it to break the air lock.

**Q:** I have a [CPP-2](#) (this could be a [CPE-2 Plus](#), CPA-2, TBE-2, or an [ATL-1000](#)) and when I turned it on this morning it won't hold temperature--it just keeps dropping no matter how long I leave it on. Even if I refill it with warm water, it doesn't heat--the temperature drops.

**A:** A little more discussion reveals that either the owner will turn his machine on in the morning while the trough is dry, and then fill it with hot water in order to hasten the warm-up time, or will fill the machine with water over the desired temperature and then turn on the machine. In the first case, if you do not get the water into the unit quickly after you have turned it on and set the temperature, the thermal overload will detect heating without water, and will shut down the heater to prevent a fire hazard or melt down. In the second case, if hot water is used and allowed to cool down to operating temperature, the problem is with the temperature of the water used. Too hot a water input into the trough will fool the thermal overload into registering too warm a condition, and it will shut down the heater circuit to prevent overheating and melt down.

It is certainly acceptable to use warm water to hasten the heating of a processor. If you want to run a process at 38°C be sure the water which you start with is about 32 to 35°C. This will allow the machine a short warming cycle but will not trigger the thermal overload. Any time you are using this quick warm-up sequence be sure that the solution bottles are up to temperature before you start the process. The bottles do not heat as fast as the water bath, and if you don't wait for them, your first run could be grossly underdeveloped due to low temperature.

If you have the heating problem and suspect that the thermal overload is tripped, you will find the overload button on the left side of the control unit on all of the machines listed except the ATL-1000. Just turn the processor off, press the overload button, then turn the machine back on. If this was your problem the heater will now be working. With the ATL-1000 the thermal overload button is located inside the body of the machine directly under the control panel. Call Customer Service for directions.

**Q:** I have been using JOBO reels for a number of years, but it seems in the last 1 or 2 they have become more of a problem to load. If I can trace this to any cause, it is the advent of the thin base-thin emulsion films that has given me fits. Do you have any suggestions ?

**A:** I have the same problem. At times it seems that if the film bases become much thinner it will be impossible to load. I have started to completely remove the exposed film from the paper backing by gently peeling the adhesive tape from the paper and then folding it under the edge of the film. This gives you in effect two layers of tape on what can be the leading edge of the film when you are loading it into the reel. This stiffens the film enough to be able to load it with greater ease. I have also found that a slight beveled snip on the two corners of the leading edge of the 120 film help it to go into the reel. With the indented segment on each flange of a JOBO reel, I find that 120 in particular has a tendency to bind as the film passes through that segment. The beveled corners help the film to ride past the indented segment.

**Q:** Every time I try to figure out how I can re-use my chemicals so that I can use them to maximum capacity, I get so confused that I give up. Can you help at all with this??

**A:** This is a question that we get often, and I have always tried not to answer it in print because it is so difficult to explain in writing. Finally a good customer wrote asking the same question, but he explained how he had been figuring this so well that I am going to try and answer this using the framework of his explanation.

All chemical manufacturers typically give times for their solutions on a first third, second third, and third third basis, but assessing when to use these times, and when you are in what third of the strength of solution is the problem. Lets assume that you want to process six rolls of 135-36 color negative film.

Make 480ml (approx. 16 oz or 1 pint) of your solutions. You can then process 2 rolls at a time, as follows:

1st 2 rolls 3:15 sec.

2nd 2 rolls 3:25 sec.

3rd 2 rolls 3:35 sec.

This assumes you are using all or part of your 480 ml, and then mixing the used portion back into the unused portion. Now thus far it is all logical and straightforward. Suppose you want to process 4 rolls first, and then do the next two. Four rolls in the 480 ml is the insertion of four rolls in fresh solution, and they would all be treated as if they are first third, or use 3:15 for your first developer time. Now what do you do with the last two rolls? You are dealing with a quantity of developer that has had four rolls put through it. These four rolls represent 2/3 of the limit allowable in this quantity of solution, so the two remaining rolls are the last third of the allowed limit. As such the last two films should have a 3:35 developing time. You can follow this type of reasoning to come to a developing time for any combination of developer quantity and film quantity. A word of caution, however, if you make any mistakes with this reuse of solutions you stand to loose your vital film. There is no doing it over. Let your mistake be on the side of putting less film through the solution and knowing that you will have adequate developer activity.

**Q:** I have noticed that Kodak, in their C-41 chemical packages, always makes a distinction between 400ASA, 1000ASA and Vericolor Films, and the lower speed Kodacolor films. None of the other brands of chemicals even mention this. Why is this and how do I handle it??

**A:** First, believe that Kodak knows what they are talking about. In general the 400, 1000, and Vericolor films have thicker emulsions and more silver. This means more developer activity is required and consequently a lesser number of films can be processed in a given quantity. This becomes a problem that you need to consider only if the bulk of the films you are processing through any given quantity of developer are in the special group. Most amateurs will not have a large percentage of their films in this group, and it is on this basis that other chemical manufacturers can disregard the warning that Kodak gives on the number of films processable depending on type.

So how should you handle this? If only one or two of your rolls are going to be in the 400,1000,Vericolor group for every liter of solution you make up, you can disregard this whole thing as no problem to you. If a more significant portion of your films are in this group, I would treat my chemistry just like Kodak suggests, even if I was not using Kodak chemistry. Use the time extensions and limits on number of rolls just like they call for. This is a of course a conservative approach, but you are dealing with film. You often can't re-expose if you botch the job.

**Q:** I have a manual JOBO processor, and I am always confused about the use of the rotation control switch. When should I use rotation in both directions, and when should I rotate in only one direction ?

**A:** The only process at this time that calls for one way rotation is Disc Film. ALL other processes,both film and paper, are best with bi-directional rotation.

# Tips & Techniques: CPP-2 & CPA-2 Processors

Occasionally there will be a problem, especially with print processing in a rotary processor, where the end of the drum opposite the motor head will float. This yields a band on the end of the print where the developing solutions were unable to reach. The cause of the problem is too much water in the upper red trough. If you have already turned the black dial at the end of the red trough so that it is at maximum drain (the flat section of the dial is on the bottom), and the drum still floats, your problem is a "high output pump". The pumps for the [CPP/CPA](#) units are not calibrated to a tight tolerance of output. Normally there is enough leeway in the adjustment of the black dial to cover the slight output variations. When you have been lucky enough to receive a "high output" model there are adjustments necessary to allow the extra water to drain to the lower trough of the processor.

The modification of choice is to enlarge the drain hole which is located behind the black dial. This will allow more water to drain to the lower trough, and the black dial can then be used to regulate the water level in the red trough. There are 5 Phillips head screws located around the perimeter of the red trough. Remove these and you will be able to lift the red trough from the processor. The black dial is held from behind with a large Phillips head screw. Remove this screw and you will have access to the drain hole. Enlarge the hole, best done by the use of a half round file or rasp. Then replace the black dial, and re-install the red trough on the processor. This enlargement should allow the excess water to drain from the trough and keep your print drum from floating..

**Formulas for mixing Acetic Acid Stop Bath** often seem confusing. Since there are a number of different concentrations of acetic acid, plus the fact that you may want to mix different concentrations for your own use, we will attempt to give you a chart which will try to clarify the situation:

## Acid Source - Mix w/water - % - Mix w/water - %

Kodak Glacial Acetic Acid - 13ml/liter - 1.3 - 20ml/liter - 2.0

Kodak Indicator Stop Bath - 16ml/liter - 1.3 - 25ml/liter - 2.0

Kodak 28% Stop Bath - 48ml/liter - 1.3 - 72ml/liter - 2.0

Photo Technology Indicol Intern'l - 50ml/liter - 1.3 - 75ml/liter - 2.0

The first column is the standard Kodak recommendation for concentration of stop bath (approx. 1.3% mix). The second column gives you the figures for a slightly more concentrated mixture. In all cases the instructions are to use the quantity of acid plus water to make 1 liter. ALWAYS ADD THE ACID TO THE WATER when you are mixing.