

Paterson FX-50:

Single Bath, Two Bath Options For Maximum Versatility

by Roger W. Hicks



Paterson's latest black and white developer, FX-50, is extremely interesting: fascinating, even. As far as I know, the approach that designer

Geoffrey Crawley has used is unique. Not only is it an ascorbate developer containing no poisonous metal or hydroquinone (thus avoiding hazardous material or "hazmat" regulations): it is supplied as two stock solutions, but it is not normally used in the conventional two-bath manner.

Rather, it may be used either one bath or two bath, but the recommended two-bath approaches involve a most unusual split-developer technique, and even the one-bath approach allows for different dilutions of the two parts, one dilution optimized for all-round optimum quality, the other for maximum film speed. It should also be possible to devise a dilution for finest grain, with proportionately reduced film speed, though this is not given in the instructions. This is a long review for a new developer, but then, there are a lot of different ways you can use it.

Before going any further, it is worth saying that none of this stops FX-50 from being easy to use. The basic one-bath approach could not be much easier. You take 20ml each of A and B, and make them up to 300ml of one-shot working solution. That's it. That's what I do, but then, I've long believed in making life as simple as possible.

Devotees of the Zone System and others who prefer to make life complicated will find however that they can have endless fun with dilutions and development times. They will also find that they get much more consistency than they can if they reuse classics such as D-76, where they have a choice between accepting the build-up of hydrobromic acid (so that the activity of the developer falls each time it is reused) or using a fully "seasoned" (replenished) developer that wipes up to a stop-off film speed.

Used as already described, FX-50 is a typical Crawley developer: it does exactly what it promises, with no fuss or confusion. As with any developer, you may need to make minor adjustments to the development time to get precisely the results that you like best, but just following the instructions that come with it will give you first-class negatives with what most people would regard as an optimum blend of sharpness, grain, and acutance. The film speed is likely to be at least as great as the ISO speed on the box, and with some films, a true ISO speed increase of up to $\frac{2}{3}$ stop should be obtainable. In other words, Ilford HP5 Plus (ISO 400) should deliver a true ISO 650, or Kodak Tri-X a true ISO 500.

Maximizing Film Speed

The other single-bath option, for maximum film speed, is less expected. The working solution is made up with less of Part A and the same amount of Part B: for 300ml, with 15ml of Part A and 20ml of Part B. Development time is then prolonged by 50 percent as compared with the basic single-bath option. This gives a further speed increase of up to one stop. This speed increase is no longer to ISO conditions of toe speed and contrast—it is an Exposure Index (EI) rather than



You know you have stumbled on something remarkable when you put a magnifier on a 6x enlargement from Ilford HP5 Plus at ISO 650 (dilution 1+1+13) and still see extra texture and detail in things like the ropes in this shot. (Voigtländer Bessa-R, 90mm f/3.5 Apo Lanthar, yellow filter.)



The finest lines in the rigging in this shot are about $\frac{1}{200}$ mm (1/500") wide in a 6x enlargement, which means they are $\frac{1}{1200}$ mm (1/3000") wide on the negative. Sharp or what? (Ilford HP5 Plus at ISO 650 (dilution 1+1+13), Voigtländer Bessa-R, 50mm f/1.5 Nokton, orange filter.)



With Ilford Pan F Plus, at a true ISO of 64 or maybe 80, grain is visible only with a strong magnifier, and tonality is excellent. (Ilford Pan F Plus at ISO 64 (dilution 1+1+13), Voigtländer Bessa-R, 50mm f/1.5 Nokton, orange filter.)

an ISO speed—but the loss of quality will be imperceptible to most people, and is likely to be very acceptable to anyone who actually needs the extra speed.

Development times are on the long side of average. At 20°C, 68°F, at the two dilutions, they range from 6/9 minutes for Ilford Pan F Plus to 13/19.5 minutes for Ilford HP5 Plus or Kodak TMY 400. No times are given for other temperatures, but the usual rule of thumb is to knock off $\frac{1}{3}$ of the time at 20/68 when working at 24/75.

At the recommended times for Paterson Acupan 200, which seemed like a logical film for the sensitometric testing, I saw a gamma of close to 0.70. This is rather above the ISO gamma of 0.62, but it is exactly what I prefer for my (diffuser) enlarger, and it easily justified the claimed increase in film speed. Acupan 200 is a true ISO 200 only in speed-increasing developers—in D76, it's about 125 or at best 160—but at a gamma of 0.70 or thereabouts I saw an easy EI 200 even at the recommended times with the standard development.

Using the technique for increased speed with the same film, I saw a further $\frac{1}{2}$ to $\frac{2}{3}$ stop increase; even with a slightly reduced time (10.5 minutes instead of 11.5) I still saw $\frac{1}{3}$ to $\frac{1}{2}$ stop over the “standard” approach, but at something very close to the ISO gamma of 0.62. This is a very impressive per-

formance indeed, and at least with this film, this is one of the best “push” developers I have ever seen: the actual ISO speed may have been in excess of 200, which is something I have never seen before with this film. When I heard of some photographers rating Acupan 200 at 320 I was deeply suspicious but I am prepared to concede that this may be quite possible at a gamma of 0.70. I would not have much hesitation in rating Ilford HP5 Plus at EI 1000 using this technique.

FX-50 can also be used for “push” films such as Fuji Neopan 1600, Ilford Delta 3200, and Kodak TMZ P3200: development times are 14/21 minutes, 11/16.5 minutes, and 16/24 minutes respectively, though (rather irritatingly) film speeds are not given. I'd suggest starting points of 1000/1600 for Fuji, 2500/5000 for Ilford, and 2000/4000 for Kodak, but these are probably conservative as I like a little more exposure than most people: you may well be perfectly happy at 1250/2000, 3200/6400, and 2500/4000 respectively, maybe even faster.

Unexpectedly, times are also given for Kodak Technical Pan: 5/7.5 minutes. I did not try this, as I find Tech Pan to be far more trouble than it is worth—I'd rather use a conventional film any day—but in theory there is no reason why this style of developer should not work well with Tech Pan. You

might however need to spend some time refining the development times, as Tech Pan can be very critical indeed in this respect. In any case, I might be more inclined to try one of the two-bath methods, as described later, for this film.

Recommended agitation with all dilutions, including the two-bath techniques, is four inversions per minute. Minimal inversion (and this is certainly minimal inversion) gives maximum sharpness and finest grain, but lower toe speed, so for maximum speed at the appropriate dilution, I might be inclined to give four inversions every half minute or (better still) constant agitation, in the latter case knocking 15 percent off the time.

There's a table with the instruction leaflets that gives the required amounts of A and B for 300, 600, and 1200ml of working solution, at either concentration, but if you need different amounts such as the 450ml I use in my two-reel Kinderman tanks, you must either mix up 600ml and throw away 150ml, or calculate the volumes needed. Fortunately this is not difficult.

With the basic dilution, you work out how much developer you need, and divide by 15. As A and B are used in equal quantities, for 450ml you need 30ml of A, 30ml of B, and 390ml of water. In other words, the dilution is 1+1+13.

With the “push” concentration,

you divide by 20 for Part A and 15 for Part B. Thus for 450ml you would need 22.5ml of A, 30ml of B, and 397.5ml of water. This is rather less memorable than 1+1+13! Of course you don't need to measure the water separately: you just top it up to the required amount.

The Two-Bath Technique

Now for the two-bath techniques. In conventional two-bath developers, Bath A contains the developing agent, plus a preservative; Bath B, the alkali. In the first bath, the emulsion soaks up the developing agent, but development is slow: if you use *only* the first bath, you get very fine grain, much reduced film speed, and very long development times. In the second bath, the alkali energizes the developer, with an automatic compensating effect. “Compensation” means that the developing agent exhausts faster in the highlights (where there is more silver to develop) but works longer and harder in the shadows. Result: more film speed, but without runaway highlights. Clever, eh?

The trouble is, many modern films are ill-suited to this technique. There are all kinds of emulsion additives such as wetting agents and development accelerators, and of course, the emulsions are harder and thinner than was normally the practice in the 1930s, when two-bath development was at its height, so they soak up less developer.

Although it is theoretically possible to use FX-50 as a conventional two bath, it is very, very slow. When I spoke to Crawley about it, he laughed and said, “Leave it in the airing cupboard overnight.” If you want to try FX-50 as a conventional two bath, I'd suggest trying Part A full strength for 5 minutes, then half an hour in Part B 1+9; agitate every 5 minutes or so. Part A could be reused repeatedly. But I have to admit I haven't tried it, and besides, the two recommended but unconventional ways work fine, *if you* like compensating developers, which generally I prefer to avoid.

The first option is to make up two batches of developer, one full strength (“normal” dilution, 1+1+13) for use at 20°C, 68°F, and one half strength (1+1+28) for use at 30°C, 86°F. Develop the film for half the standard time in the first solution, at 20/68, then drain it out. Immediately and without rinsing, tip in the second solution and develop for the other half the time at 30/86. As far as I am aware, this is the only developer ever to recommend a split-temperature technique.

The sudden rise in temperature

of 10°C, 18°F, is a tribute to the hardening of modern films—though I wouldn't want to try it with Kodak Tri-X until the revised film comes out this autumn—but the way it works is very cunning. Partly, the developer acts like a classic two bath, with the absorbed developer from the first bath exhausting faster in the highlights than in the shadows during the second part of development, and partly it acts like a compensating developer, exhausting rapidly because it is weak and hot. In popular theory, the latter effect should be particularly noticeable with an ascorbate developer, as experience with very dilute Kodak Xtol has shown: this is why Kodak recommends minimum dilutions and volumes for their ascorbate developer.

My own suspicion is that the popular theory is less important than the practice, and that in practice, a well-buffered ascorbate developer at the appropriate pH won't suddenly exhaust in the way that weak Xtol does. But life isn't long enough to run all the necessary

titrations on fresh and part-used developers, and even if it were, it wouldn't tell anyone much that was of use in the real world.

Two-Bath Option, Part II

The other two-bath option is more economical and arguably even more radical. This time, you only need one solution, at the usual 1+1+13 concentration, but you also need a container of water at a truly impressive 35°C, 95°F.

Again, the first half of the development is carried out with the usual stock solution, but halfway through, you tip out the developer into a suitable container: pour half of it away, and add an equal volume of water to the remaining half at 35/95. This gives you a working solution at about 27-28°C, 81-82°F.

Tip this into the tank (again without rinsing), and develop for $\frac{3}{4}$ of the standard time. In other words, if you are developing Kodak T-Max 100 (recommended time for standard development 12 minutes), you develop it for 6 minutes at 20/68 with the standard dilution, then for 9 minutes (75 percent of

the full time) at the higher temperature. The results are similar to the first option, with a built-in compensating effect. I found that the changeover (tip out, dilute half, tip back in) took me just under 45 seconds, which I included in the full development time.

You may now understand why I opened my review by saying that this is a fascinating and probably unique developer. Used in the way I intend to use it, at the basic 1+1+13, it gives an excellent balance of speed, grain, sharpness, and tonality: it may even replace FX-39 in my affections, which is probably not what Paterson intended, as "cannibalized" sales are never welcome. A side benefit of the two-bath formulation is that the developer is very long lived: Part B lasts pretty much forever, while Part A is at least as long lived as any other normal developer. It should be discarded when it develops a pale yellow tint.

But as I say, I like to keep life simple. Plenty of photographers don't, and for them, FX-50 proba-

bly offers more options for customizing their film processing than just about any other developer on the market. I was very, very pleased with the results I got from Paterson Acupan 200 and (for pictorial testing) from Ilford HP5 Plus, chosen as one of my standard films.

Just to push the envelope, I also exposed a roll of Ilford Pan F Plus at EI 64 and processed it for the recommended time, and I was pretty amazed at how well that came out, too, despite the fact that I generally reckon that Pan F Plus requires a fair amount of fiddling about to find the optimum EI and development time. Try this with your favorite film, either the easy way (like me) or the hard way (twin bath). I think you'll be impressed.

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