

# Developing Film at Home (or anywhere!)

I have been developing film at my house for over three years now. In this presentation, I plan to describe the tools and materials that I have used and to discuss my experiences with them. Like so much in photography, there are many ways to do the same thing, and I don't believe that my way is the only or even the best way. I have found that the methods and materials that I use suit me just fine, but I encourage each of you to take what you will from my experiences and come up with whatever processes make the most sense to you.

One final note before I jump in: The purpose of this exercise is to discuss developing film away from the lab environment, whether it be at your home, someone else's home, in a hotel, or in an RV. What I am **NOT** discussing is the development process itself. That subject deserves and requires its own discussion or indeed many discussions.

## What are the differences between developing film at home versus the lab?

The photography lab at Palomar College is a great, and convenient place to develop your own black and white film. The lab contains all the equipment, including tanks, reels, changing rooms, chemistry, washers, and dryers. So why bother with this discussion at all? Well, off the top of my head, there are a few unfortunate truths about the lab:

1. It's not always open.
2. You won't be able to use it forever. 😞
3. You are limited to the chemistry available in the lab.
4. You cannot process color film.

Considering the long list of items at your disposal in the lab, it can make the prospect of developing film at home seem quite daunting. Rest assured that things are not as difficult or complicated as they seem, though. Given the smaller scale of the outfit that you will have outside the lab, it lends itself to be more flexible, which can be a bonus.

# The space

As I mentioned in the opening, this process can be done at your home, someone else's home, in a hotel, or in an RV. I know because I have done them all. However, it can't be done just *anywhere*. To do this properly, you should take the following into consideration before developing:

## 1. Dust

- a. Dust is a film killer, and nobody likes to spend endless hours at the spot toning station. As much as possible, choose a location that is dust-free.

## 2. Water

- a. **Chemistry** – Much of the chemistry we purchase comes in the form of either powder or liquid concentrate and therefore requires the addition of water. It is often advocated that we use distilled water for this purpose, but I have had good luck so far with Vista tap water.
- b. **Processing** – Washing our film takes a fairly significant volume of water. If you are in a location without running water, you will need to be hauling in a significant amount of water yourself. It may not be as much as you think, though, as Ilford points out in [this document](#) (quoted below).

*i. "For minimal water usage the following method is well tested:*

- 1. • After fixing, fill the spiral tank with water at the same temperature, +/- 5°C (9°F), as the processing solutions. Invert the tank 5 times.*
- 2. • Drain the water away and refill. Invert the tank 10 times.*
- 3. • Once more, drain the water. Invert the tank twenty times and drain the water away.*
- 4. • Finally rinse with a few drops of ILFORD ILFOTOL Wetting Agent (1:200) added to the rinse water"*

## 3. Temperature

- a. As you all should know by now, the chemistry of our developer should be 68 degrees Fahrenheit. If you are in a location without climate control, you will need to take additional steps to ensure that the chemistry is not too hot or too cold. *I have used hot water baths, a refrigerator, and even a freezer to help me overcome this obstacle.*

## 4. Film Drying

- a. You will need a space to hang your film while it dries. In the lab, we have the luxury of having large film dryers at our disposal, which perform this duty extremely quickly and with minimal dust. Unless you are extraordinarily awesome, I doubt you will have the same luxury at your home. But having a clean space that is out of the way enough to let film dry for many hours is necessary. *Showers work great for this step.*

## 5. Chemistry Storage

- a. This isn't directly tied to the development process, but it is something that you will want to figure out before jumping into the at-home-development world. As you will hopefully see in this presentation, you don't need to have enormous storage tanks taking up precious square footage, and you will not want to mix chemistry every time you process film, and then dispose of it all afterwards.

**So... what spaces do I use?** I mainly do my film processing at my kitchen sink! While its true that I do have a dedicated darkroom at my house, it doesn't have a sink. If it did, I would likely process my film in there, if for no other reason than that's where I store my chemistry, and I wouldn't have to carry it into the house and back out each time I develop film. I start with getting all the dishes and any food completely out of the way, then I give the sink and the counters a decent cleaning before I begin.

I wash my film in the kitchen sink, and then I take it out to the darkroom where I hang it over the shower pan to dry. I typically don't develop and print on the same day, but during warm months, I have been known to develop in the morning and print my fully dried negatives in the late afternoon.

I mix my chemistry in the kitchen as well. It is easy to do and doesn't require much working space.

**NOTE: If you utilize your kitchen space for chemistry mixing and/or film development, *PLEASE PLEASE* clean the kitchen thoroughly when you are done.**

# The materials

Now that you have a space all set for processing, the first thing you will need to do is to buy and mix your chemistry. I will not go into the qualities of different brands and types of chemistry, but I will note which ones I have used. I highly encourage each of you to experiment with different films, papers, and chemistry combinations to come up with a formula that works best for you and your work.

## Chemistry Storage

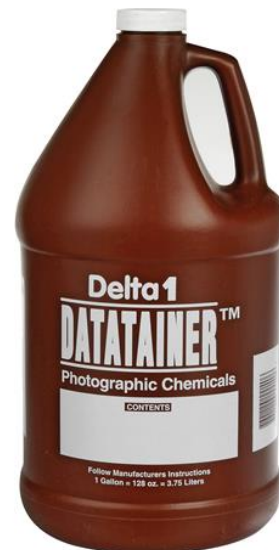
To begin, you will need chemistry storage containers. Depending on the type of chemistry that you intend to use, this could be as small as 1 quart. There are some that are intended specifically for photographic chemistry, but anything could work. Make sure that it has a good lid, and that it is not made of clear material. Some people prefer to use amber glass bottles, but I only use those for my color chemistry (and they get almost no use). I don't like to use breakable materials if I can help it.

I have several bottles that are essentially just like these:



[One Quart Bottle](#)

\$7.00 each at Adorama



[One Gallon Bottle](#)

\$8.00 each at Adorama

I was also able to take advantage of some great deals on a few of these 2-gallon tanks, so I have a few of them. **NOTE:** *Unless I am doing quite a bit of volume, these are too big for me.*



### [Two Gallon Storage Tank](#)

\$40.00 each at Adorama (don't forget to add the \$20.00 floating lid for this much chemistry)

You can find different brands of similar items and almost all photography retailers (including George's Camera) sell this type of container, so you don't have to stick with this exact one. They're not too expensive, and it's better to have one or two too many, than to not have enough. However, you really should make sure that the chemistry you want to use will work with the size container that you get. For instance, D-76 powder comes in a package that makes one gallon of chemistry. Trying to figure out how to only use  $\frac{1}{4}$  of the powder and then properly store the remainder would be a nightmare. It would be much simpler to just get the one-gallon container.

**How many do you need?** If you are just developing film, and not setting up a darkroom, I would say that you need 2-4 of these. Even if you get the one-gallon sizes, you're looking at spending between \$16.00 and \$32.00 here.

### **Chemistry Mixing**

I almost want to label some of these items as "optional" because I was able to get by without most of these for a good amount of time. This was mainly because all the chemistry I was using was designed to make one gallon at a time, so I was able to just fill up my one-gallon container and mix in there. This seemed to work perfectly fine, so it might be a good place to start. That said, I always use graduated beakers now along with a stirring paddle. A funnel also makes this process so much easier. The volume of your beaker is somewhat up to you, but if it's too small, you will have to fill it several times.



[Paterson 1 Liter Beaker](#)

\$11.49



[Paterson 4.25" Funnel](#)

\$7.19



[Chemical Stirring Paddle](#)

\$4.95

**NOTE:** *I also use my beaker during the development process, so it pulls double duty.*

You really don't **need** more than one of each of these. Some people don't like to share anything between their different chemistries, meaning that they have a mixing paddle for developer, and another for fix, etc. I have one set that I use for everything, and so far, it's been fine.

You're looking at about another \$20.00 here, which brings our running total to between \$36.00 and \$52.00.

### Tanks, Reels, and Tents

Some of you prefer to use stainless steel tanks and reels, and that is just fine. Anybody that's been around me in the lab knows that I prefer plastic Paterson tanks and reels. There is no wrong answer here. No matter which you use, you will still need to change your film in complete darkness. As mentioned before, I have a darkroom at my house, and I will lock the door and turn off all the lights (including the safe lights) and change my film in there. When I don't have access to my darkroom, I use my film changing tent.



[Film Changing Tent](#)

\$49.95

While I have never done it personally, I have talked with many people that have changed film in their bedroom closet, or in a windowless bathroom with a towel on the floor to block any light under the door. Some have even gotten under lots of heavy blankets and done it that way. Whatever you decide to do, make sure that it's **pitch black** and dust free.

If you are developing 35mm or 120 film, the Paterson 115 is a great place to start. It can process two rolls of 35mm on a single 120 roll.



[Paterson PTP1 15 with two Reels](#)

\$33.70

If you are determined to stick with stainless, you will be paying considerably more for the privilege.



[35mm Stainless Reel](#)

\$44.95 each



[120 Stainless Reel](#)

\$64.95 each



[Stainless Tank](#)

\$24.95

For two 35mm reels, you are paying \$33.70 for the plastic Paterson, or \$114.85 for the stainless-steel option. Additionally, the Paterson option already works for 120 film but the stainless option will cost another \$64.95.

I mainly process several rolls of 120 and/or several sheets of 4x5 when I develop my own film. For that reason, none of the options above work for me. Sticking with the Paterson style tanks and reels, though, I have two 3-reel tanks along with a few 4x5 film inserts for them. With this system, I can process up to 4 rolls of 120 at once, or 12 sheets of film at once. For many of my portrait sessions, I expose 2 rolls of 120, and 6 sheets of 4x5, and I can develop them all at the same time.



[Paterson 3 Reel Tank](#)

\$45.95



[MOD 54 4x5 Sheet Adapter](#)

\$64.99

There are many other options out there, and some can be quite spendy. Hopefully you see here that you don't need to let it get out of hand, and that for a reasonable investment you can get started. True, I have spent a couple hundred dollars on my tanks and reels, but I have some specific needs that require that extra investment. If you are only shooting on 35mm or 120, you can start for much less than I have spent.

# The chemistry

As I mentioned before, I don't intend to document the qualities of different chemistries, but I will touch base on what I've used before. There are two chemicals that you must use for this process, and a third is optional. The most obvious requirement for developing film is DEVELOPER. I hope this goes without saying, but if you are shooting B&W film, you need to use B&W chemistry, and that includes the developer. Additionally, you will need to get FIXER. The optional chemical is STOP BATH. I use water at home, and we do the same here in the school lab, but some prefer a chemical stop. I don't have any insight to the pros and cons of water versus chemical stop, but I will say that water has always worked just fine for me personally.

## Developer

This might be the sexiest subject in this entire discussion. For the uninitiated, the coupling of different film stocks with different developers can result in significant variations in the negative. Some combinations produce more or less grain, more or less detail, and more or less contrast. Depending on what you require for your final product, this choice can be vitally important. If you are primarily scanning your negatives, you may desire a flatter, lower grain negative. But then again, perhaps your subject matter or personal style dictates a contrasty and grainy negative. You may find that you like one combination of film and developer for scanned negatives, and a different combination for darkroom printing.

The possibilities are vast and the journey in finding your favorite formulas can be fun and rewarding.

Here in the Palomar Photo Lab, we mainly use EcoPro Ascorbic Acid developer, which is a version of XTOL. It is quite a wonderful developer with many different film stocks, and its eco-friendliness is bonus as well. *Please note that if you decide to use this at home, then package makes 5 Liters, which is a bit more than one gallon. As such, you may need to get a 1.5-gallon storage container.*

We also stock D-76 for the 105/210 students in case they want to use that as well.

Below are some developers that I have used many times at home with great results:



### [EcoPro Ascorbic Acid Developer](#)

Chemical Powder

\$14.99: Makes 5 Liters

Approx. \$0.88 per 35mm roll

Approx. \$1.49 per 120 roll



### [Ilford Ilfosol-3](#)

Liquid Concentrate

\$13.82: Makes 5-7.5 Liters

Approx. \$0.81-\$0.53 per  
35mm roll

Approx. \$1.38-\$0.92 per  
120 roll



### [Kodak D-76](#)

Chemical Powder

\$9.95: Makes 1 Gallon

Approx. \$0.71 per 35mm  
roll

Approx. \$1.24 per 120 roll

In the Spring 2022 semester, the intermediate and advanced darkroom students did a project where they tested different combinations of film and developer. I would encourage you to reach out to any of those students and talk about their experiences, and which combinations they loved and which they hated.

For the record, my favorite combinations are Ilford Delta 100 & D-76, and Ilford HP5+ & Ilfosol-3.

***NOTE:** Some photographic chemistry is designed to make a "stock solution". This can be confusing if you don't pay attention. The concentrate or powder might make one liter of stock solution, but then you can use various dilutions for your final product. For instance, Ilford Ilfotec HC comes in a liquid concentrate that is first diluted to make the stock solution. That stock solution can then be diluted to between 1+11 and 1+47 times! Like I said, it can be confusion, and not understanding your chemistry can result in bad development.*

## Stop

As stated above, I just use water as my stop, and if you're just getting started in developing at home, I would encourage you to do the same. Chemical stop is not expensive, but I'm not sure it's absolutely necessary for film. A quick glance online shows that you can get Kodak Indicator Stop Bath in a liquid concentrate for about \$6.50, and that will make 8 gallons. You will, of course need to get a storage container for that as well if you go that route.

## Fixer

First and foremost: **DO NOT POUR USED FIXER DOWN THE DRAIN!** Used fixer contains heavy metals and should be recycled accordingly.

Admittedly I have not spent much time or energy experimenting with different fixers. All the ones that I have used at home have been from liquid concentrations, but there are powder options as well. Fixer can be reused repeatedly until it's "spent" or saturated. This can take a long time, so the cost of fixer keeps going down with usage. I'm sure some are better than others, but I have yet to find any real differences. I have used Ilford Rapid Fix, and one of the Photographers' Formulary models as well.

I hesitate to quote prices here, but expect to spend less than \$20.00 on fixer, and it could possibly last you a few years.

How do you know when your fixer is spent? Well, you can just keep developing film rolls until they stop clearing fully, or you can get some "Hypo-Check", which is a small dropper that you use to put a few tiny drops into your fix. If the drops turn milky, then the fix is spent. If they remain clear, the fix is good! Hypo-Check can be a bit expensive (\$15.00?), but one tiny bottle will last ages and ages.

# Miscellaneous

While I have discussed the main items required, there are a few additional items that you might find will ease your at-home film development.

- Thermometer
  - I use a laser style thermometer, and it seems to be accurate enough. This is another area that certain people will want to get ultra-scientific and precise.
- Film Clips (for film drying, could be laundry clips)
- Separate beakers for measuring and holding chemistry during processing

Since these items can vary so greatly, I won't even bother to give cost estimates here. You can certainly spend quite a bit on these items, or go super cheap.

# Conclusion

I think that about wraps is up the discussion, I think. Before signing off, I think it might be a good idea to compile a breakdown of up-front costs to develop B&W film at home:

ITEM	COST	COUNT	TOTAL
1 Gallon Chemical Storage Container	\$8.00	2	\$16.00
1 Liter Graduated Beaker	\$11.49	2	\$22.98
Funnel	\$7.19	1	\$7.19
Stirring Paddle	\$4.95	1	\$4.95
Film Changing Tent	\$49.95	1	\$49.95
Paterson Tank w/2 Reels	\$33.70	1	\$33.70
Film Developer	\$15.00	1	\$15.00
Fixer	\$15.00	1	\$15.00
<b>GRAND TOTAL</b>			<b>\$164.77</b>

Hopefully this shows just how accessible this undertaking can be. Remember that in the table above, the chemistry is the only cost that is renewed as you move forward. The first developer that you purchase should be able to process about 17 rolls of 35mm film. Film developing at a lab will cost at least \$10.00/roll, so right off the bat this would save you money. The more you develop yourself, the better that price/roll gets.