

STANDARD Black & White Film Developer

Like all other Sprint chemicals, we supply it as a liquid concentrate. You dilute it 1:9 with water, to make a working solution. In other words, if you are going to develop 4 rolls of 35mm film in a typical stainless-steel tank, which holds 1 liter, you will need to combine 100 ml of concentrate with 900 ml of water.

One liter of STANDARD concentrate will make 10 liters of working solution, enough to develop at least (50) rolls of 35mm 36 exposure film, (or enough replenished solution to develop 110 rolls). Directions provided here are for basic negative processing, using the developer once only.

100ml STANDARD B&W Film Developer Concentrate

+ 900ml Water

= 1000ml STANDARD B&W Film Developer Working Solution

Procedures for Processing B&W Negative Films

Time, and temperature (- and agitation – more on that later –) are very important in film developing. The warmer the developer, the faster it acts, while cool temperatures slow things down. Develop long enough and hot enough, and your film will all but turn a solid black; too short a time and too cold will hardly give you anything. For a rich, easily printed, full gradation image, you have to get it right. While experience – and keeping good notes on what you did – is the best teacher, Sprint's Standard Film Developer Time Chart (here) will give a good starting point.

Sprint tries to make things easy for you – within limits you can process film at room temperature – the temperature at which everything tends to end up anyway* – and adjust developing time according to our chart, rather than struggling to maintain exactly 20 or 24 degrees Celsius.

*In very dry conditions, desert or a heated building in very cold weather, all solutions will tend to evaporate faster than usual, which may cause a degree or two of unexpected cooling.

Chart Letters

Different films develop at different speeds; Sprint's Chart Letter summarizes this information and gives you a convenient way to find the appropriate developing time at **your** room temperature. You can develop any films with the same chart letter together in the same tank.

To find the recommended development time for your film, find it on the [STANDARD Film Developer Time Chart](#), and read across to the column with your working temperature at the top. For example, for Ilford HP5+ at 75 degrees F/24 degrees C we recommend 6:30 – that is 6 minutes 30 seconds. With experience, you may want to make your own adjustments.

If your working temperature is not on this chart, simply note the letter next to your film (for HP5+ that would be “O”), and go to Sprint’s Development Timing System Chart ([here](#)). Find “O” in the first column (“CHART LETTER”) and you can read off from that row all the different development times for the different temperatures at the heads of the columns. So, if you are going to develop your HP5+ at 23 degrees C/73.5 degrees F, you will find 7:15 – 7 minutes and 15 seconds.

This all assumes you have photographed a “normal” subject, with a good quality lens/camera, in “normal” light (rather than very flat or very contrasty lighting), and have not waited too long (more than a handful of days, maybe a week or two) before processing. We assume you are going to make enlargements using a condenser enlarger, variable-contrast paper and a # 2 and a half filter.

If you have done something else, you can adjust development to make your negatives easier to print. At the bottom of the Standard Film Developer Time Chart is a table of adjustments. For example, if you had used film that had passed its expiration date you would add **1** chart letter (going to “P” for your HP5+). If you were **also** planning to use a color head enlarger when printing, you would add **3 more** chart letters (going to “S”). Your suggested development time at 23 degrees C/73.5 degrees F now becomes 12 minutes 30 seconds.

Developing Film Procedure

We suggest you prepare all solutions in advance, allowing enough time for them to come to room temperature. If they are at different enough temperatures, the thermal shock to the gelatin of the film can cause apparent graininess. In the days before modern, pre-hardened emulsions, this was a much more serious problem and you might get reticulation – a sort of reptile-skin effect.

If your water supply does not come from a thermostatic valve, or is very warm or cool, consider getting a stainless-steel or plastic tank large enough to hold all the water needed for a complete processing cycle, and filling it long enough in advance to reach room temperature. Some clean, empty gallon water jugs might be a low-cost alternative.

Use all solutions at (or as close as possible to) the temperature selected for development (step 2). Normally this would be room temperature.

1. Room temperature water Pre-wet. 1 minute (at least, longer does no harm), continuous agitation.

Wets the film all over to development starts evenly and consistently. If colored water comes out, this is likely dissolved anti-halation dye, and is not a problem.

2. Development with Standard Working Solution at room temperature. See above (“Chart Letters”) table for timing and below (“Agitation”) for agitation. Because the film will still be wet with developer, some development will continue even with the developer poured out; experience will help you allow for this in your timing. In practice, usually developer is only used once; for developing large quantities of film, we have instructions for replenishment.

3. Stop Bath (Block mixed 1:9) 1 minute (at least, longer does no harm), continuous agitation for the first minute. If you need to leave the film, make sure you have used enough stop bath to cover it.

Development actually stops when the Stop Bath hits the film. The developer is alkaline, and the mildly acidic Stop Bath prevents the developer from contaminating the fixer. Working Stop Bath is pale yellow when fresh, and may be used until the color changes to purple, indicating exhaustion. Film and print stop baths should not be interchanged.

4. Record Speed Fixer Working Solution (Record Speed Fixer diluted 2:8 with water). At least 1 minute, constant agitation.

The rule of thumb is to fix with constant agitation for twice the clearing time, and to discard the working solution when the clearing time has doubled. (If you keep the narrow pieces from the ends of 35mm films you can use these to find the clearing time – it is easy to grab a small strip with the print fixing tongs and swish it around in a beaker of fixer. You will notice that slow, fine-grain films clear faster than high-speed films). If your film is particularly important to you, always err on the side of using fresh fixer!

5. Water Pre-Wash 1 minute

The tank may be opened at this stage; if the film looks milky, all is not lost, it has little light-sensitivity. Put the lid back on, mix some fresh fixer and fix again for a minute. If you have the kind of water hose that can be pushed down through the centers of the reels, make sure it has reached the bottom of the tank, so that clean, tempered, water enters at the very bottom.

Or, fill with water, put lid back on, agitate vigorously for 30 seconds, pour out through the lid, making sure to also rinse the cap. Repeat, repeat again. This stage removes fixer that has not been absorbed into the emulsion.

6. Archive Fixer Remover Working Solution (1:9) 1-3 minutes, continuous agitation. 1 minute for commercial permanence or if you’re really in a hurry, 3 minutes for archival.

Archive Working Solution is blue-green when fresh and is kept and reused until it changes color to yellowish-green. It is good practice, although not essential, to keep separate working solutions for films and prints.

In this step the Archive reacts with fixer residues and other unwanted substances in the emulsion to make them more water-soluble so that they can be washed out.

7. Water Wash, 3 minutes.

Make sure the flowing water is close to the temperature of the previous processing solutions. If using a hose, make sure it enters at the very bottom of the tank, flowing out over the top edge. Make sure it is flowing at a rate fast enough for a complete change every 15-20 seconds.

Or, fill the tank with water at room temperature. Put the lid back on, agitate vigorously for 30 seconds, pour out through the lid, being sure the cap gets rinsed too. Ten repetitions gives a well-washed film.

8. End Run Wetting Agent & Stabilizer (superconcentrate, dilute 1:99, preferably with distilled or deionized water, especially if your water supply is hard) 1 minute
In practice add 1 capful (~10 ml) to 1 liter of water. Agitation is not necessary and would cause foaming; mixing in a strictly clean container and pouring into the open tank is enough to evenly distribute the superconcentrate in the water. It does no harm to leave the film in the End Run working solution for a few minutes before sponge squeegeeing. In principle the shelf-life of End Run working solution can be up to 30 days; in practice it tends to accumulate mysterious tiny pieces of debris, maybe sponge and film fragments, (or maybe dandruff), and can be reused on the next batch or two of processing.

9. Sponge squeegee gently. (Ideally use sponge tongs reserved for this, dip them in the End Run working solution and then squeeze them. Hang the film to dry, away from dust, and gently squeezing run the tongs down the film, being careful not to pull it off its clip. If it falls to the floor, wash it again).

Use a sponge squeegee; fingers leave an uneven coating, and rubber-blade squeegees can easily scratch the film.

If you are processing sheets of film too large to squeegee, use 3 ml of End Run per liter of water, and simply hang to dry.

Check that film is in fact completely dry before starting to cut and file!

Step	Procedure	Timing
1	Water Pre-Wet	1 minute
2	STANDARD Film Developer	See Chart Letters
3	BLOCK Stop Bath	1 minute
4	RECORD Speed Fixer	3 minutes
5	Water Pre-Wash	1 minute
6	ARCHIVE Fixer Remover	3 minutes
7	Water Wash	3 minutes
8	END RUN Wetting Agent & Stabilizer	1 minute
9	Sponge Squeegee & Dry	

Agitation

For each step listed above, agitate continuously for the first MINUTE and for 10-15 seconds of each MINUTE thereafter. During development (step 2), if development time is less than 6 minutes, agitate continuously for the first MINUTE and for 10-15 seconds of each HALF-MINUTE thereafter. When development time is less than 3 minutes, agitate continuously. Use only enough solution to cover reels, leaving an air space for thorough agitation with bubbles. (In general, more agitation gives contrastier negatives, which is sometimes desirable, but more often makes them harder to print. As always, our recommendations are intended as a useful starting point, and you should modify them in the light of your own experience).