



## LYSC Retro Technologies Workshop: Developing Photographic Paper

The paper used in this workshop is Ilford Multigrade IV but any resin coated B/W photographic paper will work\*. This is a silver halide treated photographic paper that will produce a negative image.

Photographic paper works because it is light sensitive, and is still light sensitive even after it has been exposed. Therefore, the developing process should be carried out under a red photographic safe light (red

LED bicycle lights make a good substitute light; however, you should test to see if they will slowly expose the paper). Try not to let the light shine directly onto the paper or developing trays.

There are four stages to developing photographic paper. These are: Developing, Stopping, Fixing, and Washing. Each of the first three steps has a solution associated with it, while the fourth uses water.

### Developing an image – step by step

#### 1 Prepare your Developer, Stop, and Fixer baths

Label your trays. Keeping one tray for each bath will prolong the life of your solutions, and prevent mix ups while developing. The trays should be just bigger than the paper size (9 x 13 cm in our camera).

Consider where you are going to work. Although photographic developing is safe, you should consider ventilation and also the use of gloves and protection for clothing while working with your solutions.

Developing bath – The developer we provide is Ilford Multigrade. It is supplied as a concentrate, and needs to be diluted before use. A typical dilution is 1:10 (1 part developer in 9 parts water). You will need enough developer to fill your developing tray to just under halfway. Your developer bath will last for around 1 day. Remaining developer concentrate should be stored tightly closed and will remain active for around 6 months. More information can be found here: <http://bit.ly/1AdpdsG>

Stop bath – The stopping agent we provide is Ilford Iflostop which is a dilute citric acid bath. Again, stop solution is supplied as concentrate, and will require diluting. A typical dilution is 1:20 (1 part fixer to 19 parts water). You will need enough solution to fill your tray to just under halfway. Your stop bath will remain active for around 7 days. Unused concentrate should be stored tightly closed, and will remain active for around 12 months. More information can be found here: <http://bit.ly/1ECd8h9>

Fixing bath – The fixing agent we provide is Ilford Rapid Fixer. It is also supplied as a concentrate, and requires diluting before use. For paper fixing, it is recommended to dilute the concentrate 1:10 (1 part fixer to 9 parts water). You will need enough solution to fill you bath to just under half way. The fixer bath will last for around 7 days in an open tray, and longer if stored in a tightly capped bottle. Any unused concentrate will last for around 6 months in a tightly capped bottle. More information can be found here: <http://bit.ly/1yKwo96>

\* There are many different types of photographic paper available; however, Ilford products tend to have very good companion data sheets – which will help you to get the most out of your paper. Information on their products can be found here: <http://bit.ly/1v4ocRs>

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## **Developing your exposed paper**

Under your red light remove the paper from the camera, taking care to handle it from the edges, or with wide plastic tongs.

Place your photographic sheet into the developing bath using the tongs. A typical developing time is 45 sec to 1 minute at room temperature. During this time you should gently agitate the tray, taking care not to spill the solution.

Remove the paper from the tray using your tongs with around 10 seconds remaining. This will allow the developer to drain.

If you believe your image is not fully developed at the end of your minute, leave it slightly longer; likewise if it is developed in a shorter time, remove it early.

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## **Stopping the developer**

Take your developed image and place into the stop bath using your tongs.

Agitate the bath gently, taking care not to spill the solution. Your paper will need to remain in the stop bath for around 10 seconds.

Using a different set of tongs, remove your paper and allow to drain into the bath.

Your stop bath contains an indicator to show when it is exhausted and needs to be remade. Yellow – Ready for use, Purple – Exhausted.

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## **Fixing your image**

Take your stopped paper, and place into the fixer tray using your clean tongs – separating the tongs used for the developer and fixer baths will prolong the life of your fixer.

Gently agitate the tray, taking care not to spill the solution.

Your paper should remain in the fixing bath for between 30 seconds and 1 minute to ensure all unreacted silver halide is removed.

Remove your finished picture from your fixing bath using tongs and allow to drain.

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## **Washing your paper**

The final step is washing your paper to ensure no processing chemicals remain. This should be done carefully in a further tray or deeper bowl filled with water.

Washing times vary, however 5 minutes should give the desired results. It is important if you are washing multiple images that they are not allowed to sit together, as this may streak your image, or allow the leaves to stick together.

If possible wipe your picture with a rubber squeegee (a car windscreen scraper will do a decent job although specialist tongs are available), this will avoid drying streaks.

## The science behind each stage

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### **Developer**

Developer solutions can have many active ingredients and formulations; however they all do the same thing. They contain chemicals which will selectively react chemically with the silver halide on the surface of the paper. This process reduces the silver halide to silver metal, and allows an image to appear. The selectivity of the developing solutions means only silver halide which has been exposed to light will be reduced, allowing the 'latent image' captured on the paper to be made visible. It is important however that the paper is not left in the developing solution for too long, as this can 'over develop' the image.

### **Stop Solution**

The stop bath is essentially an acidic solution which deactivates the developer, preventing it from overdeveloping the image. The stop bath also acts as an intermediate step between the developer and fixer – this helps to prolong the life of your fixing bath.

### **Fixer**

Fixing solutions are the final chemical step to developing photographic paper. To prevent the silver halide on the paper from further reacting with light, the fixing bath dissolves any unreacted silver halide from the paper, simply leaving behind the metallic silver image on the paper. Your image is now stable, and the paper will no longer react with light.

### **Washing**

It is important to wash the fixer from your paper once the process is complete. This should be done in gently flowing water, and the image should be agitated to stop it from sticking to any other paper in the wash bath.