

Glass Plate Positives

DRY PLATES

Harking back to the earliest days of photography, we first had wet plate collodion images popularised by Frederick Scott Archer in 1851, which meant that for the first time practitioners could make an image that was cheap and easily produced (relatively). This process however came with the inconvenience of having to process the images 'on location' and working in the field was not so easy due to the fact that the 'mobile darkroom' had to be taken with you!

Shortly after in 1871, Dr Richard L Maddox came up with a process of Dry Plate photography (or the gelatin process), which meant that images could be taken anywhere and processed back in the studio darkroom. This made the whole business of photography truly portable and convenient to use in difficult to reach places.

The process of Dry Plate photography is very similar to traditional darkroom working with 35mm or medium format film, however images are captured in large format cameras (4x5" or 8x10") onto light sensitive glass plates. When exposed and developed correctly, the image produced is the same as for any film - a negative on glass rather than on film. This process is great for producing archival work to use in an enlarger or for contact printing in alternative processes. The glass plates themselves are a work of art and are sublime to hold and look at.

THE NEGATIVE PROCESS

Whilst it can be an exhaustive process making the sensitised emulsion to cover the glass plates, there are a couple of companies making commercial plates already coated and ready for use. The chemicals and ingredients can sometimes be difficult to obtain and making the emulsion has to be done at high temperatures and left to cool overnight and go hard. This part of the process is also undertaken under red safelight and can be difficult to obtain a consistent coating which in turn will affect exposure times.

I have chosen to get my plates from a small company in Slovenia called Zebra, who hand make their plates and quality check prior to shipping. The plates are obtained through Their own website (zebradryplates.com) and arrive usually within a week of ordering. Once they arrive in my studio, they can be unpacked individually (under red safelight) and loaded directly into my large format plate holders (also by Zebra), and carried into the field ready for use at anytime. Once on location the camera can be unpacked and made ready for the plate holder.

After composing the image and focussing the camera, the placeholder is slid into the back of the camera and dark slide removed, then given the requisite exposure. The sensitivity of the emulsion is at around ISO 2 so is quite slow, but other factors can affect the exposure time such as bellows extension, UV conditions etc; which I won't go into here now. When the image has been taken the dark slide is replaced in the holder and the holder packed away ready for developing back in the darkroom.

Processing is done under red safelight again and undertaken with regular black and white darkroom chemicals in trays. After removing the exposed plate from the holder the image is processed in your chosen developer (see chart below), washed in clean water for 1 min, fixed in rapid fixer until all the unexposed emulsion is cleared away (approx 5 mins), then

given a final wash for 3 mins in clean water. The plate is then left in the drying rack until completely dry (at least 3 hrs) or you can free dry with a hairdryer on low heat. The image can then be processed via the enlarger to traditional photo papers or contact printed with alternative processes.

DEVELOPER	DILUTION	ASA / ISO	TEMP.	DEV. TIME
Zone Imaging 510 PYRO	1+150	2	20°C	5min
KODAK HC-110	1+31	2	20°C	5min
FOMATOL LQN	1+59	2	20°C	4min
D76 / ID-11	STOCK	2	20°C	3min
Moersch ECO 4812	1+30	2	20°C	3min
ILFOTEC HC	1+31	2	20°C	5min
Bellini Euro HC	1+31	2	20°C	5min
KODAK HC-110 (less contrast)	1+61	2	17°C	7min30s
Cinestill DF96 monobath	STOCK	2	20°C	8min
XTOL	STOCK	2	20°C	7min
D23	STOCK	2	20°C	9min
DEKTOL	STOCK	2	20°C	5min

Listed from most to least recommended

THE POSITIVE PROCESS

With my interest in alternative processes I wondered if I could produce a positive glass plate to view and hold as a finished art piece, rather than going through the additional step of contact printing or via the enlarger! After a little research I discovered that this can be achieved through additional chemical processing or with something called the Sabattier Effect. Whilst intriguing, neither of these processes are foolproof and can be subject to wild variation. Another method is to take an already exposed plate and contact print it on top of an unexposed plate to make a reverse (or positive) of the original image. This seemed to be the most direct route to achieving my goal but also involved taking the negative plate first. This is when the light bulb went off in my head!

Why not make a digital negative (much cheaper and easier) and then contact print that onto a blank plate! I can then make as many images as I want from my entire photo catalogue, without even venturing outside....

I knew from the outset that experimentation would be involved and initially would result in a few failed plates. This can be expensive if you don't have a clear plan in mind. The first step was to produce a digital negative. Easily done, but is it better to have a 'normal', 'thin' or 'dense' negative? After a few trials, a slightly 'flatter' neg produced good highlight details without compromising shadows and had great density throughout.

A PDF download from my website is available detailing how I make my digital negatives.
<https://www.tomleephoto.com/interesting-stuff> > Downloads.

I decided to design my own contact print setup, consisting of a mask for maintaining 'registration' of the unexposed plate and digital negative above. The unexposed plate simply fits into an opening cut into a piece of mount board. The negative is then hinged with low tack masking tape on one side of the mask to ensure they align perfectly. The negative is placed over the plate (the printed side of the negative onto the emulsion side of the plate) and another clear glass plate placed over the negative to hold everything in place and keep the negative flat.

Now to expose the plate and this is a bit of trial and error until you get the first one right! I don't have an enlarger but arranged a simple jig to hold a battery operated torch above the plates (approximately 13-14" above the contact area). Exposing the plate for 1 second proved too much and the resulting plates were very dark (black) and developed almost within a few seconds. I had to dim the light sufficiently to give myself a reasonably short but manageable exposure time, and settled on ND filters held below the head of the torch. To my surprise, I needed a 10 stop ND filter to dim the torch sufficiently to allow a manageable exposure time (approx 2 seconds with fresh batteries). As the batteries loose power the exposure time is lengthened to compensate, or just change the batteries and stay at 2 seconds to maintain consistency!

Developing the positive plate was exactly the same for negative plates. Development can be stopped at any stage and when you 'feel' the image looks right. If you overdevelop the plate (darker), the resulting image will be too dense to be displayed correctly when mounted and framed. The darker areas of your image need to be lighter in tone than normal so that all the detail will show through. The washing and fixing processes are exactly the same as for the negative plates.

BACKING THE PLATES

Once the plates have dried, the emulsion is still soft and subject to the vagaries of the elements. We also need to be able to see the image registered on the glass plate so a simple, cheap and effective solution is to place a white card behind the image so it looks like a normal black and white photo. This can then be framed and hung on the wall, however this does not seal the emulsion onto the plate.

A good way to do this is to create an 'Orotone'. Metallic mica dust with a yellow(ish) tint, or even gold leaf can create a distinctive finish and protect the emulsion from damage and environmental effects at the same time. To start we need some Paraloid-B72 (available from eBay) which is solid resin pellets and then dissolved in acetone to make a 5% solution.

Mix 5g of Paraloid-B72 per 100ml of acetone to make a stock solution. When coating the plate you only need about 3/4 of a teaspoon of mica powder to approx 10ml of your stock solution for a 5x4" plate, and stir with a glass rod. At this point you need to be reasonably quick as it's already starting to go off and solidify!

Pour the solution over the back of the plate and tilt it in all directions until the whole of the plate is covered. Lay flat to dry for about 2hrs. When dry your plate can be mounted in any way you choose.

There is a complete step-by-step video on my YouTube channel for this entire process.
<https://youtu.be/NmWwOKPn3IE>

DIRECT POSITIVES (FROM CAMERA)

It's now possible to produce direct positives from the camera, without having to make an additional contact negative! It just needs an additional chemical adding to the developer and an adjustment to the time in the tray.

Listed from most to least recommended	DEVELOPER	DILUTION	ADDITION OF AT	TEMP.	DEV. TIME	INSTRUCTIONS	AT=Ammonium Thiocyanate
	FOMATOL LQN	1+59	3g (3scoops) per 300ml of water	20°C	3min30s	You would mix 5ml of concentrate in 300ml of water and add 3g of AT	
	D76 / ID-11	STOCK	3g (3scoops) per 300ml of water	20°C	2min	You would mix 300ml of stock solution and add 3g of AT	
	KODAK HC-110	1+59	3g (3scoops) per 300ml of water	20°C	3min30s	You would mix 5ml of concentrate in 300ml of water and add 3g of AT	
	Moersch ECO 4812	1+30	3g (3scoops) per 300ml of water	20°C	2min	You would mix 10ml of concentrate in 300ml of water and add 3g of AT	
	Dektol	STOCK	3g	20°C	3min	You would mix 300ml of stock solution and add 3g of AT	
	Bellini Euro HC	1+33	3g (3scoops) per 300ml of water	20°C	3min30s	You would mix 9ml of concentrate in 300ml of water and add 3g of AT	

Ammonium Thiocyanate (the magic ingredient) is pretty nasty stuff and can be difficult to get hold of except from specialist suppliers. However you can now get your chems from zebradryplates.com, along with almost everything else you may need equipment wise. Alternatively try betterequipped.co.uk for your Ammonium Thiocyanate.

CHEMICALS

The chemicals (and alternatives) you will need for developing your plates are shown in the charts above, and the process is shown in the video linked above.

Development times will vary with exposure time, type of developer and temperature. Normal development should be at 20°C however I suggest that the temp should be 1 or 2°C higher to allow for heat loss in the open trays. Some developers can be quite harsh and you should test for yourself if other developers are suitable.

The above solutions should be good for about 2No 5x4" or 1No Whole Plate (8½x6½") but will be exhausted shortly thereafter and development times will increase significantly or produce weak imagery.

Fixer			
Ilford Rapid Fix	50ml concentrate	450ml water	Makes 500ml
Adofix Plus (alternative)	65ml concentrate	435ml water	Makes 500ml

Fixer solution should be good for an entire session and then discarded (approx 10-12No 5x4" plates).

Orotone			
Acetone (or clear nail varnish remover but MUST NOT contain water)	200ml	Mix together vigorously over several hours and leave to fully dissolve overnight	Makes 200ml (store in brown bottle)
Paraloid-B72 (eBay)	10g		
Mica Particles (bronze, copper, gold etc)	Only mix with the above solution just before applying to plates. Available from Amazon, eBay etc.		

In some parts of the world it is possible to buy Paraloid-B72 ready dissolved in acetone to a 5% solution. (I got some from eBay).

A cheaper (and more basic solution) is to use a metallic card at the back of the glass plate to achieve a similar effect, but does not protect the emulsion surface!

STEP BY STEP

- Make digital negative.
- Place sensitised glass plate emulsion side up in frame.
- Tape digital neg to one edge of frame emulsion side down.
- Place clear glass plate over negative to keep flat.
- Expose with white light for you designated exposure time (determined by testing).
- Develop in open tray (by inspection) and remove just before highlights look overexposed. Agitate continuously and image should appear fairly quickly and full development will happen between 3 and 5 mins (depending on developer used).
- Stop development in second tray with tap water (agitate continuously) at 20°C for 1min.
- Fix with chosen chems until all white areas have been cleared from the image (agitate continuously). The best way is to periodically lift the plate out and inspect the other side of the image. The image is fixed when the plate is completely clear of unspent emulsion. This is a hand coated process and the emulsion will vary in thickness across the plate and will take longer to clear in some parts than others.
- Back in the water tray and agitate for 1 min and soak for 15 mins to wash off excess chemicals. Discard the water after each couple of plates then use fresh.
- Allow plates to dry for about 2-3 hours, or force dry with a hairdryer!
- When dry, prepare the plates for Orotone and make sure they are clean by brushing with a hake or air duster. Mix 10ml of your Paraloid/acetone solution with a $\frac{3}{4}$ teaspoon of mica (metal flake) particles in a shot glass using a glass rod. This will coat a single 5x4" plate.

- Pour immediately over the emulsion side of your plate, tilting and flowing the solution over the entire surface. This takes time to master so don't rush it. Place it on a flat surface to dry.
- The plate should be dry in about 1-2 hours and can then be framed in your desired manner. Remember to reference the video <https://youtu.be/NmWwOKPn3IE> and follow along.

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tomleephoto.com

tomleephoto@me.com