

Temperaprint

By Alex Chater

This guide will give you a basic introduction to the process in as simple, quick and low-tech way as possible. Temperaprint is best as a multi coat system of working. In essence, thin layers of whole egg and colorant are coated on to a surface and then selectively hardened using ultra violet light (UV) and a printing negative in direct contact with the print. The image, after exposure, is developed by removing the unhardened parts, which remain soluble with water, as those areas have been protected from the UV light by the dark parts of the negative. Successive layers, each go to construct the image until the final desired result is achieved.



Saturated solution of ammonium dichromate
Flow aid
Two eggs
Three sealable jars
Set of kitchen measuring spoons
Disposable gloves
Plastic tea strainer

Preparing the Egg

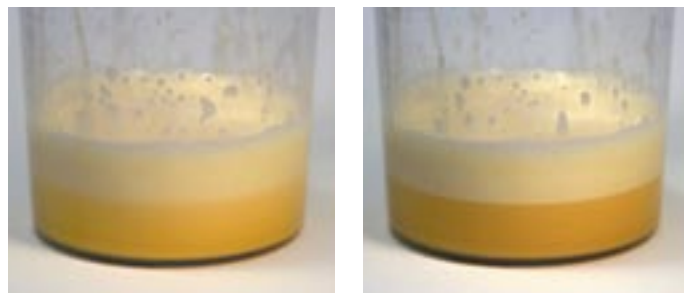
Once you have assembled all the materials and ingredients begin by breaking the two eggs into the first of the jars. Replace the lid and shake the jar to mix the egg yoke with the egg white. This will take about a minute to ensure the two are well mixed.



In this liquid there may be parts of the egg that have not mixed in properly which will need to be filtered out if you have not used the hand blender. If the mixture is not filtered, then you will have problems getting an even coat. Use the plastic tea strainer to strain the liquid into a second jar and then discard the residue caught in the strainer.



An alternative to the jar method is to use a common kitchen blender as shown here. The mixture will not need to be filtered, but it will need to be left to stand until the small bubbles rise to the surface leaving a distinct difference between froth and mixed egg



Sensitizer

Next you will need to create a saturated solution of ammonium dichromate. To do this use a small jar into which you can fill with 50ml of distilled water, add ammonium dichromate and stir. Keep adding small amounts until no more will dissolve and sits at the bottom. You will need your disposable gloves when handling the ammonium dichromate and it needs to be carried out in a safe place, not a domestic situation, and preferably in a sink or a photographic dish where spillage can be washed away easily. I have found that the use of non brown containers has not caused any problems.



The distilled water, now a bright orange, is saturated and can be drawn off when needed.

Note of Caution

Ammonium dichromate is a chemical and should be handled with due respect. Keep away from domestic situations and contained in an area that it cannot be misunderstood or misused. Read the hazard sheet that come with it and ensure you understand the nature of the hazards. Wear disposable gloves and eye protection. If it gets on your skin wash immediately. Always label containers with their contents and hazards. Work in a clean environment away from domestic areas, ensure that is not cluttered and clean up as you proceed, removing any spillages as they occur and dispose of any remaining emulsion when you have finished printing. These are what I consider as basic set of safe working practices. There may be others that could be included that I have missed but I think that these rules should serve as a basic set of rule to start out with

Mixing the Temperaprint Emulsion

The Temperaprint formula is two parts of the egg mixture to one part of the saturated solution. Use a large measuring spoon and place two measures of the egg into a clean jar, then wash and dry the measuring spoon. Now add one measure of the saturated ammonium dichromate liquid, seal the jar and give it a good shake to mix the two liquids together. You now have a basic Temperaprint emulsion.



The basic Temperaprint Emulsion ready to be mixed into a colour of your choice.

Colouring the Emulsion



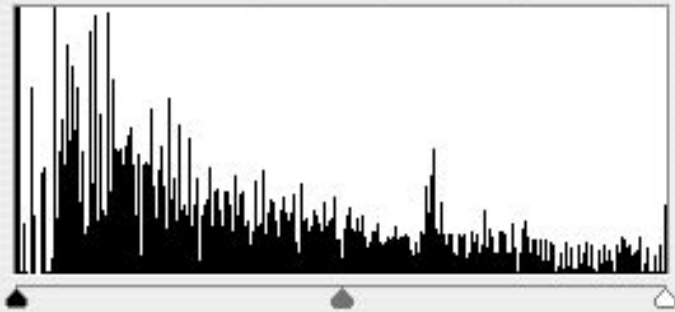
You will need: -
Small paint tray
Half inch paint brush
High density foam glossing roller
Artist acrylic paint
Measuring spoons
Pallet knife
Gloves

Measure 2.5 mil of the crimson acrylic paint and place it in the paint tray. Next measure 5 mil of the Temperaprint mixture and work this into the paint with the brush. Once mixed add another 5 mil and continue in measured stages until you have added a total of 20 mil. This will give you an emulsion to paint ratio of 8:1.



Preparation of the printing negative

There are a number of ways to make a negative suitable to make a print which is involved enough to write a book which is not the intent of this document. For the purposes of this document we will presume that you are going to make a digital negative, that is a negative that you produce on an ink jet printer. The most important element to address is the levels.



Which ever image editor you are using go to the levels pallet and set your black and white points so that they just touch the beginning of the pixel information at both ends

Next you will want to put a white boarder around your image so that when you invert the image you will get a non printing area around your image. In Photoshop go to the canvas size and increase the canvas size by two centimeters. Set the colour to white and click OK. Invert the image and flip horizontal (Edit>Transform>Flip Horizontal) The instructions given are for Photoshop, It may be different according to which image editor you are using. In essence the goal is to end up with a digital negative that has a black boarder around the image so that when you are printing you end up with clean paper around your image. In the print dialogue box set the media type to Premium Glossy Photo Paper



Registering the negative and paper

As Temperaprint is a multi coat system you will need to ensure that the printing negative and paper can be put back together in register, that is that the negative goes back in the same position on the paper as it occupied previously. A really simple way is to use two drawing pins (thumb tacks)



Yupo is a plastic paper made of bonded layers of polypropylene. This is the standard paper for this process because of its dimensional stability in water and its resistance to pigment stain. You can apply multiple coats without mis-register or the build up of stain. It comes in a variety of paper weights, the heaviest weight is the one I would recommend for the process.



You can strengthen the position of the pin holes by first placing masking tape at the location of the prospective holes. Place the printing negative on the cardboard and place a piece of masking tape over the position where the pins will be pushed through

Now place the printing negative in position on the Yupo. Take the drawing pins and push them through the negative and the Yupo in the middle of each of the two short sides.



Mark the corners, this will make it easier to locate the pin holes and will define the outer area for the first coat

When complete it should look like this

Coating

Coating needs to be done in a methodical and ordered manner. There is no need to rush, take your time. Keep your coating within the marks in the corners where the printing negative will sit, that way you are keeping your chemistry contained to an easily managed area



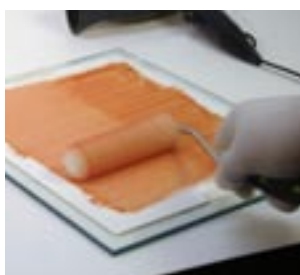
Begin by fixing your prepared sheet of Yupo onto the sheet of glass with the masking tape.



Start painting a coat of the mixture onto the Yupo. A good brush full should be enough. Begin on one side and place a series of stripes across the image area without reloading the brush



Now, without reloading, pull the brush across in the opposing direction to even up the coating as a whole. Repeat this process until the whole area is reasonable even



Next take the clean dry roller and lightly roll over the surface to remove the excess. The roller will absorb the surplus resulting in the coating looking thinner and lighter, but allowing you to get a smooth finish.

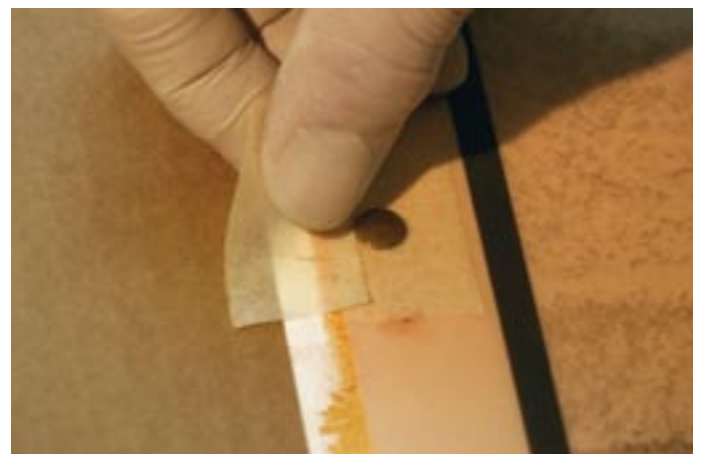
Continue to roll the print. At first it will be quite “bobberly”, but as you continue it will smooth out. If you have too much of the emulsion on the paper and the coating will not smooth, then use a spare piece of Yupo to offset the roller on before proceeding. It is not advisable to use newspaper as allowing the chemistry to be absorbed into paper fibers can lead to those fibers becoming air bourn dust. A small risk perhaps but it is always best to err on the side of caution in these matters. Roll in one direction only to begin with, say from top to bottom, then lift the roller and repeat the action. Roll in a methodical manner so that the whole of the area is worked equally.



As you proceed you need to lighten the pressure on the roller and increase the speed. At a certain point you can abandon the rolling in one direction and roll in backwards and forwards. Towards the end of the coating procedure you can roll fast and very light, is if to polish the coat to a final finish



You can allow the coating to dry by itself which will not take very long as there is no paper fibers to dry. To assist in the drying use a hair dryer, keep it moving and between six and twelve inches from the surface, do not allow it to stay on one area as this will cause the Yupo to swell up and can cause the coating to harden due to the heat; “heat fogging” as it is known



Now place the coated paper back on the cardboard and realign the two drawing pins through the printing negative and the coated Yupo.

Secure the two together with masking tape



And remove the drawing pins before placing them in the contact frame

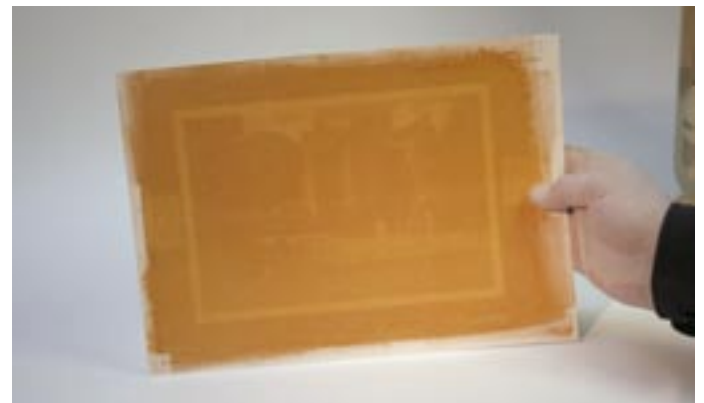
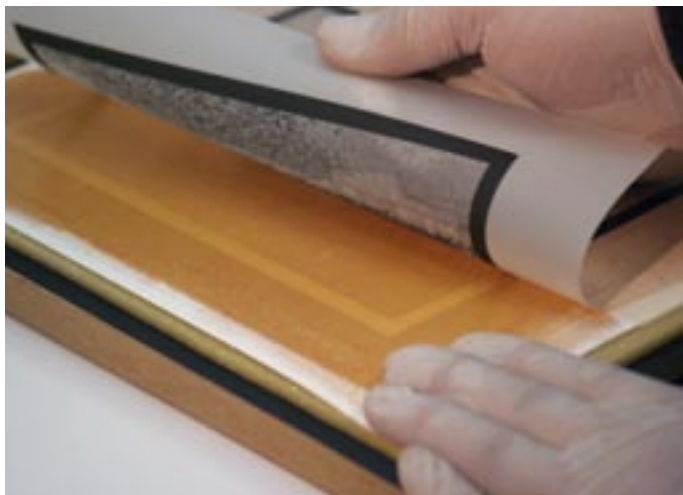
And place in the contact frame

Exposure

To expose the coat you will need a UV light source, a contact frame and a timer. A simple and affordable UV unit is a facial sun bed which can often be found in second hand shops or markets. Even new they are not expensive. A traditional photographic contact frame will provide the second part. . Temperaprint is not sensitive to small differences in exposure so a simple cookery timer will be quite sufficient for the process



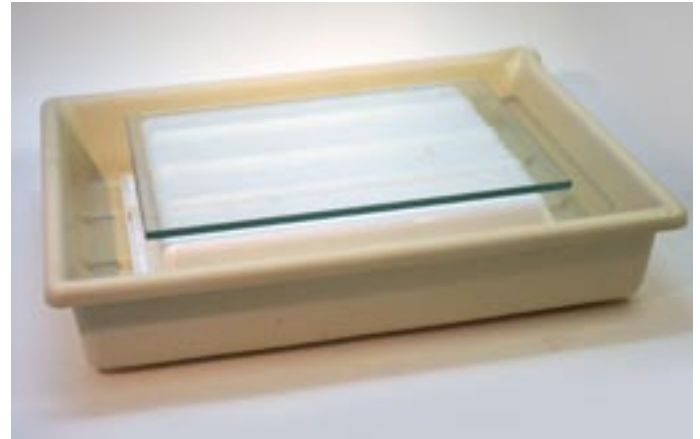
In the illustration above I have for convenience used a photographic dish and a small piece of wood to support the facial sun bed over the contact frame. I chose to keep the sun bed positioned such that I cannot directly see the tubes. You could use a piece of card to obscure the light further if you are worried about the light itself



To create a temperaprint you will need to make a series of coats each exposed for a different amount of time. See the section at the end of this document on evaluating your light source. Generally speaking a good exposure should be visible if you peel back the printing negative as illustrated above.

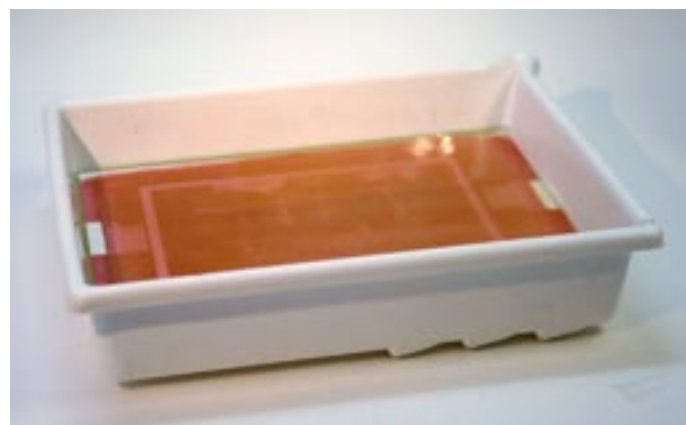
Wash Off

To make a simple wash off unit place a smaller photographic dish upside down in a larger dish and place a sheet of glass on top. The glass will provide a rigid flat surface for laying the print on to while you wash away the unexposed portions of the print, the waste water from the wash off will be caught in the larger dish which can be discarded later.



Washing up liquid
Foam roller
Paint tray
Small paint pad
Jug

Fill the paint tray with water and add a small amount of washing up liquid. Place the roller and the paint pad in the tray and set the tray beside the wash off unit



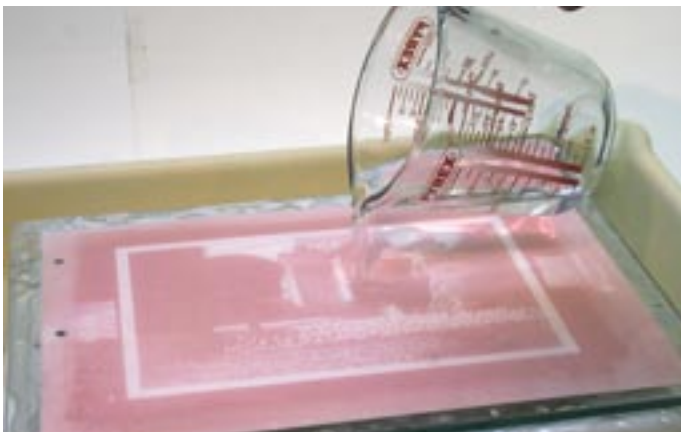
Before you can wash off the unexposed parts of the print, you will need to soak the print in water for at least three minutes. The soak is to allow the coat to soften as a preparation for the wash off, it will remove most of the dichromate from the coat. It is a good idea to soak it face down, this should ensure that it is fully wet across the whole print area.



After the print has had it's three minute soak lay it on the sheet of glass. Take the roller and with a gentle pressure begin rolling back and forth. This will provide a very gentle and even pressure that will slowly remove the soft unexposed portions of the coating in a controlled manner. Do not rush, you have plenty of time to do this, for the dichromate is left behind when the print had it's pre-soak, so it is no longer light sensitive



After you have used the roller you may want to be a little more aggressive with some parts of the image. The paint pad is ideal for this. It needs to be used flat and used in a circular manner. Keep in mind that the coat is soft and can be scratched easily so do not press on the pad to begin with. If the coat has had a long exposure then some pressure can be applied



When you are happy with the wash off, remove any residue from the surface of the print using the jug of water.

There will be a dichromate stain which will give the print a slight orange cast. You can change this cast to a negligible light grey by using clear distilled vinegar, not the brown vinegar. To do this lift the print off the glass and pour some of the vinegar on the glass and lay the print face down on the glass and leave for at least fifteen minutes. Periodically lift one side and then the other. This will ensure an even clearing of the stain.

Then wash the print under running water





To create a print continue with further coats. Use the register system and keep your coats to at least five parts standard emulsion mixture to one part pigment. Mixtures with more colorant in them will have problems sticking and holding any tonal range. To make a print will require multiple coats with different exposures. There is no formula, it is best done by trial and error. On the good side Yupo has no fibres and holds no water so the turn round time from coat to coat is quite fast.



Evaluating your exposure unit

To evaluate your exposure unit you will need to test it first by using a piece of the clear film and doing a series of test exposures to find the point where an average coat is fully exposed through the clear film. The edge of your printing negative as illustrated here will do fine. You can tell what this exposure is by doing a series of timed exposures across the bare coat and through the film. After the wash off look to see where the areas that had the film are equal to the areas that had no film. This will give you a good idea of what the minimum full exposure is for the film you are using, shorter exposures than this will not have the full colour of the coat and much shorter they will not stick to the Yupo.



The exposures are in one minute steps. As you can see the one minute exposure is insufficient for any of the coat to stick to the Yupo. The two and three minute exposure has adhered to the Yupo but the film is presenting some light blocking so that the edge of the film is clearly visible. The four minute exposure is overcoming the light blocking ability of the clear film and shows that the coat is fully exposed at this exposure time. Further exposure now starts to progressively overcome the tones beginning with the lighter tones of the of the printing negative



Peter and I
Dedicated to my dear friend and teacher
Peter Charles Fredrick 1935 - 2009