

How to process a **COLOUR** SLIDE FILM



You can save time and money and still get top-quality results by processing your own colour slide film. Darkroom expert Derek Watkins shows you how to make the most of your slides without spending a fortune.

There are many benefits of home processing colour slide films, although on the surface there seems to be little to recommend it. The problem is that some slide films, like Kodachrome, are sold at a price that includes processing and mounting by the manufacturer's own laboratories. Also, there are independent processing laboratories all over the country which handle films sold without processing rights. Most of them offer a fast, reliable, high-quality service, so why do it yourself?

Benefits of home processing

As well as being satisfying, processing your own colour slide film is faster than getting it done by a professional laboratory. You can see the results within an hour of taking the pictures if you are shooting at home and have the chemicals up to temperature.

This is a big advantage if you're taking studio portraits or still-life pictures, as it means you can leave your lighting in place until you see the results, make any adjustments, and re-shoot if necessary. It also enables you to shoot a test film to find out if you need any small filter adjustment on the camera to correct the colour balance before you take your pictures.

Home colour slide processing can also be cheaper, but how much cheaper depends on the amount of colour slide photography you do. The more slide films you shoot, the better use of the solutions you will make.

My regular processing lab charges £4.37 to process a 36-exposure film. A local dealer sells the Kodak E-6 Hobby-Pac processing kit for £14.99. It processes up to six 36-exposure films, so the cost per film is £2.50. By using larger kits or those from other manufacturers, such as the Tetenal E-6 kit or the Photocolor Chrome-6 kit, you can cut the cost per film still further.

Either of these kits in their largest sizes bring the cost per film down to around 60 pence. If you don't have a high throughput of films, share a kit with a friend.

Quality does not have to be sacrificed when you process your own colour slide films, though. With care you can produce slides that are at least as good as those from professional laboratories. These labs are set up to produce commercially acceptable results from perhaps thousands of films every day.

Finally, processing your own colour slide films enables you to retain full control. For example, you can up-rate and down-rate your films and change the standard process to compensate for under- and over-exposure respectively. Again, most professional laboratories offer this service, but they charge extra for it.

Before you start processing

To get the best from your colour slides, it is essential to get the exposure right in the first place. A colour slide is unique, and if >

Shopping list

One kit Kodak E-6 Hobby-Pak	£14.99
35mm plastic developing tank	£6.99
One thermometer, 12in mercury	£8.95
Four 600ml measuring cylinders	£10.50
Four 600ml bottles	£1.60
Total cost	£41.98

These companies specialise in darkroom materials and equipment:

Agfa	081-560 2131
Fotolynx	0272 635263
Ilford	071-636 7890
Introphoto	0628 74411
Jessops	0533 320033
Johnsons/Photopia	0782 717100
Kodak	0442 61122
Paterson/Photax	081-905 1177
Firstcall Photographic	0823 413007
Mr Cad	081-684 8282

Bottles

Glass bottles are best, especially for the two developers. Wash the bottles thoroughly before using them to store chemicals – a few drops of another solution will contaminate either developer.

Squeegee

A squeegee lets you remove water drops from both sides of your films quickly and easily.

Timing device

A stop-watch or wrist-watch with a sweep second-hand is adequate for timing each processing step. A good purpose-made timer is better because you don't have to keep watching it.

Film washer

You can wash your films in several changes of fresh water, but a properly designed film washer is better. Buy one that you can attach to both hot and cold taps so you can control the temperature of the wash water.

Film clips

Hang your films up to dry with plastic or stainless steel film clips. Don't use ordinary steel clips like the bulldog type, as they rust and can cause spots on your slides. Wooden spring pegs are a good alternative.

Developing tank

This light-tight container holds film for processing. Tanks are available in both plastic and the more expensive but tougher stainless steel. An inversion tank gives more uniform results than a rotary agitation model. Once you've loaded your film into the tank you can switch on the lights.

Thermometer

Accurate temperature control is essential. Buy a good mercury thermometer or a digital electronic one, as they're more accurate than spirit thermometers.

Temperature control

By far the simplest and least expensive way to control the temperature of the processing solutions is to stand them, in their bottles, in a bowl of water a few degrees warmer than the processing temperature – about 40 to 41°C.

Measuring graduate

A small measuring graduate like this one is ideal for precise measurement of chemicals used in developing.

Measures

A separate measure is needed for each solution and should be marked clearly – one each for the first developer, colour developer, bleach/fix and stabiliser.

Chemicals

Because E-6 is a standard process there are several kits on the market, including Kodak's Hobby-Pac. But kits are also produced by Tetenal, Paterson, Photocolor, and other independent manufacturers. All work at relatively high processing temperatures.

Changing bag

If you don't have a darkroom, use a changing bag to load your film on to the reel and into the tank. A carefully folded and buttoned dark jacket used in subdued lighting will do in an emergency.

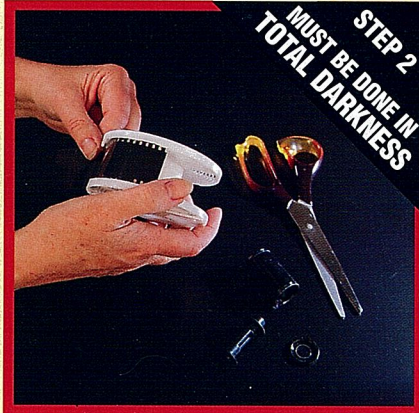


A STEP-BY-STEP GUIDE...



▶ Put the bottles containing your processing solutions in a bowl of water at 40°C (104°F) 2 hours before you want to start processing. Keep an eye on the temperature if you don't have a thermostatic heater, and top the water up if it drops below 38°C (100°F).

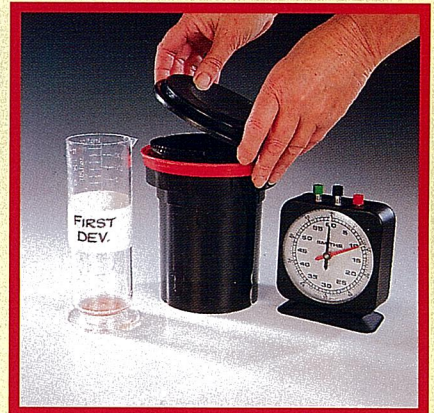
1



STEP 2
MUST BE DONE IN
TOTAL DARKNESS

▶ In darkness, open your cassette of film and load the spiral of your developing tank. If you process one film in a multi-spiral tank, put the empty spirals in the tank to prevent the film being over-agitated. Before you start, check the first developer is within 0.3°C of 38°C (99-101°F).

2



▶ Pour the first developer into the tank as quickly as possible and start the timer immediately. Then put the lid on the tank. It is important to tap the tank on the bench a few times in order to dislodge any air bubbles on the film and begin agitating.

3



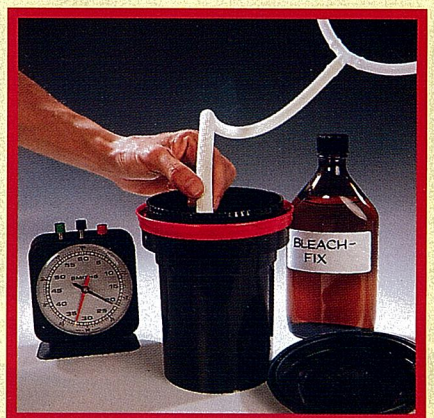
▶ Wash for 2min in running water – again check the temperature to ensure that it is between 33-39°C. Alternatively, you can wash in four changes of fresh water. Once again, if you decide to do the latter, it is important to agitate each change for ½min.

7



▶ Then pour the bleach-fix solution into the tank. Invert the tank over and back for the first 15sec, then twice every 30sec for the remainder of the 10min bleach-fix stage. At the end of this time, simply pour the solution back into its bottle.

8



▶ Wash the film thoroughly in running water for at least 4min. Alternatively, you can wash it in six changes of fresh water. If you decide to do the latter, you should agitate each change for 45sec. Empty out the tank when you have finished this final wash.

9

you get the exposure wrong there is no second chance to put it right as, unlike a negative, the slide is the finished image. The only chance you have of correcting a slide is to make a duplicate, but if you start with a second-rate original, at best you'll get a second-rate duplicate. You can retrieve it to a degree at the processing stage, but quality is never as good.

When you are shooting on negative film, whether it is black and white or colour, the golden rule is – if in doubt err towards over-exposure. When you are

shooting slide film, the golden rule is – if in doubt, err towards under-exposure. Never over-expose, as this produces thin, washed-out colours, while slight under-exposure results in rich, strong colours.

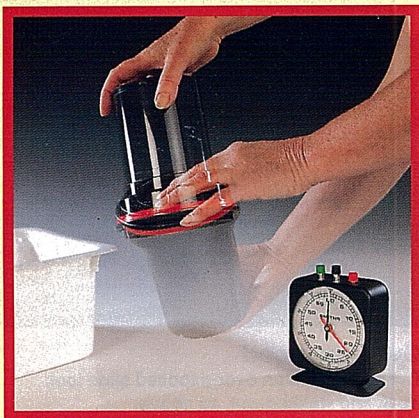
A number of photographers habitually set their exposure meters to the next higher film speed rating than the slide film that they are using, in order to get this rich effect. This effectively means that they under-expose every shot by around one third of a stop. Of course, it is best to get the exposure right. For more on

exposure problems, see *How to avoid exposure and development problems* on page 47.

Preparing the solutions

Kodak produces an amateur-size kit for processing E-6-compatible films. Called the Kodak Hobby-Pac kit, it makes up to 500ml of each of the four solutions and can process six 36-exposure 35mm films.

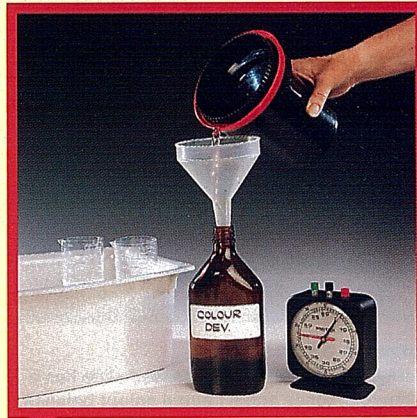
Complete mixing instructions are provided in the leaflet that comes with the kit, but a few hints may be useful here.



4 ▶ Agitate the tank for 15sec – give it 7 or 8 inversions. Invert it twice every 30sec for the rest of the 6½min development time – put the tank in a water bath between agitations. 15sec before the end of development time, start to pour the first developer back into its bottle.



5 ▶ The next step is to wash the film for 2min in running water – make sure that the temperature of the water is between 33-39°C. Alternatively, you can choose to give four changes of fresh water. If you do the latter, agitate each change for ½min.



6 ▶ Drain water from the tank and pour in the colour developer as quickly as possible. Agitate in the same way as for the first developer. The full colour development time is 6min. About 15sec before this time is up, begin to pour the colour developer back into its bottle.



10 ▶ Then fill the tank with the stabiliser solution and agitate for just a few seconds – give it approximately 5 inversions. The next stage is simply to leave the film to stand for 1min, before pouring the stabiliser back into its bottle.



11 ▶ Finally, remove the film from the tank. At this point you must squeegee surplus stabiliser from the surfaces, and then hang the film up to dry. Note that while the film is wet it has an opalescent appearance – don't worry, this clears as the film dries.



12 ▶ When the film is dry, cut it into individual frames and fit into slide mounts. There is a variety of mounts on the market, including plastic, glass, cardboard, masking and pin-registered mounts. Most photo libraries prefer plastic or cardboard mounts.

Make sure the jug or measure you use for mixing the solutions is clean, especially for the two developers. The chemical balance of the developers is critical, and contamination by old black and white or colour chemicals will affect the quality of your slides.

Use a vessel of about double the capacity of the quantity of solution you are mixing. This will prevent any solution splashing out when you stir it. Also make sure that you use a clean stirring rod made of plastic or glass, not metal.

Pour the liquid concentrate into the mixing vessel. Then pour a little water at the correct temperature into the empty concentrate bottle, cap and shake it and pour this into the mixing vessel. Finally make the solution up to the right volume with water at the correct temperature.

If two or more bottles of concentrate are needed to mix a solution, add the concentrates in the right order and stir well before adding the next one. As soon as you have mixed a solution, pour it into a clean bottle, cap, and label it. Put the date on the

label, as colour processing chemicals have a shorter life than black and white ones.

The storage life of the solutions recommended by Kodak is four weeks for the first developer, eight weeks for the colour developer, and 24 weeks for the bleach-fix and stabiliser.

Many of the solutions used in colour processing contain toxic chemicals that can be absorbed into the body through the skin, so wear rubber gloves when handling them. If you get splashes on your skin, wash them off instantly with cold water. ➤

HOW TO AVOID EXPOSURE AND DEVELOPMENT PROBLEMS



Correct exposure

A perfectly exposed and processed slide has a full range of tones and a neutral colour balance.



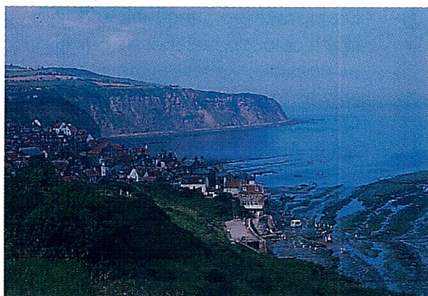
Under-exposed

If your slides are dark overall, you've probably had your meter set at too high a film speed.



Over-exposed

The colours on an over-exposed slide look weak and washed-out, as above.



Correct first development

First development controls the density of the slide. If correct it should look like the above.



Under-first development

The result of under-first development is similar to the effect of under-exposure.



Over-first development

Over-first development makes the slide look thin and lacking in highlight details.

Things can go wrong when using colour slide film, either at the photography stage or in the darkroom. Under- and over-exposure are common problems, but it is important to get the exposure right when taking a shot, as you can't correct it at the printing stage.

The most consistent way to do this is to use a separate hand-held incident light exposure meter. This measures light falling on the subject rather than that reflected from it, so it isn't affected by the subject's colour and tones. One of the best examples of this type of meter is the Weston Master with its Invercone attachment.

If you don't have a separate meter, you can get the same result by taking a meter reading from a grey card held in front of the subject, but don't cast a shadow on the card with your camera. The grey card reflects 18 per cent of the light falling on it, which is the standard used to calibrate exposure meters and equates to an incident light reading.

But if you're in doubt about the correct exposure, it's best to bracket. This means taking one shot at the exposure indicated by your meter or camera, followed by another shot with the lens opened by a half-stop and a third with the lens closed a half-stop.

If your camera is automatic, use manual override control. If you're still not sure, take two more shots: at one-stop more than the meter indicates and at one-stop less.

How to recognise exposure faults

But how can you tell if a shot is under- or over-exposed? A perfectly exposed and processed slide should have a full range of

tones and a neutral colour balance.

Naturally, the image should be sharp.

But if the slide is dark overall, you've probably had your camera's built-in meter or separate hand-held meter set at too high a film speed, so the slide is under-exposed. To stop it happening again, check the film speed setting on your camera or meter as soon as you load a new film. You can recover a shot to some extent by having a duplicate made and asking the lab to lighten the slide by over-exposing it slightly.

However, the worst thing that can happen to a slide is over-exposure. This makes all the colours weak and washed-out. It's usually caused by setting the film speed on the camera or meter at too low a speed. There's nothing you can do at the duplicating stage to improve things. Again, check the film speed setting when loading a fresh film.

Up-rating and down-rating

If you under- or over-exposed as a result of having your meter set at the wrong speed, up-rating and down-rating can save the day. Normally, to get the optimum results from colour slide films, you must rate them at the speeds recommended by the manufacturer. But you can rate the film at a higher speed and increase the first development time to compensate – called up-rating, or rate it at a lower speed and reduce first development time – called down-rating. Either way there will be a slight loss in quality.

You can take up-rating to three-stops without losing much quality. With down-rating

it's limited to two-stops. To compensate, you must modify first development time like this:

Over/under-exp	First dev time (38°C)
3-stops under	16min
2-stops under	13min
1-stop under	10½min
Normal	6½min
1-stop over	5¼min
2-stops over	4¼min

Avoiding development problems

Incorrect first development can damage a slide. First development controls the density of the final slide. If you give this stage too little time or agitation, or the temperature of the solution is too low, the result will look like under-exposure. Over-first development looks similar to over-exposure – the slides are thin and lack highlight detail. It is caused by giving too long a first development time, too much agitation, or having the temperature of the solution too high.

Other problems can arise. If your slides are dark with no edgeprint, you've probably got the first developer and colour developer mixed up. Dark results that look like the film isn't transparent usually mean the bleach-fix stage has been omitted or the solution is exhausted. Treating in fresh bleach-fix should solve this. If the slides are light with a blue colour balance, the first developer may be contaminated with fixer. If the image is faint or missing, you've probably used first developer for first and colour development. There are potential problems, but if you know what to look for, processing your colour slide films can be satisfying.