

**record
photography
in the
classroom**

a KODAK Publication

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Hitherto, photography for teaching and demonstration purposes has not been possible without a photographic darkroom available. The new technique described in this leaflet enables photographic processing to be carried out in any classroom, and in normal room lighting. There is no need for a darkroom at any stage.

The necessary photographic materials are:—

For producing negatives:

'Kodak' Plus-X Pan Film 35mm, 20-exposure (PX135-20)
and 'Kodak' Film Monobath.

And to make prints:

'Kodak' Ready-Mounts size 24 × 36mm ;
'Kodak' Projection Paper P153, size 8 × 10 inches ;
'Kodak' Universal Developer
and 'Kodafix' Solution.

All of these photographic materials are available from Kodak Limited.

The equipment necessary for processing and printing the film comprises 1 calibrated medicine measure ; 1 agitation rod ; 1 paper holder, size 5 × 8 inches ; and 2 dishes, size 10 × 12 inches.

This equipment can be supplied as a kit, known as "Photographic Accessories Kit, Nuffield Item 171", available from Philip Harris Limited, 63 Ludgate Hill, Birmingham 3.

In addition, a standard 2 × 2-inch slide projector, as used in classrooms, is required for printing.

Loading and unloading the film

Load the film into the camera as instructed in the camera manual. Make two *extra* blank exposures at the beginning. Then make no more than sixteen exposures, thus leaving at least two blank exposures at the end of the film.

After exposing, rewind the film in the normal way, but take great care not to rewind the film fully into the cassette ; *the leader tongue must be left protruding.* (To prevent all the leader being inadvertently wound into the cassette, attach it to the take-up spool of the camera with adhesive tape when loading).

Processing the film

Preparing the film

Cut off the protruding tongue (Fig. 1) and fold about an inch of film back around the cassette (Fig. 2). Hold the folded film in position with an elastic band around the cassette (Fig. 3).

Causes of possible faults

Fault	Cause	Remedy
Milky appearance	Incomplete "fixing" action of the monobath solution	Carry out steps given in "optional after treatment"
Dark bands across width at ends of film	Too great a rotation of the agitation rod during processing	Decrease the amount of rotation
Light bands across width of film	Not sufficient agitation	Increase agitation slightly
Parallel scratches along the length of film	Agitation too vigorous and excessive	Agitate less vigorously
	Tightening of the film on the spool	Do not tighten film onto spool
Irregular scratches or abrasions anywhere on the film	Careless handling of the film while washing or wiping down	Check that the chamois leather is free from grit or foreign bodies

Optional after-treatment

Films processed in 'Kodak' Film Monobath have sufficient permanence for normal teaching needs. If, however, full permanence over a period of years is required, the films should be fixed in the usual way.

FIX in 'Kodafix' Solution diluted 1 part 'Kodafix' Solution with 3 parts of water. Fix at about 20°C (68°F) for 5 minutes.

WASH. Give three 2-minute rinses in water at 18° – 24°C (65° – 75°F).

DRY in a dust-free, warm area after removing surface water with a clean chamois leather.

NOTE: One bottle of 'Kodak' Film Monobath is sufficient to process 3 films. Unused monobath solution will keep for a reasonable period if stored in a tightly-stoppered bottle.

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Processing

The use of rubber surgical gloves is recommended when processing, since the alkaline solution may affect some sensitive skins. Also, like most photographic processing chemicals, 'Kodak' Film Monobath may cause marks or staining if spilt on clothing or polished surfaces.

Pour at least 40cc of 'Kodak' Film Monobath solution into the measure. Do not dilute the solution.

Insert the agitation rod into the recessed end of the cassette (Fig. 4). Rotate the rod just sufficiently to tighten the film on to the spool (clockwise, as viewed from the recessed end of the cassette). Take care not to wind the film too tight, as this may cause scratching of the film or "cinch-marks".

Next, rotate the rod in a counter-clockwise direction, counting the number of turns, until resistance is felt, indicating that the film has been fully "unwound" to the outer rim of the cassette.

Lower the cassette slowly into the monobath solution, at the same time winding and unwinding the film by rotating the agitation rod to and fro by the number of turns determined in the previous step.

Carry out the winding and unwinding action twice as the cassette is lowered *slowly* into the processing solution. This procedure ensures that the solution is distributed thoroughly between the convolutions of the film, and that the air is expelled, resulting in consistent processing. (It is usual for a small amount of air to be trapped inside the top of the cassette, and small bubbles may leak out during processing).

Now give the agitation rod half the number of turns from either end of the winding/unwinding cycle, in order to have the film at the mid-point of this cycle. Continue agitation by rotating the rod to-and-fro through about 1½ revolutions, gently but firmly, throughout the processing time. (Check occasionally that agitation is being carried out at about mid-point between the fully-wound and unwound positions.)

Process for at least 3½ minutes at 20°C (68°F).

Processing may be carried out at higher temperatures up to a maximum of 30°C (86°F); the minimum processing time is then 2½ minutes. Do not use the monobath solution at temperatures higher than this.

Note that the processing times given are minimum times. Any increase on these times will not have any significant effect, but any reduction on these times will result in under-processed films.

After the processing time, lift the cassette from the solution and allow to drain. Discard the monobath solution.

Immerse the cassette in water of about the same temperature as the monobath solution. Open the cassette and remove the film, or simply pull the film out through the cassette mouth. Rinse the film for about one minute.

For printing, the film may be either wet or dry. If it is required dry, remove surplus surface water with a clean chamois leather and hang the film in a warm, dust-free atmosphere.

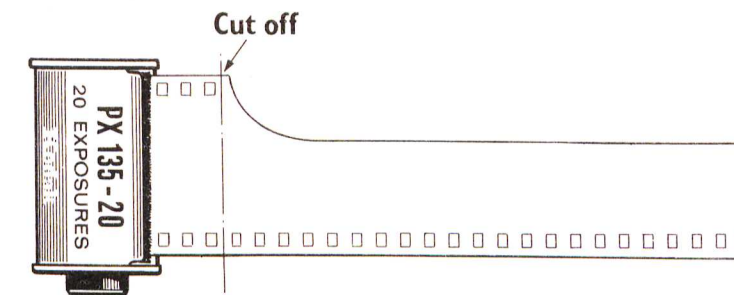


FIG. 1



FIG. 2

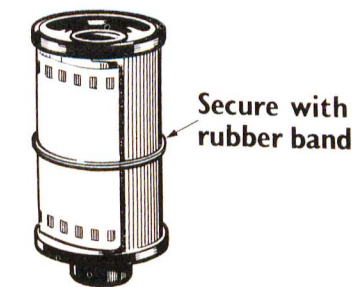


FIG. 3

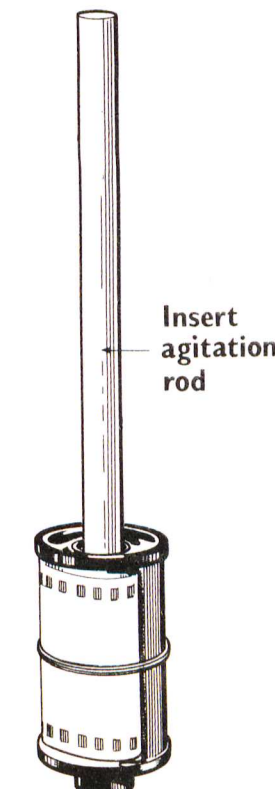


FIG. 4

Causes of possible faults

Fault	Cause	Remedy
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DRY in a dust-free, warm area after removing surface water with a clean chamois leather.

NOTE: One bottle of 'Kodak' Film Monobath is sufficient to process 3 films. Unused monobath solution will keep for a reasonable period if stored in a tightly-stoppered bottle.

Making the print

Prints can be made in normal room-lighting, either tungsten artificial light or subdued daylight away from the window.

Preparation: Mount the wet or dry negatives in 'Kodak' Readymounts.

In one 10×12-inch dish, make up a solution of 'Kodak' Universal Developer, diluted 1 part developer with 7 parts water.

In the other 10×12-inch dish, dilute 1 part 'Kodafix' Solution with 7 parts water.

Exposing: Insert a mounted negative into the slide projector. Adjust and focus the projector onto a blank sheet of paper in the paper holder. Switch off the projector.

Working quickly to avoid excessive exposure to the room lighting, remove a sheet of 'Kodak' Projection Paper P153 from the packet; cut it in half to fit the paper holder (8×5 inches), and place one piece into the paper holder, yellow side out. Replace the other half-sheet in the packet.

Switch on the projector and expose. With a 500-watt projector, expose for about 5 seconds.

Processing: Develop the exposed paper, face down, for about 1 minute at 20°C (68°F) – agitate by rocking the dish. The development time may be varied between 30 seconds and 2 minutes. Processing may be carried out at higher temperatures, if necessary, with a consequently shorter development time. The developer, fixing solution and washing water should preferably be all at the same temperature.

If the print goes very black, check that the general level of room lighting is not too high, thus causing "light fogging" of the paper. If the room lighting is satisfactory, reduce the exposure.

If, even after full development, the print is too light, increase the exposure.

Lift the developed paper from the dish and allow to drain for a few seconds; transfer it to the fixing solution. Fix for about 1 minute at 20°C (68°F) – agitate by rocking the dish.

When fixed, wash the print briefly in running water, preferably at 20°C (68°F). If greater permanence is required, wash the print more thoroughly.

Remove surplus surface water by blotting. Hang up prints to dry, or lay them out, face up, on blotting paper.

Kodak Limited London

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Printed in England.
581TP666/axP8/8-66

T164536

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