

# PROCESSING B&W PAPER

## PROCESSING AND FINISHING ILFORD FIBRE BASE PAPERS

ILFORD fibre base papers are processed in a similar way to other fibre base papers.

Additional recommendations on processing ILFORD MULTIGRADE FB WARMTONE paper are given in the ILFORD MULTIGRADE FB WARMTONE fact sheet.

Note Photographic chemicals are not hazardous when used correctly. Always follow the health and safety recommendations on the packaging. Photochemicals material safety data sheets containing full details for the safe handling, disposal and transportation of ILFORD chemicals are available from ILFORD.

### AGITATION

Use intermittent agitation when dish/tray processing prints, that is, intermittently rock the dish/tray when processing single sheets, or interleave them when processing several sheets of paper at once.

To interleave prints, slip the sheets into the dish/tray, one at a time. Then pull out the bottom sheet and place it on top of the remaining sheets in the dish/tray. Continue moving the bottom sheet to the top, until the processing step is complete.

### DEVELOPMENT

ILFORD developer	Dilution	°C/°F	Time (min) Recommended	Range
<b>Liquids</b>				
MULTIGRADE	1+9	20/68	2	1½-3
	1+14	20/68	3	2-5
PQ UNIVERSAL UNIVERSAL	1+9	20/68	2	1½-3
	1+9	20/68	2	1½-3
<b>Powder</b>				
BROMOPHEN	1+3	20/68	2	1½-3

On correctly exposed prints, the image will begin to appear after 35 seconds with these developers. Development may be extended to 6 minutes without any noticeable change in contrast or fog.

To maintain print to print consistency when batch processing a large number of prints, it may be advantageous to reduce exposure slightly and extend development.

### Developer capacity

The following table gives the developing capacity of one litre of working strength developer.

ILFORD developer	Dilution	20·3x25·4cm (8x10 inches) ILFORD prints
<b>Liquids</b>		
MULTIGRADE	1+9	50
	1+14	40
PQ UNIVERSAL UNIVERSAL	1+9	45
	1+9	45
<b>Powder</b>		
BROMOPHEN	1+3	45

### MULTIGRADE developer

MULTIGRADE developer is supplied as a liquid concentrate and can be used at the standard dilution of 1+9 or at 1+14 for greater development control and for economy.

MULTIGRADE developer is clean working and has excellent keeping properties. It can be stored as a concentrate in full unopened bottles for up to two years; in half full, tightly capped bottles, it will keep for about six months. Diluted developer will stay in good condition in the open dish/tray for two working days, at dilution 1+9, and for one working day, at dilution 1+14.

### PQ UNIVERSAL developer

PQ UNIVERSAL developer is supplied as a liquid concentrate. A full, tightly capped bottle of PQ UNIVERSAL developer concentrate will keep for up to two years; in half full tightly capped bottles it will keep for about six months. During use, PQ UNIVERSAL will keep in good condition for about 24 hours in the open dish/tray.

### BROMOPHEN developer

BROMOPHEN developer is supplied as a powder which is mixed to make a stock solution, which is then diluted before use. BROMOPHEN powder can be stored indefinitely in a dry place. A full, tightly capped bottle of stock solution BROMOPHEN developer will keep for six months; in half full tightly capped bottles it will keep for about two months. During use, BROMOPHEN will keep in good condition for about 24 hours in the open dish/tray.

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### STOP BATH

After development, rinse prints in an acid stop bath, such as ILFORD ILFOSTOP or ILFOSTOP PRO. A stop bath stops development immediately, reduces the risk of staining and will extend the life of the fixer bath. A water rinse can be used instead of a stop bath, but it must be changed frequently to avoid processing marks.

ILFORD stop bath	Dilution	°C/°F	Time (min)
Liquid			
ILFOSTOP	1+19	18–24/ 64–75	½
ILFOSTOP PRO	1+19	18–24/ 64–75	½

A guide to the capacity of ILFOSTOP solution is 30 20·3x25·4cm (8x10 inches) prints in 1 litre of working strength solution. ILFOSTOP contains a colour indicator which turns from yellow to purple when the working solution is exhausted. ILFOSTOP PRO has a higher capacity of 45 20·3x25·4cm (8x10 inches) prints in 1 litre of working strength solution. Alternatively, discard the solution if the prints still feel slimy after 10 seconds in the bath.

### FIXATION

ILFORD non-hardening fixer	Dilution	°C/°F	Time (min)
Liquids			
ILFORD PAPER FIXER	1+3	18–24/ 64–75	1
HYPAM	1+4	18–24/ 64–75	1
HYPAM	1+9	18–24/ 64–75	2
MULTIGRADE	1+4	18–24/ 64–75	1
UNIVERSAL RAPID	1+4	18–24/ 64–75	1
Powder			
ILFOFIX II	stock	18–24/ 64–75	3

The use of a hardening fixer is not recommended as it reduces washing efficiency. There is no benefit in extending fixation beyond the recommended time; some loss of print quality might be seen when long fixing times are given due to image etching.

#### Fixer capacity

The capacity of a fixer is limited by the build up of silver compounds in the bath. The extent to which these can be tolerated depends on the permanence required from the prints. A silver level of 2g/l is safe for all commercial use with fibre base papers. This approximates to 40 20·3x25·4cm (8x10 inches) prints per litre of working strength fixer. For prints with maximum stability, that is, for long term storage, a silver level of 0·5g/l should be used (approximately 10 20·3x25·4cm (8x10 inches) prints). However, print

throughput can only be a guide as it depends on the proportion of black areas on the prints.

Silver estimator papers are generally not sensitive enough to test the silver levels suitable for optimum permanence. For important prints, therefore, it is recommended that the paper is tested in the following way to ensure adequate fixing.

**Checking paper is adequately fixed**  
Prepare the testing solution by dissolving 2g of sodium sulphide in 125ml of water. Take care to follow the health and safety information supplied by the manufacturer of the sodium sulphide. For use, dilute the testing solution 1+9 with water.

To establish a permanent reference for a particular type of paper, place a drop of the diluted testing solution on a white area of a print that is known to be well fixed (through two fresh fixing baths) and thoroughly washed. Remove any excess solution with clean blotting paper or absorbent tissue. A barely visible cream tint should be left. This is the reference colour for a well fixed and washed print on this type of paper.

Any subsequent prints that show a yellowing of the test spot are not properly fixed. Soak such prints in water for 5 minutes, then repeat the recommended fixing and washing sequence, using fresh fixer. Prints must be well washed before using the test. It is not effective on prints direct from the fixer bath.

#### Two-bath fixing

The capacity of a fixer can be significantly increased, while still obtaining optimum permanence, by using a second fixing bath. When the silver level of the first bath has reached 2g/l (approximately 40 20·3x25·4cm prints per litre of working strength fixer), discard it and replace it with the second bath. Make up a fresh second bath. This cycle can be repeated up to four times but, in any case, replace both baths after one week.

#### Two-bath fixing at 18–24°C/64–75°F

	Dilution	Fixing time (min)	
		Bath 1	Bath 2
Liquids			
ILFORD PAPER FIXER	1+3	1	+
HYPAM	1+4	1	+
HYPAM	1+9	1½	+
MULTIGRADE	1+4	1	+
UNIVERSAL RAPID	1+4	1	+
Powder			
ILFOFIX II	stock	3	+

#### WASHING

	°C/°F	Time (min)
Fresh, running water		
Double weight	Above 5/9	60

Do not wash ILFORD papers with some non-ILFORD papers which 'yellow' on prolonged washing,

because this can cause the papers to have a bloom or haze over the black areas on the prints.

A washing aid is not needed when conventionally processing fibre base papers, but its use does reduce the final wash times, thus saving time and water. If a hardening fixer has been used, a washing aid is recommended as hardened prints take longer to wash. When using ILFORD GALERIE WASHAID or UNIVERSAL Wash Aid, wash prints for at least 5 minutes in running water before using the washing aid, then wash prints in running water for 20 minutes.

#### Washing aid

ILFORD washing aid	Dilution	°C/°F	Time (min)
Liquid			
GALERIE WASHAID	1+4	18–24/ 64–75	10
UNIVERSAL Wash Aid	1+4	18–24/ 64–75	10

#### OPTIMUM PERMANENCE

There are several ways of achieving prints which will have optimum permanence under long term storage conditions. Essentially, prints must have minimum levels of residual silver (adequately fixed) and minimum levels of thiosulphate (adequately washed).

Where short fixing times can be given, the following sequences give extremely low levels of retained fixer and silver compounds. This is achieved by the combination of a very short fixing time and the use of GALERIE WASHAID or UNIVERSAL Wash Aid. These sequences replace the standard fixing and washing sequence.

#### Optimum permanence sequence

Fixing	ILFORD PAPER FIXER (1+3), intermittent agitation	1min
First wash	Fresh, running water	5min
Rinse	GALERIE WASHAID (1+4), intermittent agitation	10min
Final wash	Fresh, running water	5min

Processing conditions: 18–24°C/64–75°F including wash water.

#### Optimum permanence sequence with selenium toner

Fixing	ILFORD PAPER FIXER (1+3), intermittent agitation	1min
Toning	Selenium toner diluted with working strength GALERIE WASHAID instead of water, intermittent agitation	*min
Rinse	GALERIE WASHAID (1+4), intermittent agitation	10min
Final wash	Fresh, running water	30min

Processing conditions: 18–24°C/64–75°F including wash water.

\*Tone the print for the appropriate time to achieve the depth of colour needed.

Be careful not to exceed the capacity of the fixer and not to extend the fixing time as both of these make washing more difficult.

#### PRINCIPLES OF GOOD FIXATION

The biggest cause of premature deterioration of black and white photographs is undoubtedly poor processing technique, notably inadequate fixing and/or washing. In the case of fixing, this can mean times that are too long as well as too short.

Do not exceed the capacity of the fixer

Residual silver depends on fixer usage. There are three ways of keeping the residual silver to acceptable levels.

1 Fix only a few prints before replacing the fixing bath (approximately 10 20·3x25·4cm (8x10 inches) prints in one litre of working strength fixer).

2 Use two-bath fixation.

3 Use a single fixing bath plus a washing aid. The number of prints through the single fixing bath can be increased to approximately 40 20·3x25·4cm (8x10 inches) prints in one litre of working strength fixer.

Use short times in a 'rapid' fixer, such as ILFORD PAPER FIXER

This reduces the absorption of thiosulphate by the prints and thus makes them easier to wash.

Use a non-hardening fixer, such as ILFORD PAPER FIXER

Hardened prints take longer to wash. If a hardening fixer is preferred, use a second fixing bath with a non-hardening fixer.

#### PRINCIPLES OF GOOD WASHING

1 Use of a washing aid, such as ILFORD GALERIE WASHAID, shortens effective washing times, even when two fixers or long fixing times have been used.

2 If short fixing times can be given, then washing times when using a washing aid can be very short – see the ILFORD optimum permanence sequence.

#### TONING

Most toners can be used effectively with fibre base papers. Apart from creating aesthetic effect, some toners provide additional protection by converting or coating the silver image with compounds which make it less reactive to external contaminants. Selenium and sulphide (sepia) toning are particularly recommended for their protective effect.

### DRYING

A final rinse in ILFORD ILFOTOL, diluted 1+200 with water, will aid even and rapid drying. After washing, squeegee prints on both sides to remove surplus water. Prints can then be air-dried at room temperature or heat-dried.

Air-dry prints face down on clean nylon or plastic mesh screens, or clipped back-to-back in pairs and hung from a line. Prints can be heat-dried or glazed/ferrotyped in the usual way. The use of belt print dryers and photographic blotters is not recommended with MULTIGRADE FB WARM TONE prints because there is a risk that prints will stick to them.

Take care to ensure that only well washed prints come into contact with any equipment used for drying. It takes only one fixer-contaminated print to contaminate all those dried subsequently.

### RETOUCHING

ILFORD fibre base papers respond well to all types of retouching (ie spotting, knifing and air brushing). Use retouching dye for a glossy finish or water colour for a matt finish.

### DRY MOUNTING

This technique is very convenient, fast, clean to work with and provides a permanent, perfect bond between print and mount.

### WET MOUNTING

This is generally used to mount very large prints for display purposes and is not recommended where the highest level of image permanence is needed.

### DISPLAY OF PRINTS

Prints made for display must be toned to protect them from the oxidising gases that are found in many environments. Oxidising gases come from everyday items such as newly laid carpet, wet gloss paint, newly applied adhesives and traffic fumes. Selenium and sulphide (or sepia) toning give images of increased stability, as do polysulphide toners (for example, Kodak Brown Toner).

Some metal replacement toners, for example, gold toner and platinum toner can protect the image, but other metal replacement toners, such as blue (iron) toner and red (copper) toner may not give extra protection as the image might fade. Dye toners do not give extra protection.

Also recommended for image protection are image stabilising solutions, such as Agfa Sistan, Tetenal Stabinal and Fuji AgGuard.

Laminating may also help to protect the image, but ideally prints should be toned before laminating. ILFORD ILFOGUARD laminating and encapsulating films are recommended.

### Long term print storage

When exceptionally long term print life is needed, prints must be processed as described in the section 'Optimum permanence' and then stored under special storage conditions. The ANSI standard on print storage (ANSI IT9.20-1994) has two levels of storage conditions: medium term and extended term. Medium term is for prints with a life expectancy of at least 10 years. Extended term is for prints with a longer life expectancy and to prolong the life of all prints. Briefly, the main conditions are:

Freedom from chemical contamination, either airborne or from storage containers. Also protection from high levels of ultra-violet radiation, particularly sunlight but also fluorescent lighting.

For medium term storage: a stable temperature up to 25°C/77°F (but preferably below 20°C/68°F) with a maximum daily cycling of  $\pm 2^\circ\text{C}/4^\circ\text{F}$ ; and a stable humidity between approximately 20%RH and 50%RH with a maximum daily cycling of  $\pm 10\%$ .

For extended term storage: a stable temperature up to 18°C/64°F (but preferably lower) with a maximum daily cycling of  $\pm 1^\circ\text{C}/2^\circ\text{F}$ ; and a stable humidity between approximately 30%RH and 50%RH with a maximum daily cycling of  $\pm 5\%$ .

A wide range of fact sheets is available which describe and give guidance on using ILFORD products.