

TECHNICAL INFORMATION

FP4 PLUS**ISO 125/22° BLACK AND WHITE PROFESSIONAL FILM
FOR HIGH PRINT QUALITY AND FLEXIBILITY IN USE**

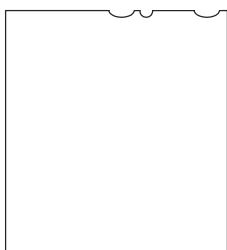
ILFORD FP4 Plus is an exceptionally fine grain, medium speed, black and white film. It is ideal for high quality indoor and outdoor photography, particularly when giant enlargements are to be made. In addition to general photography, FP4 Plus is also suited to copying and internegative work, and has many applications in scientific, technical and industrial photography.

FP4 Plus is robust and will give usable results even if it is overexposed by as much as six stops, or underexposed by two stops. It is compatible with all major processing systems, including those which give the standard short fixing and washing times.

FP4 Plus 35mm film is coated on 0.125mm/5-mil acetate base and is available in 24 or 36 exposure cassettes, or in bulk lengths of 17 and 30.5 metres (56 and 100ft). FP4 Plus 35mm film is supplied in DX coded cassettes, suitable for all 35mm cameras.

FP4 Plus rollfilm is coated on 0.110mm/4-mil clear acetate base with an anti-halation backing which clears during development. It is available in 120 and 220 lengths and is edge numbered 1 to 19 (120) and 1 to 40 (220).

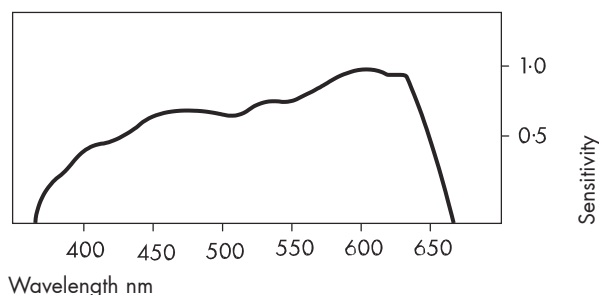
FP4 Plus sheet film is coated on 0.180mm/7-mil polyester base with an anti-halation backing which clears during development. It is available in a wide range of standard sizes. The emulsion faces the user when sheet film is held in the position shown.

**EXPOSURE RATING**

FP4 Plus has a speed rating of ISO 125/22° (125ASA, 22DIN, EI 125/22) to daylight. The ISO speed rating was measured using ILFORD ID-11 developer at 20°C/68°F with intermittent agitation in a spiral tank.

Best results are obtained at EI 125/22, but good image quality will also be obtained at meter settings from EI 50/18 to EI 200/24.

It should be noted that the exposure index (EI) range recommended for FP4 Plus is based on a practical evaluation of film speed and is not based on foot speed, as is the ISO standard.

SPECTRAL SENSITIVITY**Wedge spectrogram to tungsten light (2850K)****FILTER FACTORS**

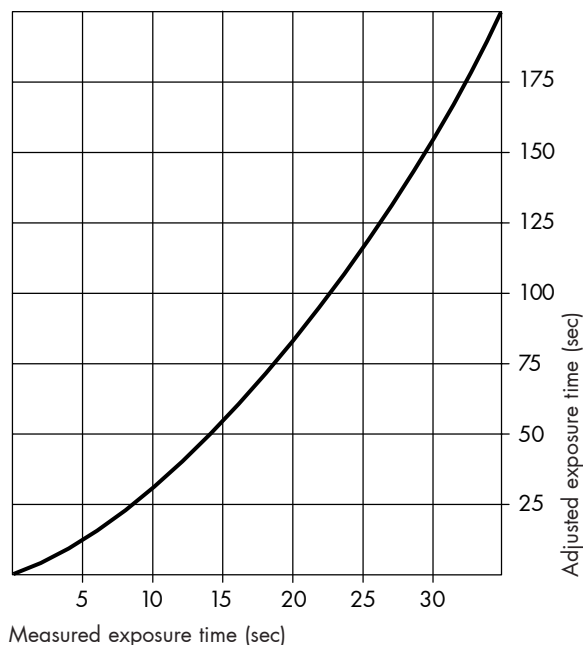
FP4 Plus film may be used with all types of filters (eg colour, polarising and neutral density filters) in the usual way. Follow the instructions given by the filter manufacturer.

The exposure increase in daylight may vary with the angle of the sun and the time of day. In the late afternoon or the winter months, when daylight contains more red light, green and blue filters may need slightly more exposure than usual.

Cameras with through-the-lens metering will usually adjust the exposure automatically when using filters. With some automatic exposure cameras, the correction given for deep red and orange filters can produce negatives under exposed by as much as 1 1/2 stops.

MAKING LONG EXPOSURES

For exposures between $\frac{1}{2}$ and $\frac{1}{10\,000}$ second, no adjustments are needed for reciprocity law failure. When exposures longer than $\frac{1}{2}$ second are given, FP4 Plus, along with other films, needs to be given more exposure than indicated by a meter. Use the graph to calculate the increased exposure time which should be given once the measured time is known.



CHOOSING THE BEST ILFORD DEVELOPER FOR THE JOB

Manual processing (eg spiral tank, dish/tray, deep tank) and rotary processors

	Liquid	Powder
Best overall image quality	ILFOTEC DD-X	ID-11 (stock)
Finest grain	ILFOTEC DD-X	PERCEPTOL (stock)
Maximum sharpness	ILFOSOL S	ID-11 (1+3)
Maximum film speed	ILFOTEC DD-X	MICROPHEN (stock)
One-shot convenience	ILFOSOL S ILFOTEC DD-X	ID-11 (1+1) MICROPHEN (1+1)
Economy	ILFOTEC LC29 (1+29)	ID-11 (1+3) MICROPHEN (1+3)
Rapid processing	ILFOTEC HC (1+15)	—
Replenishable	ILFOTEC HC	ID-11

Machine processing

Dip and dunk	ILFOTEC DD ID-11 ILFOTEC HC	Best overall image quality (liquid) and long tank life Best overall image quality (powder) and long tank life Flexible process time, range of dilutions and economy
Short leader	ILFOTEC RT RAPID ILFOTEC HC	Rapid processing, best overall image quality and long tank life Range of dilutions, flexibility and economy
Roller transport	ILFOTEC RT RAPID	Rapid processing

DEVELOPMENT TIMES

The table gives development times for both manual and machine processing FP4 Plus. These times will produce negatives of average contrast suitable for printing in all enlargers. The development times are intended as a guide and may be altered if a different result is needed.

For manual processing in spiral tanks and deep

tanks, the development times are based on intermittent agitation. Where continuous agitation is used for manual processing (as in a dish/tray or with some types of developing tank), reduce these times by up to 15%. For use in rotary processors without a pre-rinse, reduce the spiral tank development times by up to 15%. A pre-rinse is not recommended as it can lead to uneven processing.

35mm film, Rollfilm & Sheet film

ILFORD developer	Dilution	Meter setting		
		EI 50/18	EI 125/22	EI 200/24

Spiral tank, deep tank, dip and dunk machines (min/20°C/68°F)

ILFOTEC DD-X	1+4	8	10	12
ILFOSOL S	1+9 1+14	4½ 7½	6½ 9½	7½ –
ILFOTEC HC	1+15 1+31	– 6	4 8	5 9
ILFOTEC LC29	1+9 1+19 1+29	– 6 8	4 8 12	5 9 –
ID-11	stock 1+1 1+3	6½ 8 17	8½ 11 20	10 15 –
MICROPHEN	stock 1+1 1+3	– – –	8 10 14	9 14 18
PERCEPTOL	stock 1+1 1+3	9 13 17	12 15 21	– – –
Non-ILFORD developer				
Acufine Acufine	stock	–	4	6
Agfa Refinal	stock	–	6	9
Agfa Rodinal	1+25 1+50	– –	9 15	13 20
Kodak D-76	stock 1+1 1+3	6 9 14	8 11 16	9 15 20
Kodak HC-110	A B	– 6	4½ 9	6 12
Kodak Microdol-X	stock 1+3	10 17	15 23	– –
Kodak T-Max	1+4	–	8	9
Paterson Acutol	1+10	7	9	12
Tetenal Ultrafin	1+10 1+20	– –	7 11	9 14
Tetenal Ultrafin Plus	1+4	–	6	9
Kodak Xtol	stock	–	8½	10

Dip and dunk machines (min/24°C/75°F)

ILFOTEC DD	1+4	7	8½	11½
Kodak T-Max RS	stock	–	7½	–
Kodak Xtol	stock	–	7	10½

ILFOLAB FP40, roller transport and short leader machines (sec)

ILFOTEC RT RAPID	1+1+2/26°C/78°F 1+1+5/26°C/78°F	40 55	45 65	54 84
ILFOTEC HC	1+11/24°C/75°F	–	70	–
Kodak Duraflor RT	stock/26°C/78°F	–	50	–

Note Development times may need adjusting to suit individual processing systems and working practices. If an established system is producing good results, adjust the recommended development times until the desired contrast level is obtained. Development times in other manufacturers' developers are included for your convenience, and are only a general guide. Other manufacturers can and do change their product specifications from time to time, and the development times may change as a result.

METER SETTINGS BELOW EI 50/18 AND ABOVE EI 200/24

If FP4 Plus has been inadvertently exposed at settings below EI 50/18 or above EI 200/24, the following guide will ensure usable negatives are obtained. Obviously, the quality of negatives processed in this way will not be so high as conventionally processed ones.

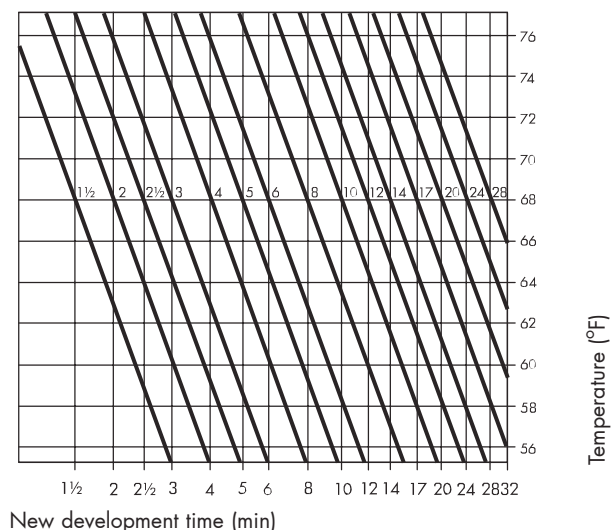
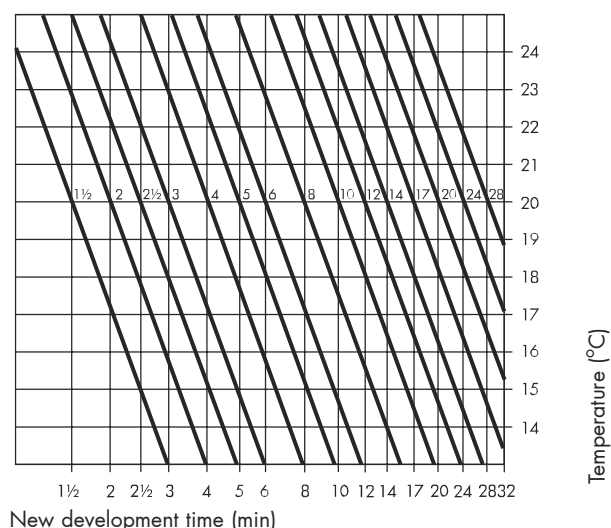
Manual processing (min/20°C/68°F) - accidental exposure only

ILFORD developer	Dilution	Meter setting	
		EI 25/15 and below	EI 400/27 and above
MICROPHEN	stock	–	16
PERCEPTOL	stock	8½	–

PROCESSING AT DIFFERENT TEMPERATURES

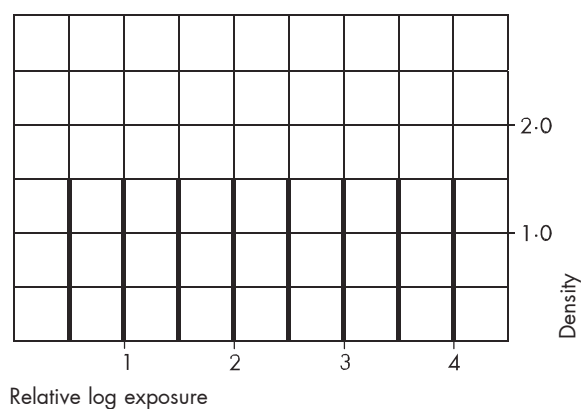
FP4 Plus film can be processed over a range of temperatures. Development at 20°C/68°F is recommended and the times are given in the development times table. If development is not possible at 20°C/68°F, the following chart can be used. The chart is based at 20°C/68°F for a general developer, and can be used to give an estimate of development times at temperatures around 20°C/68°F

For example, if 4 minutes at 20°C/68°F is recommended, the time at 23°C/73°F will be 3 minutes and the time at 16°C/61°F will be 6 minutes.



Note The chart can only be used as a guide because different developers and processing techniques can vary the results.

CHARACTERISTIC CURVE



FP4 Plus rollfilm developed in ILFORD ILFOTEC HC (1+31) for 8 minutes at 20°C/68°F with intermittent agitation. This curve is also representative of the 35mm and sheet film formats.

PROCESSING

FP4 Plus can be processed in all types of processing equipment including spiral tanks, rotary processors, dishes/trays, deep tanks and automatic processors. Standard capacity figures and replenishment rates can be maintained. FP4 Plus is very robust in processing and will tolerate less than ideal processing conditions. Also, it will not contaminate the processing chemicals.

Safelight recommendations

Handle FP4 Plus film in total darkness. For very brief inspections during processing, use the ILFORD 908 (very dark green) safelight filter, with a 15W bulb, fitted in a darkroom lamp (such as the ILFORD DL10 or DL20). Do not allow direct lighting from the safelight to fall on the film.

Agitation

Intermittent agitation is recommended for use in spiral tanks and deep tanks. Continuous agitation is recommended in dishes/trays by rocking the dish/tray. With spiral tanks, invert the tank four times during the first 10 seconds, then invert the tank four times again during the first 10 seconds of each further minute. Otherwise, follow the recommendations given by the processing equipment manufacturer.

Stop, fix, wash and rinse

For best results it is recommended that all process solutions are kept at the same temperature or at least within 5°C (9°F) of the developer temperature.

Stop Bath

After development the film can be rinsed in water but we recommend that an acid stop bath is used such as ILFORD ILFOSTOP (with indicator dye) or ILFOSTOP PRO (without indicator dye). ILFOSTOP PRO is recommended for all machine processing applications. When tanks or dishes (trays) of process solutions are in use a stop bath immediately stops development and reduces carry over of excess developer into the fixer bath. This helps to maintain the activity and prolong the life of the fixer solution.

ILFORD Stop Bath	ILFOSTOP	ILFOSTOP PRO
Dilution	1+19	1+19
Temperature range	18–24°C (64–75°F)	18–24°C (64–75°F)
Time (seconds) at 20°C (68°F)	10	10
Capacity films/litre (unreplenished)	15x(135–36)	22x(135–36)

The process time given is the minimum required, if necessary a longer time may be used and should not cause any process problems provided it is not excessive.

Fix

The recommended fixers are ILFORD RAPID FIXER and ILFORD HYPAM liquid fixers and ILFORD ILFOFIX II powder fixer, all are non-hardening fixers.

ILFORD Fixer	ILFORD HYPAM & ILFORD RAPID FIXER	ILFORD ILFOFIX II
Dilution	1+4	stock
Temperature range	18–24°C (64–75°F)	18–24°C (64–75°F)
Time (mins) at 20°C (68°F)	2–5	4–8
Capacity films/litre (unreplenished)	24x(135–36)	24x(135–36)

WASH

When a non-hardening fixer has been used wash the films in running water for 5–10 minutes at a temperature within 5°C (9°F) of the process temperature.

For spiral tank use, when a non-hardening fixer has been used, the following method of washing is recommended. This method of washing is faster, uses less water yet still gives negatives suitable for long term storage.

After fixing, fill the spiral tank with water at the same temperature, $\pm 5^\circ\text{C}$ (9°F), as the processing solutions and invert it five times. Drain the water away and refill. Invert the tank ten times. Once more drain the water away and refill. Finally, invert the tank twenty times and drain the water away.

Rinse

For a final rinse use ILFORD ILFOTOL wetting agent added to water, it helps the film to dry rapidly and evenly. Start by using 5ml per litre of rinse water (1+200), however the amount of ILFOTOL used may need some adjustment depending on the local water quality and drying method. Too little or too much wetting agent can lead to uneven drying. Remove excess rinse solution from the film before drying.

FIX HARDENER

ILFORD RAPID FIXER and ILFORD ILFOFIX II must not be used with fix hardeners as they are not compatible with them. If a fix hardener is required then only ILFORD HYPAM fixer can be used. Add ILFORD HYPAM HARDENER to turn HYPAM into a hardening fixer.

Generally for most applications modern camera films are sufficiently hardened at manufacture. Additional hardening from a fixer hardener is not usually needed or recommended for processing in spiral tanks, dishes/trays, deep tanks, rotary processors, dip and dunk (hanger) machines and short leader card processors, unless the processing temperature is above 30°C (86°F), or poor drying performance is being experienced. To minimise the risk of physical damage a fixer hardener may be needed when using a roller transport film processor.

Using a fix hardener will require the recommended fix and wash times to be extended. Depending on the film and processing conditions the hardened fix time will be between 4 and 10 minutes and the subsequent wash time 10–20 minutes in running water.

The amount of HYPAM HARDENER that can be added to the fixer is dependant on the film and process conditions used. In some processors the full amount of hardener cannot be used as the fix and wash times cannot be extended adequately. In these circumstances we recommend starting with the minimum amount of hardener to have some effect. This is around 3–6 mls of hardener per litre of working strength HYPAM used. This increases the film hardness slightly but has a negligible effect on the fix and wash efficiency. When fix and wash times are restricted the maximum amount of HYPAM HARDENER recommended is 10–20ml of hardener per litre of working strength HYPAM used. This higher amount gives a definite increase to the hardness of the films processed and while fixing and washing efficiency are reduced the films will be adequately fixed and washed for most purposes.

When fix and wash times can be extended the maximum amount of HYPAM HARDENER needed to achieve fully hardened films is 1 part to 40 parts working strength HYPAM i.e. 24 ml per litre.

Drying

To avoid drying marks, use a clean squeegee or chamois cloth to wipe FP4 Plus film before hanging it to dry. Dry FP4 Plus at 30–40°C/86–104°F in a drying cabinet or at room temperature in a clean dust-free area.

STORAGE

Store FP4 Plus in a cool (10–20°C/50–68°F), dry place in its original packaging.

Exposed film

Once exposed, process FP4 Plus as soon as practical. Images on exposed but unprocessed film will not degrade for up to several months when stored as recommended.

Negatives

Store processed negatives in a cool (10–20°C/50–68°F), dry place, in the dark. Suitable storage sleeves include those made of cellulose triacetate, Mylar, paper (pH6.5–7.5) or inert polyester.

A wide range of fact sheets is available which describe and give guidance on using ILFORD products. Some products in this fact sheet might not be available in your country.

HARMAN technology Limited, Ilford Way,
Mobberley, Knutsford, Cheshire WA16 7JL, England
www.ilfordphoto.com