

## FACT SHEET

# PAN 100

# PAN 400

## A MEDIUM SPEED AND A FAST BLACK AND WHITE CAMERA FILM

### DESCRIPTION

The ILFORD range of PAN 100 and PAN 400 black and white camera films are not generally distributed and sold worldwide, they are only made available in selected markets.

ILFORD PAN 100 is a medium speed black and white film which offers outstanding tonal rendition, together with fine grain and high sharpness. PAN 100 is suitable for most general purpose indoor and outdoor photography applications where good lighting exists, it is particularly suited to portraiture. When processed as recommended PAN 100 produces negatives that allow a high degree of enlargement.

ILFORD PAN 400 is a fast black and white film ideal for action, available light and general purpose photography. It has fine grain for its speed and excellent contrast and sharpness combining to give excellent image quality.

Both films have a high degree of exposure latitude, 1½ stops under to as much as 5 stops over, making them easy and reliable to use in difficult lighting conditions.

PAN 100 and PAN 400 are available in 35mm and 120 roll film formats. PAN 100 and PAN 400 35mm films are coated on 0.125mm/5-mil acetate base and available in DX coded 36 exposure cassettes suitable for all 35mm cameras or in bulk lengths of 17 and 30.5 metres (55 - 100 ft). PAN 100 and PAN 400 120 rollfilm is coated on 0.110mm/4-mil clear acetate base, edge numbered 1 to 19.

### EXPOSURE

PAN 100 film has a speed rating of ISO100/21° (100ASA, 21DIN, EI 100/21) to daylight. With suitable development good quality images can also be obtained at meter settings between EI 50/18 and EI 200/24.

PAN 400 film has a speed rating of ISO 400/27° (400ASA, 27DIN, EI 400/27) to daylight. With suitable development good quality images can also be obtained at meter settings between EI200/24 and EI 3200/36.

The ISO speed rating for each film was measured using ILFORD ID11 developer at 20°C/68°F with intermittent agitation in a spiral tank

### FILTER FACTORS

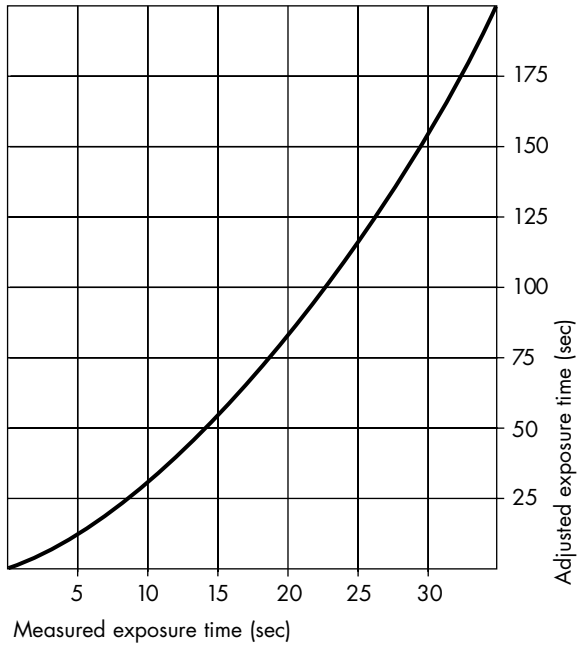
PAN 100 and PAN 400 films may be used with all types of filters (eg colour, polarising and neutral density filters) in the usual way. Follow the instructions given by the filter manufacturer.

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 1½ stops.

**MAKING LONG EXPOSURES**

For exposures between  $\frac{1}{2}$  and  $\frac{1}{10000}$  second, no adjustments are needed for reciprocity law failure. When exposures longer than  $\frac{1}{2}$  second are given, PAN 100 and PAN 400, along with other films, need 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**

<b>PAN 100</b>	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

<b>PAN 400</b>	Liquid	Powder
Best overall image quality at meter setting		
EI 200/24	ILFOTEC DD-X	PERCEPTOL (stock)
EI 400/27	ILFOTEC DD-X	ID-11 (stock)
EI 800/30	ILFOTEC DD-X	ID-11 (stock)
EI 1600/33	ILFOTEC DD-X	MICROPHEN (stock)
EI 3200/36	ILFOTEC DD-X	MICROPHEN (stock)
Finest grain	ILFOTEC DD-X	PERCEPTOL
Maximum sharpness	ILFOSOL S	ID-11 (1+3)
Maximum film speed	ILFOTEC DD-X	MICROPHEN (stock)
One-shot convenience	ILFOSOL S (1+9) 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 PAN 100 and PAN 400**

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 PAN 100 and PAN 400. 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.

**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.

**PAN 100****35mm film, Rollfilm & Sheet film**

	Dilution	Meter setting		
		EI 50/18	EI 100/21	EI 200/24
<b>Spiral tank, deep tank, dip and dunk machines (min/20°C/68°F)</b>				
ILFORD developer				
ILFOTEC DD-X	1+4	7	9	11
ILFOSOL S	1+9	4	6	7
	1+14	7	9	-
ILFOTEC HC	1+15	-	4	5
	1+31	6	8	9
ILFOTEC LC29	1+9	-	4	5
	1+19	6	8	9
	1+29	8	12	-
ID-11	stock	6	7	9
	1+1	7	10	15
	1+3	14	16	-
MICROPHEN	stock	-	7	8
	1+1	-	9	12
	1+3	-	12	16
PERCEPTOL	stock	8	-	-
	1+1	12	-	-
	1+3	16	-	-

## Non-ILFORD developer

Acufine Acufine	stock	-	4	6
Agfa Refinal	stock	-	6	9
Agfa Rodinal	1+25	-	9	13
	1+50	-	15	20
Kodak D-76	stock	6	7	9
	1+1	7	10	15
	1+3	14	16	-
Kodak HC-110	A	-	4	5
	B	6	8	9
Kodak Microdol-X	stock	8	-	-
	1+3	16	-	-
Kodak T-Max	1+4	-	8	9
Paterson Acutol	1+10	7	9	12
Tetenal Ultrafin	1+10	-	7	9
	1+20	-	11	14
Tetenal Ultrafin Plus	1+4	-	6	9

**Dip and dunk machines (min/24°C/75°F)**

ILFOTEC DD	1+4	6	7	10
Kodak T-Max RS	stock	-	7	-

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

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

**PAN 400****35mm film, Rollfilm & Sheet film**

METER SETTING Dilution EI 200/24 EI 400/27 EI 800/30 EI 1600/33 EI 3200/36

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

ILFORD developer

ILFOTEC DD-X	1+4	7	8	9	12	18
ILFOSOL S	1+9	6	7	8	14	-
	1+14	8	9	14	-	-
ILFOTEC HC	1+15	-	3	5	7	11
	1+31	5	6	9	14	-
ILFOTEC LC29	1+9	-	3	5	7	11
	1+19	5	6	9	14	-
	1+29	7	9	-	-	-
ID-11	stock	6	7	10	14	-
	1+1	12	13	16	-	-
	1+3	18	20	-	-	-
MICROPHEN	stock	-	6	7	12	16
	1+1	-	12	13	-	-
	1+3	-	23	24	-	-
PERCEPTOL	stock	10	11	-	-	-
	1+1	14	16	-	-	-
	1+3	22	-	-	-	-

Non-ILFORD developer

Acufine Acufine	stock	4	5	7	9	-
Agfa Refinal	stock	5	6	9	-	-
Agfa Rodinal	1+25	5	6	8	-	-
	1+50	9	11	-	-	-
Kodak D-76	stock	6	7	10	14	-
	1+1	12	13	16	-	-
	1+3	18	20	-	-	-
Kodak HC-110	A	-	3	5	7	-
	B	-	6	9	14	-
Kodak T-Max	1+4	5	6	8	9	-
Paterson Acutol	1+10	6	7	-	-	-
Tetenal Ultrafin	1+10	6	7	10	-	-
	1+20	13	16	-	-	-

**Dip and dunk machines (min/24°C/75°F)**

ILFOTEC DD	1+4	5	6	8	11	-
Kodak T-Max RS	stock	-	4	5	7	-

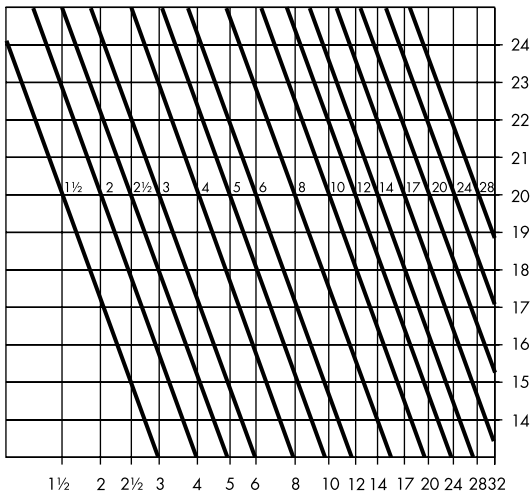
**ILFOLAB FP40, roller transport and short leader machines (sec)**

ILFOTEC RT RAPID	1+1+2/26°C/79°F	55	60	75	91	-
	1+1+5/26°C/79°F	65	70	95	120	-
ILFOTEC HC	1+11/24°C/75°F	50	55	70	90	-
Kodak Duraflo RT	stock/26°C/79°F	55	60	81	120	-

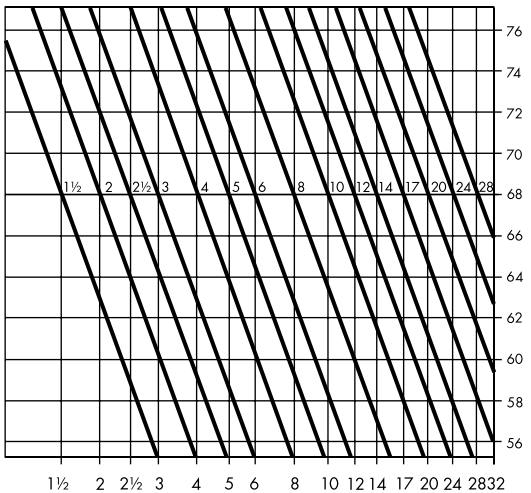
**PROCESSING AT DIFFERENT TEMPERATURES**

PAN 100 and PAN 400 films 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.



New development time (min)



New development time (min)

**PROCESSING**

PAN 100 and PAN 400 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. PAN 100 and PAN 400 are very robust in processing and will tolerate less than ideal processing conditions. Also, they will not contaminate the processing chemicals.

**Safelight recommendations**

Handle PAN 100 and PAN 400 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.

Temperature (°C)

Temperature (°F)

**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, +/- 5°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 PAN 100 and PAN 400 films before hanging it to dry. Dry PAN 100 and PAN 400 at 30–40°C/86–104°F in a drying cabinet or at room temperature in a clean dust-free area.

### **STORAGE**

Store PAN 100 and PAN 400 in a cool (10–20°C/50–68°F), dry place in its original packaging.

### **Exposed film**

Once exposed, process PAN 100 and PAN 400 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.