

TECHNICAL INFORMATION

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# HP5 PLUS

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FAST BLACK AND WHITE PROFESSIONAL FILM  
FOR HIGH PRINT QUALITY AND PROCESSING CONVENIENCE

*Photo by David Bravo, Fairfield, CT*

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# ILFORD

## HP5 PLUS

### Fast Black and White Professional Film

#### 1 DESCRIPTION AND USE

HP5 Plus is a fast black and white film. It is ideal for action, available light and general purpose photography. It is designed to give optimum results under most lighting conditions and when processed in a wide range of developers. HP5 Plus is rated at ISO 400/27° when exposed to daylight.

HP5 Plus has the fine grain, good edge contrast and sharpness required to give excellent image quality. These characteristics give prints with outstanding brightness and a full tonal range.

HP5 Plus, though, is more than an ISO 400/27° film. By extending development with some developers, for example ILFORD ILFOTEC HC and ILFORD MICROPHEN, it is possible to use meter settings up to EI 3200/36. This makes HP5 Plus the ideal film for all photography where factors such as poor lighting and moving subjects demand greatest emulsion sensitivity.

HP5 Plus is compatible with all current processing systems including those which give the standard short fixing and washing times. There is no need to change standard processing techniques when switching to HP5 Plus, or any other ISO 400/27° film. HP5 Plus is very robust during processing, giving excellent results under most conditions, and will also tolerate processing conditions that are less than ideal.

HP5 Plus 35mm film is supplied in DX coded cassettes, so the film speed of ISO 400/27° is set automatically on automatic 35mm cameras. These cassettes are very strong and have the end caps firmly fixed to the body. This ensures the caps remain in position during rough handling.

The combination of the tangential style cassette and the film's low friction characteristics allows the film to advance easily, thus saving battery wear.

The base tint of HP5 Plus enables easy print contrast assessment on a light box. For easy negative identification, it also has bold frame numbering for whole frames and letters to indicate half frame numbering.

##### 1.1 35mm FILM

HP5 Plus 35mm film is available in 24 or 36 exposure DX cassettes or in bulk film lengths of 100 feet (30.5m).

HP5 Plus is coated on 0.125mm ( $\frac{1}{8000}$  inch) acetate base.

##### 1.2 ROLL FILM

HP5 Plus roll film is available as 120 and 220 lengths. It is edge numbered 1 to 19 for 120 and 1 to 40 for 220. The backing paper has a white outer surface for easy frame identification. The portion of the backing paper visible after exposure is black with white printing for quick identification of exposed films.

HP5 Plus roll film is coated on 0.110mm ( $\frac{1}{9000}$  inch) clear acetate base which has an antihalation backing that clears during development.

#### 1.3 SHEET FILM

HP5 Plus sheet film is available in a wide range of standard sizes. It is coated on 0.175mm ( $\frac{1}{5700}$  inch) polyester base, offering rigidity and dimensional stability. The base has an antihalation backing which clears during development.

The short side of HP5 Plus sheet film is notched to indicate the emulsion surface and film type. The emulsion faces the user when the film is held in the position shown. The three notches indicate that the film is HP5 Plus.



The new notch code, being phased in (September 1995) includes an ILFORD identifier. This identifier is an elliptical notch in the number one and number five positions. Either set of notches indicated above identifies ILFORD HP5 Plus sheet film.

Both surfaces of HP5 Plus will accept commonly used retouching media and are designed to resist surface roller marks when machine processing.

## 2 EXPOSURE DETAILS

### 2.1 EXPOSURE RATING

HP5 Plus has a speed rating of ISO 400/27° and is recommended for general photography in all types of lighting. The ISO speed rating was measured using ILFORD ID-11 developer at 68°F (20°) with intermittent agitation in a spiral tank. When working in low light conditions, the versatility of HP5 Plus can be exploited by using meter settings between EI 400/27 and EI 3200/36.

It should be noted that the exposure index (EI) recommended when push processing HP5 Plus is based on a practical evaluation of film speed and is not based on foot speed, as is the ISO standard.

### 2.2 FILTER FACTORS

HP5 Plus film can be used with all types of filters (e.g., color, polarizing and neutral density filters) in the usual way.

The table gives a practical GUIDE to the increase in exposure needed when using the filters listed. 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 the daylight contains more red light, green and blue filters may need slightly more exposure than usual. The exposure increases for tungsten light are based on an average tungsten source which has a color temperature of 3200K.

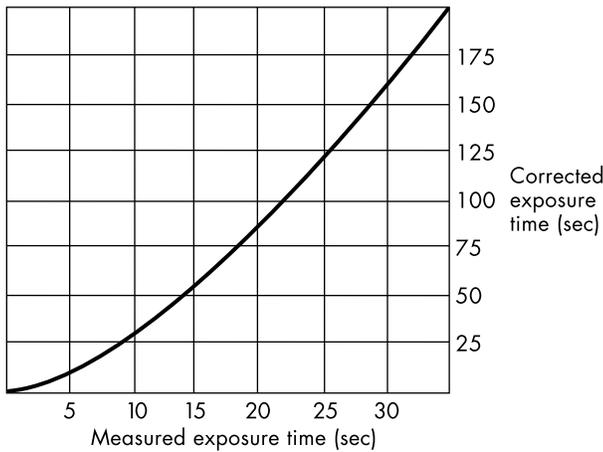
Cameras with through-the-lens metering will usually adjust the exposure automatically when using filters. With some automatic exposure cameras, the correction given for deep red and orange filters can produce negatives underexposed by as much as 1½ stops. To check for this, take two readings of the same subject, one with and one without a filter on the lens. Compare the difference between the two with the filter manufacturer's recommended increase in the exposure. Where a meter is causing underexposure, either adjust the speed rating or, if possible, switch to manual operation.

The factors are intensity scale factors, but in most cases exposures can be increased by using either a larger aperture or a slower shutter speed. Multiply a metered exposure by the filter factor to approximate the new setting.

Kodak Wratten Filter	Daylight Factor	Tungsten Factor
Yellow (#8)	1.5	1.2
Deep Yellow (#15)	2.0	1.5
Yellowish Green (#11)	3.0	3.0
Orange (#21)	2.3	2.0
Deep Orange (#22)	5.0	2.5
Tricolor Red (#25)	8.0	4.0
Tricolor Blue (#47)	8.0	25.0
Tricolor Green (#58)	6.0	6.0
Neutral Density (.30)	2.0	2.0

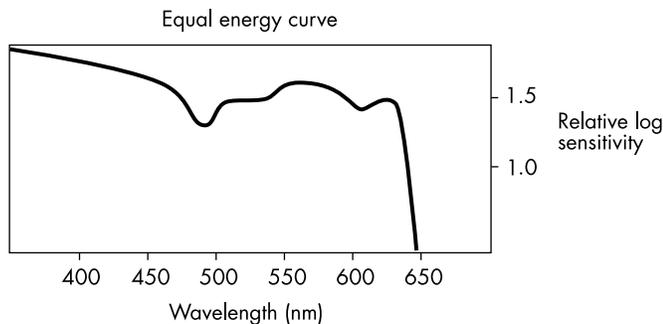
**2.3 RECIPROcity CHARACTERISTICS**

Most films, including HP5 Plus, are designed to be used over a wide range of exposures. This range covers most normal photography, including exposure by electronic flash. Thus, for exposures between 1/2 and 1/10,000 second, no corrections are needed for reciprocity law failure. When exposures longer than 1/2 second are given, HP5 Plus, along with other films, needs to be given more exposure than indicated by a meter. Use the following graph to calculate the increased exposure time which should be used once the measured time is known.

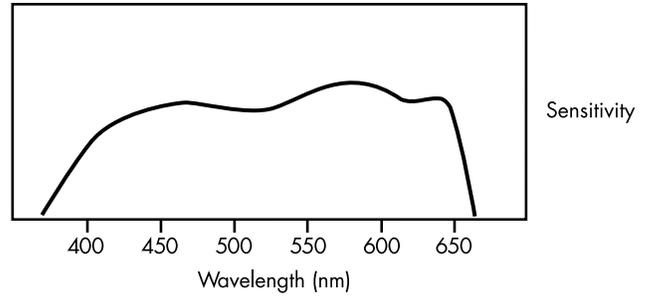


**2.4 SPECTRAL SENSITIVITY**

HP5 Plus film has full panchromatic sensitivity. The spectral sensitivity curves to equal energy and to tungsten illumination are shown below.



Wedge spectrogram to tungsten light (2850K)



**3 PROCESSING OPTIONS**

**3.1 DEVELOPERS**

The versatility of HP5 Plus can be utilized by selecting the best ILFORD developer for the job. The following table is a guide to choosing the ILFORD developer for HP5 Plus that is most suited to individual requirements.

MANUAL PROCESSING (e.g., Spiral Tank, Deep Tanks)

Requirement	Liquid	Powder
Best Overall Image Quality At Meter Setting:		
EI 400/27	ILFOTEC HC (1+31)	ID-11 (Stock)
EI 800/30	ILFOTEC HC (1+31)	ID-11 (Stock)
EI 1600/33	ILFOTEC HC (1+15)	MICROPHEN (Stock)
EI 3200/36	ILFOTEC HC (1+15)	MICROPHEN (Stock)
Finest Grain	ILFOTEC HC (1+15)	PERCEPTOL
Maximum Sharpness	ILFOSOL-S (1+9)	ID-11 (1+3)
Maximum Film Speed	ILFOTEC HC (1+15)	MICROPHEN (Stock)
One-Shot Convenience	ILFOSOL-S (1+14)	ID-11 (1+3)
	ILFOTEC HC-D	MICROPHEN (1+3)
Economy	ILFOTEC HC	ID-11 (1+3)
	ILFOTEC HC-D	MICROPHEN (1+3)
Rapid Processing	ILFOTEC HC (1+15)	
Replenishable	ILFOTEC HC	

MACHINE PROCESSING

Dip and Dunk	ILFOTEC HC	Flexible process time, range of dilutions
	ILFOTEC DD	Best overall image quality Maximum film speed
Leader Belt	ILFOTEC HC	Range of dilutions, flexibility
Roller Transport	ILFOTEC RT RAPID	Rapid processing

**3.2 EXTENDED DEVELOPMENT**

HP5 Plus can produce high quality prints even when exposed at high meter settings, such as EI 3200/36. Natural lighting and low light situations can easily be handled at such meter settings. Also, special situations requiring the very high shutter speeds available on today's cameras, such as sports events and news photography, are no problem to HP5 Plus.

ILFORD ILFOTEC HC, ILFORD MICROPHEN and ILFORD ILFOTEC RT RAPID are specially designed for push processing and therefore are the preferred developers. However, a wide range of other ILFORD developers can also be used. For the recommended meter settings, see section 5.2 Development Times.

## 4 PROCESSING METHODS

HP5 Plus can be processed in all types of processing equipment including spiral tanks, deep tanks and automatic processors. HP5 Plus is very robust in processing and will tolerate less than ideal processing conditions. Also, it will not contaminate the processing chemicals.

### 4.1 SAFELIGHT RECOMMENDATIONS

Handle HP5 Plus film in total darkness. For very brief inspections during processing, use the ILFORD 908 (very dark green) or Kodak Series 3 safelight filter, with a 15W bulb, fitted in a darkroom lamp. For direct lighting, ensure there is at least 3 feet between the film and the safelight.

When processing HP5 Plus film by inspection, the safest way is to use infrared illumination in the darkroom, with infrared goggles to see the film. This method ensures the film cannot be fogged and makes it easy to see the image.

### 4.2 SPIRAL TANK PROCESSING

The recommended agitation for spiral tank processing with ILFORD chemicals is to invert the tank four times during the first 10 seconds and again for 10 seconds (that is, four inversions) at the start of every further minute. Use this method of agitation for both development and fixing. At the end of each agitation sequence, tap the tank firmly on the sink or table top to dislodge any air bubbles.

### 4.3 ROTARY PROCESSORS

Rotary processors, such as those made by Jobo, have very similar processing conditions to spiral tank processing by hand, except they process with small amounts of solution and can be pre-programmed. Follow any guidance given by the processor manufacturer when adjusting processing times for these types of processors. Standard development times are given in section 5.2 Development Times; these may need reducing by up to 15% for use in rotary processors without a pre-rinse because of the continuous agitation given in these processors. Alternatively, if using a pre-rinse, use the development times for spiral tank processing as a guide.

## 4.4 MACHINE PROCESSING

HP5 Plus can be processed in all types of general purpose film processors, including dip and dunk, short leader and roller transport processors—see the developer recommendations in section 3.1 Developers.

After development, fix HP5 Plus in ILFORD UNIVERSAL Rapid (1+3). When roller transport processing, add one part ILFORD FIX HARDENER to every 40 parts working strength UNIVERSAL Rapid fixer. Hardener protects the film during the remainder of the roller transport processing sequence.

## 5 DEVELOPMENT TIMES

The tables give development times for both manual and machine processing HP5 Plus film. These times will produce negatives of average contrast suitable for printing in all enlargers. The development times are intended as a GUIDE ONLY and may be altered if a different result is required.

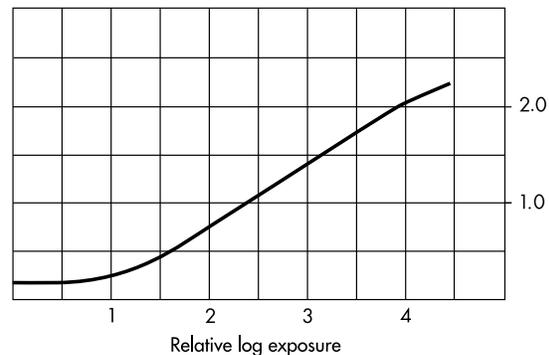
To use the tables, determine the meter setting used, then choose the developer and dilution, and read off the development time. This time has been found to give the best quality with that meter setting in that developer. This simplified approach to development times with HP5 Plus means there is no need to adjust the meter setting to suit the choice of developer.

For manual processing, these times are based on intermittent agitation (see section 4.2). When continuous agitation is used for manual processing—as in a tray or with some types of developing tanks—reduce these times by up to 15%.

**Note:** The contrast level obtained using these development times is between the “normal” and “high” contrast levels that used to be recommended for use with condenser or diffuser enlargers respectively. This approach is no longer necessary, considering the enlarger types that are popular today.

### 5.1 CHARACTERISTIC CURVE

HP5 Plus developed in ILFORD ID-11 stock for 7½ min. at 68°F (20°C) with intermittent agitation.



5.2 DEVELOPMENT TIMES

SPIRAL TANK, DEEP TANK AND ROTARY PROCESSORS (Min/68°F/20°C)

ILFORD Developer	Dilution	Meter Setting			
		EI 400/27	EI 800/30	EI 1600/33	EI 3200/36
ILFOTEC HC-D	1+9	3½**	5	7½	12½
	1+19	6½	9½	14	*
	1+29	9	*	*	*
ILFOSOL-S	1+9	7	8½	14	*
	1+14	9½	14	*	*
ILFOTEC HC	1+15	**	5	7½	12½
	1+31	6½	9½	14	*
	1+47	9	*	*	*
ID-11	Stock	7½	10½	14	*
	1+1	13	16½	*	*
	1+3	20	*	*	*
MICROPHEN	Stock	6½	8	11	16
	1+1	12	15	*	*
	1+3	23	*	*	*
PERCEPTOL	Stock	11	*	*	*
	1+1	15	*	*	*
	1+3	25	*	*	*

\*Not recommended

\*\*Not recommended due to the risk of uneven development

■ Highlighted area indicates choice for first time testing

DIP AND DUNK MACHINES (Min/75°F/24°C)

ILFORD Developer	Dilution	Meter Setting			
		EI 400/27	EI 800/30	EI 1600/33	EI 3200/36
ILFOTEC DD	Stock	5½	6	7	*
ILFOTEC HC	1+31 (68°F)	6½	9½	14	*
Kodak T-Max RS	Stock	4½*	5	7	10½

\*Not recommended due to the risk of uneven development

MANUAL PROCESSING (Min/68°F/20°C)

Non-ILFORD Developer	Dilution	Meter Setting			
		EI 400/27	EI 800/30	EI 1600/33	EI 3200/36
Kodak D76	Stock	7½	9½	12½	*
	1+1	11	13	*	*
	1+3	22	*	*	*
Kodak HC-110	A	*	*	5½	9½
	B	5	7½	11	*
Kodak T-Max	1+4	6½	8	9½	11½
Kodak T-Max RS	—	6½	7½	10	15
Acufine	Stock	4½**	6½	9½	*
Agfa Rodinal	1+25	6	8	*	*
	1+50	11	*	*	*

\*Not recommended

\*\*Not recommended due to the risk of uneven development

ROLLER TRANSPORT AND LEADER CARD MACHINES (Sec)

Developer	Dilution/ Temperature	Meter Setting			
		EI 400/27	EI 800/30	EI 1600/33	EI 3200/36
ILFOTEC RT RAPID	Standard/ 80.6°F (27°C)	55	80	120	160
	Modified/ 80.6°F (27°C)	74	87	120	160
	Standard/ 78.8°F (26°C)	60	81	120	166
ILFOTEC HC	Modified/ 78.8°F (26°C)	81	95	120	166
	1+11/ 75°F (23.9°C)	55	70	90	130
Kodak Duraflo RT	Standard/ 80.6°F (27°C)	55	81	120	160

5.3 METER SETTINGS SLOWER THAN EI 400/27

If HP5 Plus has been inadvertently exposed at a meter setting slower than EI 400/27, the following guide will ensure that usable negatives are obtained. Obviously, the quality of negatives processed in this way will not be as high as conventionally processed ones.

MANUAL PROCESSING (Min/68°F/20°C)

ILFORD Developer	Dilution	Meter Setting		
		EI 50/18	EI 100/21	EI 200/24
PERCEPTOL	Stock	9	9	11

For users who regularly like to use films slower than ISO 400/27°, the other films in the ILFORD range can be recommended—ILFORD PAN F Plus (ISO 50/18°) and ILFORD FP4 Plus (ISO 125/22°). These films can also be exposed over a limited speed range, for example, for a meter setting of EI 200/24, choose FP4 Plus and develop it in ILFORD MICROPHEN stock solution for 6.5 minutes at 68°F.

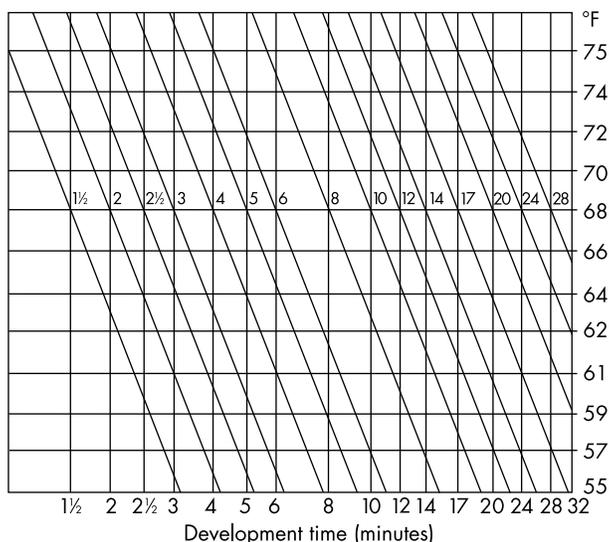
Also available is ILFORD XP2 400 (ISO 400/27°), a unique black and white film which can be exposed over a range of meter settings from EI 100/21 to EI 800/30 on the same roll of film. It has very fine grain and must be processed through standard C-41 type color negative chemicals.

5.4 PROCESSING AT DIFFERENT TEMPERATURES

HP5 Plus film can be processed over a range of temperatures. Development times at temperatures other than 68°F may be calculated from the chart on page 6.

1. Look up the development time at 68°F in the tables in section 5.2.
2. Find this time on the 68°F line—see the figures in the middle of the chart.
3. Follow the diagonal line for this time to where it cuts the horizontal line for the new temperature.

4. Draw a line straight down from this point and read off the approximate new development time on the base of the chart. For example, if 4 minutes at 68°F is recommended, the time at 74°F will be 3 minutes and the time at 61°F will be 6 minutes.



### 5.5 FIXING

HP5 Plus is fully fixed in the standard short fixing times associated with most black and white films. There is no need to give extended fixing.

After development, rinse the film in water and fix in ILFORD UNIVERSAL Rapid fixer (1+3) for 2–4 minutes at 68°F. When a hardening fixer is needed for machine processing, add ILFORD FIX HARDENER\* and fix for 4 minutes at 68°F. A hardener is recommended only when processing at high temperatures (above 86°F) or in a roller transport processor.

\*ILFORD FIX HARDENER *CAN NOT* be used with ILFORD MULTIGRADE and ILFORD 2000 RT fixers.

### 5.6 WASHING

Where film has not been hardened, wash in running water for 5–10 minutes.

For spiral tank use, when a non-hardening fixer has been used and the washing temperature is below 77°F, the following method of washing is recommended. This method of washing is faster, uses less water and gives negatives of archival permanence.

1. Process the film in a spiral tank.
2. Fix it using ILFORD UNIVERSAL Rapid fixer.
3. After fixing, fill the tank with water at the same temperature as the processing solutions, and invert it five times.
4. Drain the water away and refill. Invert the tank ten times.
5. Drain and refill it for the third time; invert the tank twenty times. Drain the water.

When a hardening fixer has been used, wash the film in running water for 15–20 minutes at a temperature within  $\pm 10^\circ\text{F}$  of the processing temperature. Use of a hardening fixer makes the film more difficult to wash and is therefore not recommended.

A final rinse of water to which ILFOTOL Wetting Agent (1+200) has been added will aid rapid and uniform drying.

### 5.7 DRYING

To avoid drying marks, use a squeegee or chamois cloth to wipe HP5 Plus film before hanging it to dry. Dry HP5 Plus at 86–104°F in a drying cabinet or at room temperature in a clean, dust free area.

## 6 CONTRAST-TIME CURVES

For normal use at EI 400/27, develop HP5 Plus according to the development times given in the table in section 5.2 Development Times. The development times for a meter setting of EI 400/27 correspond to zero contrast change on the contrast-time curves.

For subjects with an unusually large or small brightness range, and also to fine tune contrast to suit individual requirements, it is possible to vary the development time to obtain the type of negatives required. As a guide, try changing contrast in steps of 5%.

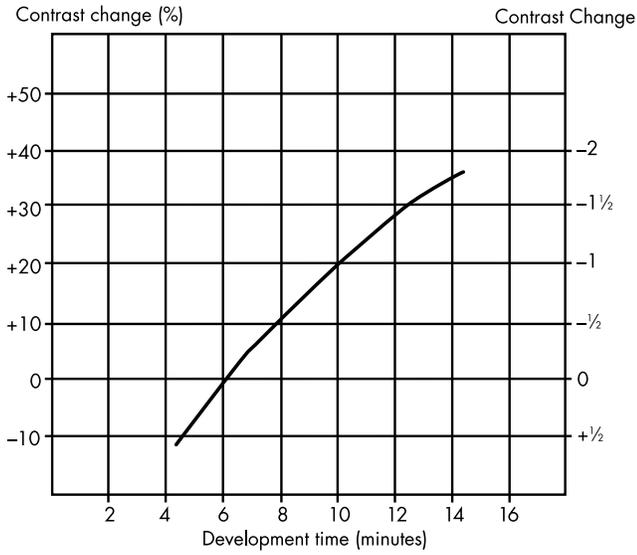
**Note:** In general, the best image quality is always obtained when the film is processed according to the recommendations given in sections 4 and 5, and printed on the appropriate grade of paper for the resulting negatives.

The scale on the right hand side of the contrast-time curves gives the contrast changes in ILFORD printing paper contrast grades.

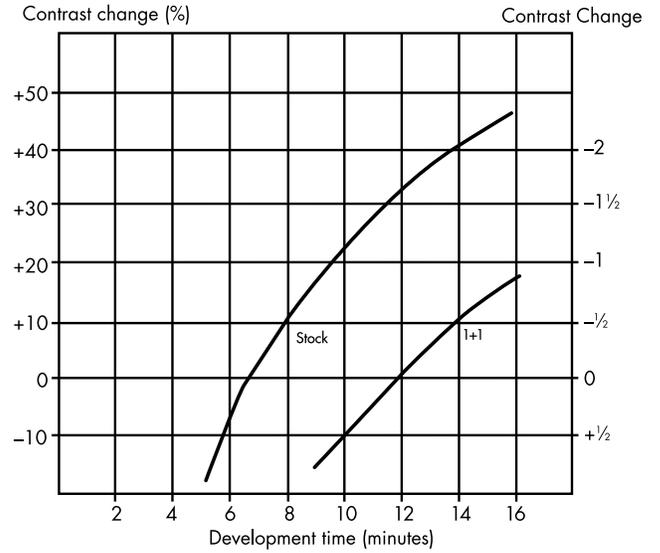
For example, if your negatives normally lie between paper grades 2 and 3, you may wish to increase the film development time, which increases the contrast of the negatives, so they print on grade 2.

In such a case with ILFOTEC HC (1+31) developer, for example, instead of giving a development time of 6 minutes, read off the new development time of approximately 8 minutes where the  $-\frac{1}{2}$  paper grade meets the contrast-time curve. Alternatively, use one of the ILFORD MULTIGRADE papers which gives  $\frac{1}{2}$  steps of contrast.

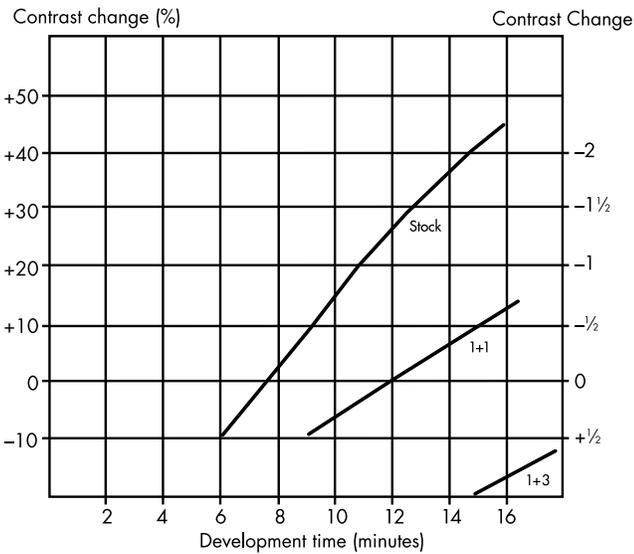
**6.1 ILFOTEC HC (1+31)/HC-D (1+19)**



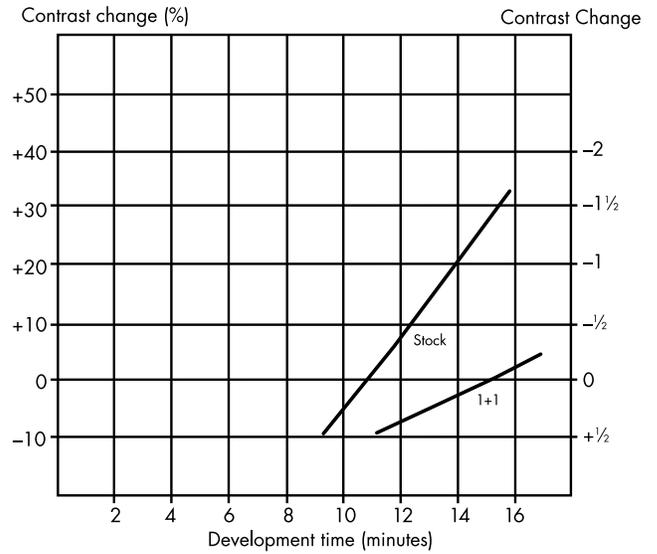
**6.3 MICROPHEN**



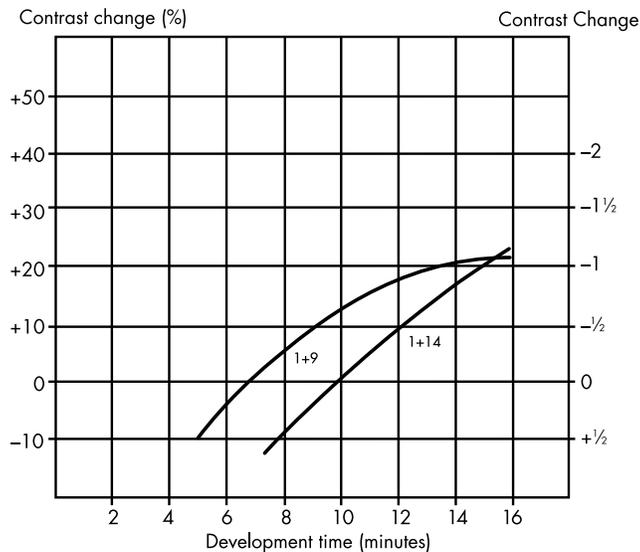
**6.2 ID-11**



**6.4 PERCEPTOL**



## 6.5 ILFOSOL-S



## 7 STORAGE

As with all film, unexposed HP5 Plus should be stored in a cool, dry place in its original packaging. Never leave near heat source. Similarly, never leave film in strong sunlight, such as near a window.

### 7.1 STORAGE OF EXPOSED FILM

As with any film, once exposed, process HP5 Plus as soon as possible. Images on exposed but unprocessed film will not degrade during normal working periods, that is, up to one month when stored as recommended.

ILFORD may modify its products from time to time and consequently the information given in this publication is subject to change without notice.

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KD 5M 3/96

## 7.2 NEGATIVE STORAGE

Store processed negatives in a cool, dry place, in the dark. Suitable storage sleeves include those made of cellulose triacetate, Mylar or paper (pH6.5–7.5) or inert polyester. Certain other plastics, PVC in particular, are not recommended for negative storage as the plasticizer used may affect the film and cause it to stick to the negative sleeves.

## 8 PRINT MAKING

HP5 Plus negatives have the traditional characteristics of quality black and white film and will ensure excellent quality prints, even from subjects with a wide brightness range. HP5 Plus is designed for use with all papers to give a full range of tones including excellent highlight and shadow detail.

For best results, the ILFORD range of MULTIGRADE variable contrast papers, and graded papers such as ILFOSPEED RC Deluxe and ILFOBROM GALERIE FB, are recommended. Additionally, the ILFORD MULTIGRADE 500 exposing system replaces the standard lamphouse on most professional enlargers and ensures fast and efficient printing on MULTIGRADE paper.

The development times in section 5 give negatives which are suitable for printing in all enlargers. These times, however, are only a guide and may be altered to suit individual printing requirements. Some guidance on altering the times is given in the contrast-time curves in section 6.