

TECHNICAL INFORMATION

ILFOTEC DD

FILM DEVELOPER AND REPLENISHER FOR DIP AND DUNK (HANGER) PROCESSORS

ILFORD ILFOTEC DD is a replenishable developer for all general purpose black and white films. For machine processing we recommend it is used in conjunction with ILFORD ILFOTEC DD STARTER solution. It is supplied as a liquid concentrate to make up replenisher and the addition of ILFOTEC DD STARTER solution turns the replenisher into machine tank developer. ILFOTEC DD is specifically designed to be used in applications where large quantities of film are processed such as replenished dip and dunk (hanger) processing systems. With some adjustments to development times and operating temperature it can also be used in deep tanks and continuous long leader processors. ILFOTEC DD has a long tank life and good resistance to contamination, reliably producing superb quality negatives under a wide range of conditions. The recommended working temperature range is 20 - 24°C, (68 - 75°F).

For some applications ILFOTEC DD working strength solutions can be used as a developer without using ILFOTEC DD STARTER.

MIXING

Working strength ILFOTEC DD solutions can be mixed either manually or by using automatic solution mixing equipment. If automatic mixing equipment is used follow the equipment manufacturer's recommendations and advice.

Note Photographic chemicals are not hazardous when used correctly. It is recommended that gloves, eye protection and an apron or overall are worn when handling and mixing all chemicals. Always follow the specific health and safety recommendations on the chemical packaging. Photochemical material safety data sheets containing full details for the safe handling, disposal and transportation of ILFORD chemicals are available from ILFORD agents or directly from the ILFORD web site at www.ilfordphoto.com

ILFOTEC DD concentrate is diluted 1+4 with water to prepare working strength replenisher.

For some applications this solution can be used as a developer but some adjustment to the recommended development times is required.

To make working strength ILFOTEC DD developer add ILFOTEC DD STARTER to the working strength replenisher, 1 + 250, i.e. 4ml of starter per litre of developer required.

NB It is very important to make sure that the correct amount of ILFOTEC DD STARTER is calculated for the amount of developer being made and measured and dispensed accurately. Adding more or less than the amount required can significantly affect the development time recommendations.

Before mixing fresh batches of ILFOTEC DD ensure that the developer and replenisher tanks, solution lines and any mixing vessels are thoroughly rinsed and cleaned, particularly if being used for the first time. When making solutions ensure that the mixing vessel is large enough for the volume of solution to be mixed and stirred.

After filling a processor with any fresh tank solution switch it on and allow it to get up to temperature and circulate the solutions. After the working temperature is reached leave it recirculating for at least 10 minutes to ensure the fresh chemicals are thoroughly mixed before attempting to process any film. Always replace the floating lid and/or tank cover on the replenishment solutions. The processor is now ready to use.

For dip and dunk (hanger) machines or deep tanks always use a floating lid on the developer tank when the machine is idle between processing sessions.

Example of solution preparation

For a dip & dunk (hanger) processor with a 150 litre developer tank and a 100 litre replenisher tank a total of 50 litres of ILFOTEC DD concentrate and 600ml of ILFOTEC DD STARTER are required to fill the processor.

First prepare 100 litres of replenisher using 20 litres of ILFOTEC DD concentrate and 80 litres of water in a suitable mixing vessel and stir thoroughly using a suitable implement as a stirrer. This is easiest with a stirrer long enough to reach the bottom of the mixing vessel. When the solution is mixed transfer it to the processor's replenishment tank and replace the floating lid and/or tank cover.

To prepare the developer, first make 150 litres of replenisher using 30 litres of concentrate and 120 litres of water again using a suitable mixing vessel and stirring thoroughly. Measure out 600ml of ILFOTEC DD STARTER and add it to the 150 litres of replenisher to make a total of 150.6 litres of developer and then stir thoroughly. Transfer this developer to the processor's developing tank

Wash out the mixing vessel.

Tabulated below are some common processor developer tank sizes along with the amounts of ILFOTEC DD concentrate, water and starter required to fill them.

Nominal Tank size (litres)	ILFOTEC DD Concentrate (litres)	Water(litres)	Starter (ml)	Actual solution Volume made (litres)
13	2.6	10.4	52	13.052
26	5.2	20.8	104	26.104
52	10.4	41.6	208	52.208
96	19.2	76.8	384	96.384
200	40	160	800	200.8

1 litre = 33.81 US fluid ounces

3.8 litres = 1 US gallon

29.6ml = 1 US fluid ounce

pH AND SPECIFIC GRAVITY

The following table gives the pH and specific gravity (SG) for fresh, working strength ILFOTEC DD developer or replenisher, (for all practical purposes the figures are the same with or without ILFOTEC DD STARTER). These figures were obtained under carefully controlled laboratory conditions and may differ slightly from measurements made by users in their own working areas. Users should make their own control measurements from their own accurately mixed fresh solutions for later comparison. Ideally a pH meter should be used to measure solution pH but if one is not available pH measurement sticks can be used. These are available in various pH ranges, those covering a range from pH 7 to pH 10 are sufficient. SG can be measured by using a hydrometer and one covering the range from 1.000 to 1.200 is useful for a wide range of photographic working strength process solutions.

ILFOTEC DD at 1+4 dilution	
pH	8.50
SG (20°C)	1.070
SG (24°C)	1.065

PROCESSORS

Dip & Dunk processors

ILFOTEC DD is specifically designed for use in dip & dunk (hanger) process machines, the recommended process temperature is 24°C (75°F).

Gas burst agitation for Dip & Dunk processors and deep tanks

If gas burst agitation is in use then nitrogen must be used to agitate the developer but air can be used for the stop bath, fixer and wash. Do not use air to agitate the developer solution. To set up gas burst agitation follow the equipment manufacturer's instructions, if none are given then as a starting point set the gas pressure to 0.3-0.9 bar (5-14psi) and the agitation cycle to 2 seconds gas on/8 seconds gas off.

Alternatively, a lower rate of agitation can be used of one gas burst every other second for eleven seconds in each minute but development times will need to be adjusted.

Care must be taken when using gas agitation as uneven processing may result with some equipment. Do not load the films too closely together as this will reduce the effect of the solution's agitation. Gas agitation is not recommended when processing films on spirals.

The same degree of agitation but with air can be used for the other process solutions.

Gas agitation of wetting agent solutions is not recommended as excessive foaming will occur

Deep tank processing

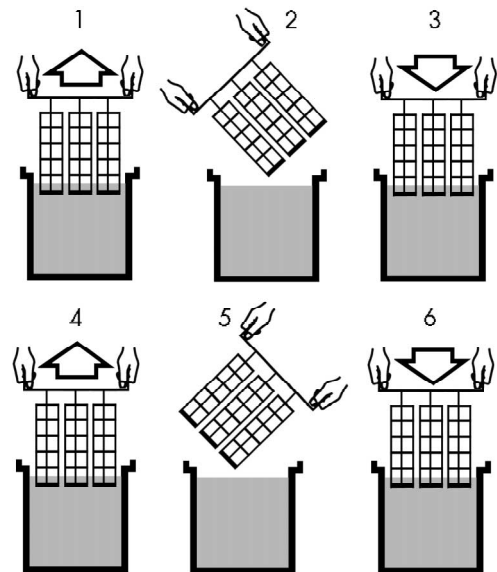
ILFOTEC DD can be used in deep tanks, in the temperature range of 20 - 24°C (68 - 75°F) the development times must be adjusted for the chosen temperature.

Manual agitation for deep tanks

The following method of manual agitation is recommended with ILFOTEC DD in deep tanks.

Lower the processing rack into the tank and tap the rack on the edges of the tank to remove any air bubbles. Lift the rack out of the solution and return it immediately. Tap the rack again on the edge of the tank.

At the end of each minute, lift the rack out of the solution, tilt it to one side and return it to the tank. Repeat this another two times, alternating the direction of the tilt. Tap the rack on the edge of the tank after the three lifts.



The same agitation technique should be used with the other process solutions.

Ten seconds before the end of each processing step lift the rack out of the solution and drain for the remainder of the time.

Continuous long leader processors

ILFOTEC DD can be used in continuous long leader processors. The recommended operating process temperature for ILFOTEC DD is 24°C (75°F). Agitation is given by the continuous movement of the film through the solutions and the action of the chemical recirculation systems.

Development times

The development times given in this fact sheet are different from those given in previous publications. This revision has been based on recent product evaluations. If you already use ILFOTEC DD and obtain satisfactory results you do not have to change what you do. However, we recommend that new users use the revised development times as a starting point.

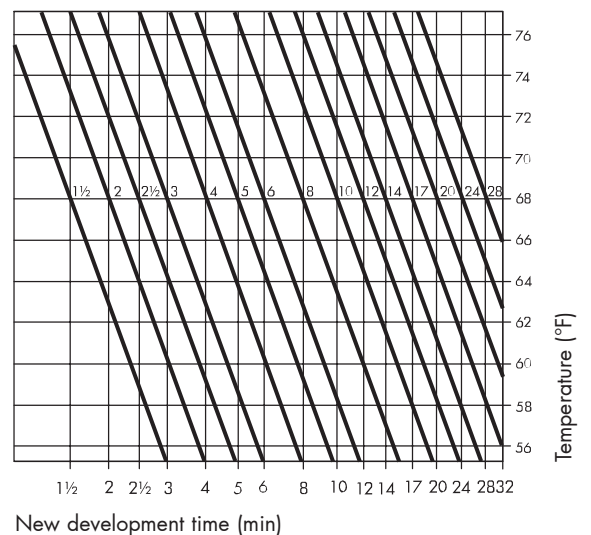
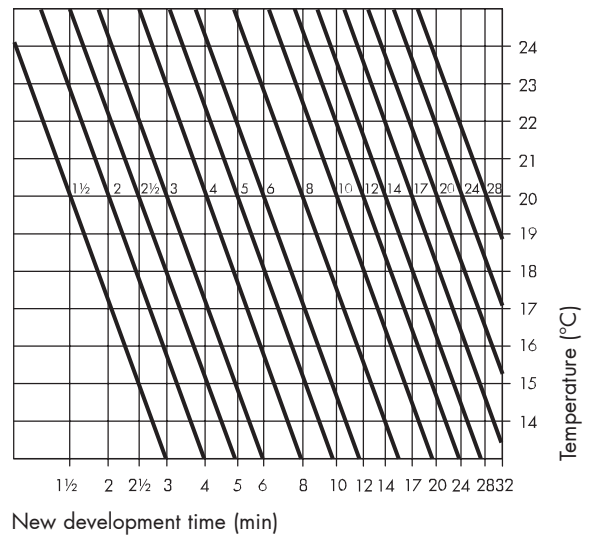
The table of development times given here is for seasoned replenished ILFOTEC DD developer with ILFOTEC DD STARTER in a dip and dunk (hanger) processor at 24°C (75°F) using the recommended nitrogen gas burst agitation. They can also be used for deep tank processing at 24°C (75°F) with intermittent agitation. The times given are for films rated at their nominal EI rating and should produce negatives of normal contrast, typically around a Gbar of 0.62. However these times are only a guide and may need to be adjusted to suit individual processing systems, working practices and preferences. Higher or lower contrast negatives may be preferred by some to suit their individual requirements and the recommended development times can be adjusted until the desired contrast level is obtained.

For a continuous processor reduce the given times by 10%

If ILFOTEC DD is used without ILFOTEC DD STARTER reduce the given times by 20% and then progressively increase them as batches of film are processed and the developer becomes seasoned.

ILFOTEC DD can be used in the temperature range of 20–24°C (68–75°F). For temperatures below 24°C/75°F increase the given development times by 10% for each 1°C/2°F drop in temperature. Alternatively use the time/temperature graphs below.

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.



In some processors the development time is controlled by the machine's speed. Please refer to the technical information of the machine's manufacturer to convert development time to machine speed.

ILFORD FILMS

	Meter setting	minutes and seconds	seconds
		24°C / 75°F	24°C / 75°F
100 DELTA PROFESSIONAL	EI 50/18	8.00	480
	EI 100/21	9.30	690
	EI 200/24	12.30	750
DELTA 400 PROFESSIONAL	EI 200/24	6.00	360
	EI 400/27	7.00	420
	EI 800/30	10.00	600
	EI 1600/33	13.00	780
	EI 3200/36	14.00	840
DELTA 3200 PROFESSIONAL	EI 400/27	8.00	480
	EI 800/30	8.30	520
	EI 1600/33	9.30	570
	EI 3200/36	10.30	630
	EI 6400 /39	13.30	810
	EI 12500/42	19.00	1140
PANF Plus	EI 25/15	4.30	270
	EI 50/18	5.30	330
FP4 Plus	EI 50/18	7.00	420
	EI 125/22	8.30	510
	EI 200/24	11.30	690
HP5 Plus	EI 200/24	6.00	360
	EI 400/27	7.00	420
	EI 800/30	10.00	600
	EI 1600/33	14.00	840
	EI 3200/36	18.00	1080
SFX200	EI 200/24	8.30	510
	EI 400/27	11.30	690
	EI 800/30	14.00	840
ORTHO PLUS Pictorial Contrast	EI 80/20 Daylight		
	Normal	5.30	330
	High	6.30	390
	EI 40/17 Tungsten		
	Normal	5.30	330
	High	6.30	390

NON ILFORD FILMS

	Meter setting	minutes and seconds	
		seconds	
		24°C/75°F	24°C/75°F
Kodak Tmax 100	EI 50/18	6.30	390
	EI 100/21	7.30	450
	EI 200/24	8.30	510
Kodak Tmax 400	EI 200/24	7.00	420
	EI 400/27	8.30	510
	EI 800/30	9.30	570
	EI 1600/33	10.30	630
	EI 3200/36	13.00	780
Kodak Tmax 3200	EI 400/27	8.30	510
	EI 800/30	9.00	540
	EI 1600/33	10.00	600
	EI 3200/36	10.30	630
	EI 6400/39	12.30	750
	EI 12500/42	14.30	870
Kodak Plus X	EI 50/18	7.00	420
	EI 125/22	8.00	480
	EI 200/24	10.00	600
Kodak Tri X	EI 200/24	6.30	390
	EI 400/27	7.30	450
	EI 800/30	8.30	510
	EI 1600/33	9.30	570
	EI 3200/36	10.30	630
Agfa APX 100	EI 50/18	8.30	510
	EI 100/21	12.30	750
Agfa APX 400	EI 200/24	8.00	480
	EI 400/27	9.00	540
	EI 800/30	10.00	600
	EI 1600/33	14.00	840
Fuji 100 Acros	EI 50/18	8.30	510
	EI 100/21	9.00	540
	EI 200/24	10.30	630
Fuji Neopan 400	EI 200/24	6.30	390
	EI 400/27	7.30	450
	EI 800/30	8.30	510
	EI 1600/33	9.30	570
	EI 3200/36	11.00	660
Fuji Neopan 1600	EI 400/27	5.00	300
	EI 800/30	5.30	330
	EI 1600/33	6.00	360
	EI 3200/36	7.00	420
	EI 6400/39	8.00	480
	EI 12500/42	9.00	540

The development times for other manufacturer's films are a general guide. the specification of these products may have changed with time and as a result these development times may need to be adjusted. If necessary the given times should be adjusted to give the result required.

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.

STOPBATH

After development it is recommended that films are rinsed in an acid stop bath such as ILFORD ILFOSTOP (with indicator dye) or ILFOSTOP PRO (without indicator dye). ILFOSTOP PRO is recommended for all machine processing applications. When tanks of process solutions are in use a stopbath 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)	15 (135–36)	22 (135–36)

The process time given is the minimum required. Due to the configuration of some processing machines a longer stop bath time may be given automatically but this should not cause any process problems. The design of some processing machines means that a stop bath cannot be included, provided that the fixer activity is monitored and adequate fixer replenishment rates used there should be no process problems.

FIXER

The recommended fixers are ILFORD RAPID FIXER or ILFORD HYPAM fixer. Both are non-hardening fixers.

ILFORD Fixer	ILFORD HYPAM	ILFORD RAPID FIXER
Dilution	1+4	1+4
Temperature range	18–24°C (65–75°F)	18–24°C (65–75°F)
Time (mins) at 20°C (68°F)	2–5	2–5
Capacity films/litre (unreplenished)	24 (135–36)	24 (135–36)

The fixing time given is the minimum required. Due to the configuration of some processing machines a slightly longer fix time may be given automatically but this should not cause any process problems.

WASH

When a non-hardening fixer has been used wash the films in running water for 5–10 minutes. The water temperature should be above 5°C (41°F), ideally within 5°C (9°F) of the developer temperature.

RINSE

For a final rinse ILFORD ILFOTOL wetting agent is recommended as it helps films to dry 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, the type of processor and its drier. Too little or too much wetting agent can lead to uneven drying.

FIX HARDENER

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

Generally for most applications modern camera films are sufficiently hardened at manufacture. Therefore additional hardening from a fixer hardener is not usually needed or recommended in dip and dunk (hanger) processors, continuous processors or deep tanks, unless the processing temperature is above 30°C (86°F) or poor drying performance is being experienced. A fixer hardener may be needed when using roller transport film processors to minimise the risk of physical damage.

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

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 10–20 mls 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. 24mls per litre.

REPLENISHMENT

The optimum developer replenishment rate for a particular process system can be found by using a process control system. For your processor please refer to the machine manufacturer’s technical information to calibrate it for replenishment.

The recommended replenishment rates for ILFOTEC DD are:-

Film Format	mls	US fluid oz
135-12	17	1/2
135-24	33	1
135-36	50	1 2/3
120	50	1 2/3
220	100	3 1/3
10.2x12.7cm(4x5")	13	1/2
12.7x17.8cm (5x7")	22	2/3
20.3x25.4cm (8x10")	50	1 2/3
6.5x9cm	6	1/4
9x12cm	11	1/3
10 x 15cm	15	1/2
13 x18cm	23	2/3

To give adequate replenishment to deep tanks, it may be necessary to remove some of the used developer from the developing tank so that the appropriate amount of replenisher can be added. Calculate the amount of replenishment needed and remove more developer than the amount of replenisher to be added. Add the replenisher to the tank and stir thoroughly and then top up the solution to the correct level using some of the removed developer.

DEEP TANK BATCH PROCESSING WITHOUT REPLENISHMENT

ILFOTEC DD can be used in deep tanks without replenishment to process either a number of films individually or multiple films in batches. With or without ILFOTEC DD STARTER each litre of unreplenished working strength ILFOTEC DD developer in a deep tank has the capacity to process up to 10 135-36 or 120 films. However, as each film or batch of films is processed it releases halides and other by products into the developer that act as a restrainer on the development of subsequent films. For this reason development times will need some adjustment after each successive film or batch of films. To calculate the adjustment a tally must be kept of the number of films processed in the developer solution.

If a series of individual films is being developed in 1 litre of working strength ILFOTEC DD, compensate for the loss of developer activity after developing the first film by increasing the development time 10% for each successive film, (see table below). This method of time adjustment is assuming that either the whole litre is used to develop each film or if only part of the developer is used then its used and unused parts are mixed together before subsequent films are processed.

1l ILFOTEC DD	N	N+ 10%	N+ 20%	N+ 30%	N+ 40%	N+ 90%
1+4	1	2	3	4	5	10

N = standard development time

The developer should be discarded either when the theoretical capacity of the solution volume has been reached or the development times have become too long to be practical.

When larger quantities of ILFOTEC DD developer are in use increase the number of films that can be processed proportionally with the volume of working strength developer, e.g. if 5 litres of working strength ILFOTEC DD are being used then increase the development times by 10% after processing every batch of 5 films. When films are being processed in small batches the following table shows for some common deep tank sizes the number of films that can be processed in working strength ILFOTEC DD before each 10% increase in development time.

tank volume litres	N	N+ 10%	N+ 20%	N+ 30%	N+ 40%	N+ 90%
5	1-5	6-10	11-15	16-20	21-25	46-50
13.5	1-13	14-27	28-40	41-54	55-68	122-135
25	1-25	26-50	51-75	76-100	101-125	230-250

N = standard development time

When batches containing a large number of films are processed or when the number of films in each successive batch varies the table above needs some interpretation. No matter how many films are in the first batch it will always receive the standard development time for the film (N). However, the number of films in the first batch will dictate the development time correction for the next batch of films. Thereafter the running total of films already processed by the developer indicates the appropriate increase for the third, fourth, fifth batches, etc.

For example, if a 13.5 litre deep tank is in use and there are five batches of film to process consisting of the following number of films 21, 21, 10, 17 and 5. The table below gives the appropriate time correction for each batch.

Batch	1	2	3	4	5
number of films	21	21	10	17	5
total of films in the previous batches	0	21	42	52	69
development time for each batch	N	N+10%	N+30%	N+30%	N+50%

It is more inconsistent to reuse developer with time compensation than to use a developer and replenishment system. The time compensation can only be an approximation to cover a wide range of film and negative types. For example, if due to the subject matter the negatives are relatively clear when developed then little of the developing agents will have been used in processing them. At the other extreme if the negatives are well blackened after development then more developing agent will have been used. There is also the risk of miss counting the number of films that have been processed through a batch of developer. Using a replenished deep tank processing system is recommended as a better alternative to developer reuse as it eliminates or greatly reduces associated problems.

We do not recommend push processing using reused developer.

PROCESSING WITH REPLENISHED DEVELOPER

The effect of use on a replenished developer system

The reaction that takes place during the film development releases by-products (halides) into the developer, uses up developing agents and changes the developers pH. These combine to reduce the activity of the developer and without replenishment the developer gradually ceases to function adequately and eventually becomes exhausted.

Replenishment has two key functions. It replaces the active ingredients used during development and dilutes the by-products that have been formed.

A replenished developer is said to be fully "seasoned" when the addition of the replenisher compensates exactly for the new by-products produced by development. At this point the concentration of halides and active ingredients have reached an equilibrium or steady state.

It is maintaining this equilibrium that gives a machine developer performance consistency. Provided that the developer is used regularly, replenishment continues and all other factors remain the same, i.e. the concentration of the active ingredients, the by-products, etc., then the developer should perform consistently for a long period of time.

Fresh versus seasoned developer and the function of a starter solution

A tank of freshly made working strength developer is more active than a tank of "seasoned" replenished developer. If the same process time is used in both cases then a small loss in film speed and contrast will be seen using the seasoned developer. The change in performance from fresh to seasoned is gradual with each film processed until the equilibrium point is reached.

In a replenished process system a starter solution is used to minimise the performance difference between fresh and seasoned developer.

The time taken to reach equilibrium from fresh depends on tank size, the amount of film processed and their type and replenishment rate. When ILFOTEC DD STARTER is used with ILFOTEC DD and the recommended replenishment rates, it takes around 1 m² of film per litre of developer in the tank to reach equilibrium. 1 m² is equivalent to around 19 rolls of 135/36 or 120 film.

PROCESS CONTROL

To process film to a consistent standard, it is essential to use a method to monitor the condition and activity of the process solutions. Valuable aids to ensure consistent film processing quality are ILFORD FP4 Plus CONTROL STRIPS and the ILFORD FILM PROCESS CONTROL MANUAL (FPC manual).

FP4 Plus CONTROL STRIPS are supplied pre-exposed on to a 30 metre (100 ft) roll of 35mm film. Each strip consists of four density patches, Dmin, LD, HD and Dmax. When needed individual strips are cut from the roll for process monitoring.

The FPC manual contains information about process control methods and equipment, and a fault finding and correction guide. It also contains useful tools such as process control charts and user data record sheets.

Process control method, aims and tolerances

FP4 Plus CONTROL STRIPS should be regularly processed at the development time usually used for FP4 Plus film. The frequency of processing control strips is for the user to decide based on their workload and work patterns but it is suggested that at least one control strip is processed per working session. After processing, measure the density of the patches using a calibrated transmission densitometer and record the results for Dmin, LD and HD-LD on a process control chart. A visual assessment of density cannot be relied upon.

Before starting process control it is important to ensure that the developer is at equilibrium and producing satisfactory negatives. If it is, then process three FP4 Plus CONTROL STRIPS, measure and record the density patches on each one and calculate HD-LD. Average the results for Dmin, LD and HD-LD and use these as your aim values for future measurements. The process is considered in control provided that the measurements from subsequent strips are within ± 0.06 units of the established aim values.

The following FP4 Plus CONTROL STRIP density patch values are typical for a seasoned developer in good condition in a dip & dunk processer. Development time 8 1/2 minutes at 24°C/75°F. They are given only as a guide and are not absolute values that must be achieved, do not attempt to adjust your process to obtain identical values. The most important thing is that the quality of the negatives produced is satisfactory.

	Seasoned
Dmin	0.35
LD	0.54
HD-LD	0.80

Dealing with process variations Properly replenished ILFOTEC DD developer in regular use should have a long tank life. Any large process variations seen are most likely to be caused by an external change. If a sudden and significant process variation has occurred it is most important to identify the cause so that the appropriate corrective action can be taken.

Identifying a problem

First, look for the obvious. The cause of the process change may be something visible such as low solution levels, blocked/leaking pipes, no recirculation, poor agitation, etc. Check the solution temperatures, SG and pH as well as gas pressure and recirculation. Run the processor with some test films and check that it triggers all the correct machine functions, e.g. agitation, replenishment, etc.

Check for any obvious sign of developer contamination e.g. cloudiness in the developer or an unusual odour.

Check the machine settings, e.g. temperatures, development times and replenishment rate as they may have been changed from normal.

Regaining control of the process Once the cause of the problem has been found and corrected then some action will probably be needed to get the process back within limits. It might happen automatically, for example if the temperature has been returned to the correct setting. If the problem was caused by low replenishment then removing a few litres of developer and replacing it with replenisher may bring the process back in control. In an extreme case it may be necessary to replace the developer solution completely to get back inside the limits.

If the reason for poor performance is contamination of the developer by stop bath or fixer then remove all the developer, flush out pumps and pipes, clean the tank and change the solution filter before replacing with a fresh solution.

WORKING SOLUTION LIFE

The life of a solution in a replenished system is dependent on film throughput, replenishment rates, processing temperature and film types. The only sure way of always knowing that the activity of the developer is adequate is to use a process control system. As a general guide, replenished LFOTEC DD developer should be replaced after 6–12 months in the process tank.

Unreplenished ILFOTEC DD working strength solutions should last for up to:-
6 months in full capped containers
2 months in a tank with a floating lid
1 month in a half full tightly capped container.

STORAGE

Full unopened containers of ILFOTEC DD concentrate stored in cool conditions, 5–20°C, (41–68°F), will keep for two years. Once opened use completely within three months and keep all containers tightly sealed until used.

If stored in cool conditions 5–20°C, (41–68°F), ILFOTEC DD STARTER will keep indefinitely in tightly capped bottles.

AVAILABILITY

ILFOTEC DD is available in:-
5 litre bottles to make 25 litres of working strength solution, replenishment for 500 135-36 films.
25 litre kegs to make 125 litres of working strength solution, replenishment for 2500 135–36 films.
205 litre barrels to make 1025 litres of working strength solution, replenishment for 20500 135–36 films.

ILFOTEC DD STARTER is available in 1 litre bottles. 1 litre of starter will turn 250 litres of working strength replenisher into 251 litres of developer.

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.