

## FACT SHEET

# ILFOFIX II

## A SODIUM THIOSULPHATE (HYPO) POWDER FIXER FOR BLACK AND WHITE FILMS AND PAPER

ILFOFIX II is a multipurpose, standard sodium thiosulphate (hypo) non-hardening fixer supplied as a powder. It is made into a stock solution for the fixing of films and papers. It is easy and convenient to use in the temperature range of 18–24°C (64–75°F). It must not be used with fix hardeners and is not recommended for machine processing applications where high temperature, (over 24°C/77°F), or high speed processing are required.

### Mixing instructions

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.ilford.com](http://www.ilford.com).

ILFOFIX II cartons contain one bag of powder that is manually mixed with water to make a stock solution for use. Always make up the fixer to the volume stated on the pack, do not attempt to prepare smaller solution quantities by using fractional parts of the powder, however larger stock solution quantities can be prepared by using multiples of whole packs.

To prepare stock solution dissolve the complete contents of the bag in about three quarters of the total solution volume, (see carton), of tepid water, around 25°C/77°F but not above 30°C/86°F. Pour the contents of the bag slowly into the water while stirring and continue to stir until all the powder has dissolved. Add cold water to make the solution up to the total volume, (see carton), stir thoroughly and the fixer is then ready for use.

For all applications ILFOFIX II is used as stock solution.

### pH and specific gravity

The following table gives the pH and specific gravity (SG) for fresh, ILFOFIX II stock solution. 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 and those covering a range from pH 4 to pH 6 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 process solutions.

	pH	SG at 20°C/68°F
ILFOFIX II stock	5.1–5.3	1.170

### Fixing times

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.

Below are the average minimum fixing times at 20°C (68°F) for materials manually processed using fresh stock fixer, the range of times for film takes into account different film types. The agitation for film is the same as that used for spiral tank development, i.e. 4 inversions during the first 10 seconds of fixing repeated during the first 10 seconds of each subsequent minute. The agitation for paper is the same as that used for the dish/tray development of paper, i.e. intermittent rocking of the dish/tray.

Material	Dilution	Time (min)
General purpose film	stock	4–8
RC paper	stock	2
FB paper	stock	3

**Washing films**

After fixing films are washed to remove the residual thiosulphate and other by-products of the process. When ILFOFIX II 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.

When ILFOFIX II fixer has been used for spiral tank processing 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.

**Washing RC paper**

Wash RC papers for 2 minutes in fresh running water at a temperature above 5°C (41°F).

When it is important to obtain a print in the shortest possible time, vigorously wash RC papers for 30 seconds in running water.

**Washing FB paper**

Wash FB papers for 60 minutes in fresh running water at a temperature above 5°C (41°F).

Using ILFORD WASHAID reduces the washing time thus saving time and water. Wash the prints for 5 minutes in running water above 5°C (41°F), drain off the excess water and immerse the prints for 10 minutes in a dish/tray of 1+4 WASHAID at 18–24°C (64–75°F). Finally, wash the prints for 5 minutes in running water above 5°C (41°F).

**Capacity without replenishment**

An unreplenished fixer bath is eventually exhausted by the build up of silver and halides in it and the action of solutions carried over from the preceding baths that can cause some dilution and the pH to be raised.

material	dilution	capacity / litre of working strength fixer
General purpose film	stock	24 x 135-36
RC paper	stock	80 sheets of 20.3x25.4 (8x10in) 4m <sup>2</sup> (44ft <sup>2</sup> )
FB paper	stock	40 sheets of 20.3x25.4 (8x10in) 2m <sup>2</sup> (22ft <sup>2</sup> )

The figures for paper may be exceeded whenever print stability is not critically important.

**Replenishment**

The activity of a fixer bath can be maintained by the regular addition of fresh working strength fixer. In regular use a properly replenished fixer bath can be maintained for a long period of time.

Material	Dilution	Replenishment ml of working strength fixer
General purpose film	stock	45 ml/135-36 855ml/m <sup>2</sup> (78ml/ft <sup>2</sup> )
RC paper	stock	250ml/m <sup>2</sup> (23ml/ft <sup>2</sup> )
FB paper	stock	500ml/m <sup>2</sup> (46ml/ft <sup>2</sup> )

To give adequate replenishment to deep tanks, it may be necessary to remove some of the used fixer from the tank so that the appropriate amount of fresh replenisher can be added. Calculate the amount of replenisher to be added. Remove more fixer from the tank than the amount of replenisher required. Add the replenisher to the tank and top up the solution to the correct level using some of the removed fixer while stirring thoroughly.

**Two bath fixing**

An extremely efficient method of fixing film or paper is to use the two bath fixing technique. Make up two separate fixing baths of the same solution volume. Fix the film or paper in the first bath for half the recommended fixing time and then transfer them to the second bath for the remainder of the time. Continue to work this way until the capacity of the first bath is reached, then discarded it and replace it with the second fixer bath. Prepare and use a completely fresh second bath. Repeat this process as required with the result that the film or paper is always thoroughly fixed by the relatively fresh fixer in the second bath.

**CHECKING AND MAINTAINING FIXER ACTIVITY**

**Stop Bath**

After development and before fixing we recommend that films and papers are rinsed in an acid stop bath such as ILFORD ILFOSTOP (with indicator dye) or ILFOSTOP PRO (without indicator dye). When dishes/trays or tanks 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.

ILFOSTOP PRO is recommended for all machine processing applications.

The indicator dye in ILFOSTOP turns from yellow to purple when the stop bath is exhausted, this can be useful when dish/tray processing paper.

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 (sec) at 20°C (68°F)	10	10
Capacity–films/litre (unreplenished)	15x135–36	22x135–36
Capacity–sheets of 20.3x25.4cm (8x10in) RC paper/litre (unreplenished)	60	90
Capacity - sheets of 20.3x25.4 (8x10in) FB paper/litre (unreplenished)	30	45

### Adjusting fixer pH

If a stop bath is not used and the pH of the fixer bath is found to be too high when measured, i.e. more alkaline than it should be, then a few drops of a 50% acetic acid solution may be added to lower the pH value. This addition should be done gradually and with thorough stirring. Do not lower the pH of the fixer bath too far, the limits are given above.

### Adjusting specific gravity SG

If the solution concentration of a fixer bath is too high or too low efficiency is reduced and poor fixing can be experienced.

If the SG of the fixer stock solution is too low, i.e. the solution is too dilute, it should be discarded and a fresh stock solution made up and used in its place.

At high ambient temperatures the SG of the working strength fixer bath may become too high, it concentrates due to water evaporation. It can be restored by topping up the dish/tray or tank with water and stirring thoroughly.

### Film clearing time

In order to avoid the risk of insufficient fixing, film should remain in the fixer for twice the time it takes the emulsion to clear. Fixer should be discarded when the clearing time in used fixer exceeds twice the clearing time in fresh fixer.

The clearing time of a film and fixer combination can be found by the following method. It can be carried out in normal lighting.

Take a piece of scrap unprocessed film and place a drop of the working strength fixer on to a small part of the emulsion side. Leave it until the emulsion under the drop is a clear spot, this should take around 1 to 2 minutes. Immerse the piece of film in the fixer bath and using a stop clock time how long it takes for the rest of the film to clear. Clearing can be judged by comparing the surrounding film area with the clear central spot. The time taken for the rest of the film to clear is the clearing time. The fixing time needed is double the clearing time.

### Silver concentration

The level of silver in a film fixing bath can be allowed to rise to 8–10g/l without serious effect.

The level of silver that can be tolerated in a paper fixing bath depends on the type of paper being processed and the degree of image permanence required.

If a high level of image permanence is required for commercial use the silver concentration in the fixer should be kept below 2g/l when fixing FB papers. This approximates to 40, 20.3x25.4cm, (8x10in) FB prints. Above this level compounds may remain in the paper base after washing and over time possibly contribute to print staining. For prints that need maximum stability for long term storage the maximum silver level in the fixer should not rise above 0.5g/l i.e. approximately 10, 20.3x25.4cm, (8x10in) prints.

However, print throughput can only be a guide to silver concentration as it depends on the proportion of exposed to unexposed areas on the prints being processed. Silver estimator papers are usually not sensitive enough to test the very low silver levels suitable for optimum permanence. For important prints it is recommended that paper is tested in the following way to ensure adequate fixing.

Prepare the testing solution by dissolving 2g of sodium sulphide in 125ml of water.

NB Take care to follow the health and safety information supplied by sodium sulphide manufacturer.

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 and thoroughly washed. (Use the two bath fixing method). Remove any excess solution with clean blotting paper or absorbent tissue and 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 when tested are not properly fixed. Soak the 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.

RC papers can be processed in fixers containing higher levels of silver, 4–6 g/l as the paper base is protected on both sides by an impervious polythene coating.

### **Silver recovery**

Any method of silver recovery can be used with ILFOFIX II but for maximum efficiency the electrolytic method is recommended as the treated fixer can be recycled or reused. When collecting silver by electrolytic methods care must be taken not to pass too large a current through the solution as this may cause the fixers active ingredients to breakdown when the silver concentration becomes too low. Silver sulphide may be formed and deposited on the units cathode, this is called sulphiding, the efficiency of the fixer and the silver recovery process are both reduced by sulphiding. Vigorous electrolysis may also lead to hazardous hydrogen sulphide gas (bad eggs smell) being released.

Properly set up an electrolytic silver recovery system can considerably reduce the silver in a fixer solution and thereby increase its efficiency and capacity and so allow lower replenishment rates to be used. Silver concentrations of around 50–100ppm can be commonly achieved.

To use silver recovery units for best results consult the information provided by the relevant silver recovery equipment suppliers. More general information about silver recovery and other waste treatment, disposal and recycling is available from our web site at [www.ilford.com](http://www.ilford.com).

### **WORKING SOLUTION LIFE**

The life of a solution in a replenished system is dependent on film or paper throughput, replenishment rates, processing temperature and film or paper types. The only sure way of always knowing that the activity of a fixer is adequate is to use the techniques given above. Properly replenished ILFOFIX II stock solution in regular use should have a long life but as a general guide it is advisable to replace it after 6 months in the processing tank.

Unreplenished ILFOFIX II stock solution should last for up to:-

6 months in full tightly capped bottles  
2 months in a tank or dish/tray with a floating lid  
1 month in a half full tightly capped bottle.  
7 days in an open dish/tray.

### **STORAGE**

Unopened cartons of ILFOFIX II powder stored in cool dry conditions, 5–20°C, (41–68°F), will keep indefinitely. Once opened use completely to make stock solution.

### **AVAILABILITY AND CAPACITY**

ILFOFIX II is available in 1 litre and 5 litres cartons.

A 5 litre carton of ILFOFIX II powder makes enough stock solution to fix 120, 135–36 films or 400, 20.3x25.4cm (8x10 in) RC prints or 200, 20.3x25.4cm (8x10 in) FB prints.

Depending on the replenishment rate used a 5 litre carton of ILFOFIX II makes enough stock solution to replenish for 111 135–36 films or 400 20.3x25.4cm (8x10in) RC prints or 200 20.3x25.4cm (8x10in) FB prints.

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.