

# ZONE

## IMAGING

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### TECHNICAL INFORMATION

# ECO ZONEFIX

POWDER ODOURLESS ALKALINE NON-HARDENING RAPID FIXER FOR LOW AND HIGH-VOLUME BLACK AND WHITE FILM AND PAPER PROCESSING.

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## OVERVIEW

Zone Imaging Eco Zonefix, formulated by our chemist Nguyen Danh Khoa, is an eco-friendly, odourless, alkaline, non-hardening, rapid fixer that comes in powder form. It is diluted with water to be used as stock solution. It is easy and convenient to use in a temperature range of 18-40°C (65-104°F) for film and paper in all manual and most machine fixing applications.

This fixer was designed for optimal fixing for film, RC, and FB papers with fast washing out times with both conventional non-staining film/paper developers and pyro/catechol based staining film developers. It boasts long shelf life, high capacity, compatible with soft to very hard tap water up to a hardness of 500ppm, and easy transport for travelling to suit all consumers' needs.

This fixer is sodium thiosulphate based and free from borate derivatives, non-biodegradable DPTA and EDTA, phosphates, acetic acid, known carcinogens and mutagens to make it more friendly to the environment.

By having little odour, this fixer will provide a more pleasant working environment in the darkroom. The slight alkaline nature of the fixer makes film more resistant to over-fixing and fast washing out for film and paper without a need for hypo-clear; it also means an acid stop bath is not required and water stop is perfectly sufficient. By being non-hardening, this fixer allows for easier bleaching and toning when printing.

The powder has been formulated and packaged in a way to minimise dust entering the air when pouring the contents to make it more user friendly and meet standards for educational institutions.

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## MIXING INSTRUCTIONS

Zone Imaging Eco Zonefix 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.

### *Packets to make up one litre working solution (33.8 US fluid ounces)*

1. Prepare approximately 700ml (23.6 fluid ounces) of warm water around 30°C +-3°C (86°F +-5°F) in a measuring container.
2. Slowly pour the contents of Part A into the water and stir continuously until it is mostly dissolved, this will take approximately 30-45 seconds.
3. Slowly add the contents of Part B to the solution.
4. Add warm water to make a total of 1 litre (33.8 fluid ounces).
5. Stir continuously until all the powder has dissolved, this will take approximately 60-90 seconds. The final temperature of the solution will be approximately 20°C +-2°C (68°F +-4°F) for ready use.

1 litre = 33.81 US fluid ounces

3.8 litre = 1 US gallon

29.6 ml = 1 US fluid ounce.

For all fixing applications, Zone Imaging Eco Zonefix is used at stock solution.

**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 safety data sheets containing full details for the safe handling, disposal, and transportation of our photochemical products can be found from our distributors or our website:

[www.zoneimaging-photochemicals.co.uk](http://www.zoneimaging-photochemicals.co.uk)

Thoroughly wash all utensils, measuring and mixing vessels after use. Do not reuse them for non-film development related activities.

## pH and Specific Gravity

The following gives the pH and specific gravity (SG) for fresh stock/working solution of Zone Imaging Eco Zonefix. These two figures were acquired under controlled laboratory conditions and so may be slightly different from measurements made by users of the fixer in their own working areas.

pH @25°C/77°F	Specific gravity @25°C/77°F
7.38	1.115

## FIXING TIMES, WASHING AND REPLENISHMENT

### Fixing times and method

For best results when fixing, it is recommended that all film/paper processing solutions are kept at the same temperature or at least within 4°C (7°F) of the developer temperature.

For films manually processed, the average recommended minimum fixing times at 20°C (68°F) are 2-5 minutes. The range of times for film considers different film types.

Lower ISO films tend to fix faster than higher ISO films e.g. in completely fresh Eco Zonefix, Fomapan 100 has a clearing time of approximately 17 seconds compared to Ilford HP5+ of 47 seconds. Like all fixers, unreplenished Eco Zonefix fixing times will increase with use hence the fixing time range recommended below.

For resin coated papers, fixing time is 30 seconds and for fibre-based papers it is 60 seconds.

Material being fixed	Time (minutes)
General purpose films	2 - 5
Resin coated paper	0.5
Fibre-based paper	1

The agitation technique for film is continuous inversions for the first 30-60 seconds of fixing and then inverted again during the first 10 seconds of each subsequent minute. The agitation for paper is intermittent rocking of the dish/tray.

### Washing films

Fixed film requires to be washed afterwards to remove by-products in the film processing. As Zone Imaging Eco Zonefix is alkaline, shorter washing times are possible compared to conventional acidic fixers. There are two methods to wash film:

Films can be washed under running water for 3-4 minutes at a temperature within 4°C (7°F) of the process solutions. For Kodak Tmax films, it is recommended to extend the washing to 10 minutes to remove the purple dye.

Alternatively, if spiral tanks were used, the following method can be used which saves water: Ilford Optimum Permanence method. Fill the spiral tank with water at the same temperature as the previous process solutions or  $\pm 4^{\circ}\text{C}$  (7°) and invert 5 times. Drain the water away and refill. Invert the tank 10 times and then drain and refill. Invert the tank for 20 times and then drain.

## Washing RC papers

After fixing, resin coated papers should be washed under running water above 5°C (41°F) for at least 90 seconds.

If the print is not required to be archival, a wash time of 30 seconds is sufficient.

## Washing FB papers

After fixing, fibre-based papers should be washed under running water above 5°C (41°F) for at least 10 minutes.

## Capacity of fixer without replenishment

When the fixer is unreplenished, the fixer bath will eventually exhaust from a reduction of thiosulphate concentration and build-up of silver, halides and carry-on residue from previous solutions diluting it. Please consult the table for capacity below:

Material being fixed	Capacity/litre
General purpose films	15-20* 135-36 exp rolls (1,200-1,600 sq inches)
Resin coated paper	50 sheets of 8x10 inch size 3.5m <sup>2</sup> (38.5ft <sup>2</sup> )
Fibre-based paper	25 sheets of 8x10 inch size 1.75m <sup>2</sup> (19.25ft <sup>2</sup> )

\*The fixer can be extended to 20 rolls of film from 15 with an additional extended fixing time of minimum 3 minutes. Capacity for paper can be extended up to 40% if archival results are not needed.

## Replenishment

The activity of the fixer can be maintained by replenishment by regularly adding fresh fixer. If properly replenished, the fixer can last a very long time.

Material being fixed	Replenishment (ml)
General purpose films	45ml/135-36 exp rolls 855ml/m <sup>2</sup> (78ml/ft <sup>2</sup> )
Resin coated paper	275ml/m <sup>2</sup> (25ml/ft <sup>2</sup> )
Fibre-based paper	550ml/m <sup>2</sup> (48ml/ft <sup>2</sup> )

Higher replenishment rates may be needed for inefficient replenishment systems. Lower replenishment rates, up to 50%, is possible with a good silver recovery system in place.

A fixing time of 3 minutes and 5 minutes in a well replenished system is sufficient for fixing conventional cubic grained and Delta/Tmax films respectively.

## **Two bath fixing**

This technique is very efficient for fixing as this ensures that the film or paper is always completely fixed in the second fixing bath.

1. Make up two separate fresh solutions of fixer of equal volume.
2. Fix the film or paper in the first fixing bath for half the recommended time then
3. Transfer to the second bath for the remainder of the fixing time.
  
4. Continue with more film/paper until the capacity of the first bath is reached.
5. Discard then replace with the second fixing bath to become the new first fixing bath.
6. Make and use a new second fixing bath from fresh fixer.

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## **CHECKING AND MAINTAINING FIXER ACTIVITY**

### **Adjusting pH of fixer**

While Eco Zonefix has been formulated to be well buffered against pH change, over time it may deviate away from the base pH and become less active particularly if the user chooses to use an acidic stop bath.

If the pH falls too low, add a few drops of 50% sodium hydroxide very slowly and gradually while stirring to bring it back up.

If the pH increases to become too high, add a few drops of 50% citric acid very slowly and gradually while stirring to bring it back up.

### **Adjusting specific gravity, SG**

If the solution becomes too concentrated or too dilute, activity of the fixer can be decreased.

The fixer will become too dilute if the SG falls, this can be restored by adding a concentrate of Eco Zonefix to bring it back up through thorough stirring.

Sometimes in high temperature processors, the fixer will become too concentrated from evaporation. This will mean the SG increases; this can be restored by adding water and stirring thoroughly (some machines may naturally do this through circulation and their own moving parts.)

### **Film clearing time**

The clearing time for film in fixer is a good indication for the minimum time to fix – this should be double the clearing time for conventional films and triple for Delta and Tmax films to avoid insufficient fixing. Please note that on average, higher ISO films tend to have longer clearing times.

Fixer should be discarded once the clearing time exceeds twice the time it took to clear the same film stock when fresh.

The following method to judge clearing time of a film and fixer combination can be done in normal lighting:

1. Take the film leader or another scrap of unprocessed film and add a drop of fixer on a small area of the film's emulsion side.
  2. Wait until that small area goes transparent; this should take up to 60 seconds.
  3. Submerge the piece of film into the fixer and with a stop watch, time how long it takes for the rest of the film to go clear by comparing with the initial clear spot. This is the clearing time.
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## **WORKING SOLUTION LIFE**

For replenishment systems, the working solution life is dependent on film throughput, replenishment rates, temperature, and type of film. Therefore, it is necessary to check on activity of the fixer solution with the methods detailed above. A well replenished solution should have a long life but it is recommended to replace it after 12 months.

For unreplenished fixer working solutions, the approximate solution life values can be given:

6 months for tightly capped and full bottles impervious to gas transmission.

2 months in a tank or dish/tray covered by a floating lid.

1 month in a tightly capped but half full bottle.

7 days in an open dish/tray.

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## **STORAGE**

When unopened, the fixer powder components should last at least 2 years in cool conditions of 5-20°C (41-68°F).

Once dissolved, please see above in the "Working solution life" section.

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## **AVAILABILITY AND CAPACITY**

Zone Imaging Eco Zonefix is available in a Part A and Part B of 1 litre packet pairs from either Zone Imaging approved international retailers or direct from their store.

A 1 litre packet pair of Zone Imaging Eco Zonefix is enough to fix 20 135-36 exp films or 50 20.3x25.4 cm (8x10 inches) sheets of RC paper or 25 20.3x25.4 cm (8x10 inches) sheets of FB paper.