

TECHNICAL BULLETIN

BLACK & WHITE

Photographic Chemicals

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Additional distributor information such as Product Information Sheets, Technical Information Sheets, processing and process control tips, and the latest information about new products is always available from the FUJIFILM Belgium **ESCLUSIVO** distributor web site (WWW.FUJIFILMESCLUSIVO.EU).

Do not hesitate to contact your local **FUJIFILM** representative to assist you at any time.

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I. DESCRIPTION

1. Film Developer

Negastar Pro Developer Replenisher is a single part developer, formulated to be used with general purpose black and white films processed in high volume Dip and Dunk type processors and continuous long leader processors. It is designed for development times of between 5 to 13 minutes at a recommended developer temperature of 24°C. **Negastar Pro** has a long working life and produces fine grain with high sharpness under a wide range of conditions. It can be used for push processing.

2. Fixer

Starfix Fixer Replenisher is formulated to be used with all black and white films. It is a non-hardening fixer suitable for use in all type of processors. Modern films do not require a hardener.

II. PROCESS PARAMETERS

Due to the variety of film available and processing equipment used, it is difficult to standardise processing specifications. Tables 1 to 3 show recommended **starting points**, from which the process may be optimised. The Negastar Pro Developer can be used for push/pull processing. Please contact your FUJIFILM representative for more information.

1. Process times for most common film types using Negastar Pro developer

Development times at 24°C for Dip and Dunk or deep tank processors with intermittent agitation of 2 seconds nitrogen burst every 10 seconds. Use sufficient pressure to raise surface level 1.5 cm. These times are starting points; it may be necessary to make adjustments to achieve optimum results. In continuous long leader processors the agitation is given by film movement. Processing time should be reduced by about 10-20%.

Film	ISO Rating	Developing Time
PAN F+	50	330 sec.
FP4+	125	510 sec.
SFX 200	200	510 sec.
HP5+	400	420 sec.
100 DELTA Pro	100	570 sec.
400 DELTA Pro	400	420 sec.
3200 Delta Pro	3200	630 sec
PLUS X 125	125	480 sec.
TRI X 400TX	400	450 sec.
TRI X 320TXP	320	500 sec.
Tmax 100	100	450 sec.
Tmax 400	400	510 sec.
Tmax P3200	3200	630 sec.
APX 100	100	750 sec.
APX 400	400	540 sec.
Fuji Neopan 100 Acros	100	540 sec.
Fuji Neopan 400	400	450 sec.
Fuji Neopan 1600	1600	360 sec.

Note : Negastar Pro Developer can be used at a developer temperature of 20 - 28°C. For a temperature below 24°C, increase the developer time by 10% for each 1°C temperature rise. For every 1°C above 24°C decrease developer time by 10%.

2. Fixing of film using Starfix

Fixing times should be double the time needed to clear an undeveloped film (typically a B&W film) in a fresh fixer solution. This clearing time can change from film to film.

For most machines the fixer temperature and time is usually set at the same value as the developer ($\pm 5^\circ\text{C}$). The times below are the minimum fixing times at 20°C for materials in fresh solution with and without hardener.

Material	Time without hardener
Black & White film	120 sec - 300 sec

3. Wash for film

The recommended temperature is within 5°C of the developer temperature.

Material	After fixer without hardener
B&W film	5 - 10 min.

The shortest wash time can be used with running water at 6 L/min.

III. MIXING INSTRUCTIONS

Negastar Pro Developer Replenisher

To make 1 litre	Water	Replenisher	Concentrate	Starter ⁽¹⁾
REPLENISHER	800 ml	-	200 ml	-
TANK	797 ml	-	199 ml	4 ml
Tank from Replenisher	-	996 ml	-	4 ml

⁽¹⁾ Required starter is Negastar Pro Developer Starter.

Starfix Fixer for film

To make 1 litre	Water	Concentrate
TANK & REPLENISHER	800 ml	200 ml

IV. REPLENISHMENT

Depending on processor type and processing conditions, its use and the product processed, the amount of replenisher required may vary.

For developer, the replenishment has to compensate for aerial oxidation, carry-over losses and exhaustion by throughput.

For fixer, the replenishment has to compensate for exhaustion by throughput, increase of silver and halide concentrations, solution carried in from the preceding bath and carry-over to the wash.

It is advisable to use a 2% acetic acid stop-bath between developer and fix bath to prevent developer carry-over into the fixer. This will prolong the life of the fixer and reduces the amount of fixer replenisher required. Fixer replenishment can be reduced by continuous in-line electrolytic desilvering.

Silver levels (up to 8 - 10 g/L) can be tolerated without seriously affecting the fixing capacity (for RC paper, the limit is 4 - 6 g/L).

1. Replenishment for film processing

Film format	Negastar Pro		Starfix not desilvered no stop bath	Starfix desilvered + stop bath
135 - 12	17 ml		16.0 ml	8.0 - 12 ml
135 - 24	36 ml		32.5 ml	16.0 - 24 ml
135 - 36	50 ml		45.0 ml	22.5 - 34 ml
120	50 ml		45.0 ml	22.5 - 34 ml
220	100 ml		89.0 ml	44.5 - 68 ml
4" x 5"	13 ml		11.0 ml	5.5 - 9 ml
5" x 7"	22 ml		20.0 ml	10.0 - 15 ml

In replenished systems, according to individual processor types and processing conditions, the amount of replenisher required may vary. The figures quoted are good starting points, but the replenishment should be adjusted according to process control results.

V. pH AND DENSITY SPECIFICATIONS

pH AND DENSITY SPECIFICATIONS FOR FRESHLY PERPARED SOLUTIONS				
Product	TANK		REPLENISHER	
	pH (25 °C)	Density (20 °C)	pH (25 °C)	Density (20 °C)
Negastar Pro	8.50 ± 0.05	1.068 ± 0.003	8.50 ± 0.05	1.068 ± 0.003
Starfix⁽¹⁾ without hardener	5.20 ± 0.10	1.085 ± 0.003	5.20 ± 0.10	1.085 ± 0.003

⁽¹⁾ If the pH of the seasoned tank solution is too high due to carry-over from developer, a few ml. of 50% Acetic Acid may be added. The use of an acid stop bath will help prevent this rise in pH.

VI. Washing

To prevent drying marks on film, a wetting agent can be used in the final rinse.

VII. Chemical Handling

Developers and fixers can cause harmful effects when brought in contact with human tissue. Always wear solution resistant gloves and effective eye protection. In case of accidental contact with the developer, wash the affected area with plenty of cold running water. Wash with a pH-neutral soap and rinse thoroughly with water.

Important

Carefully read information on bottle before starting the mixing procedure and the SDS (Safety Data Sheet). SDS's are available on request if you do not have a copy.

VIII. Chemical Storage

Developers and fixers should be stored above 5 °C to prevent crystallisation. Storage temperature above 25 °C will cause premature ageing.