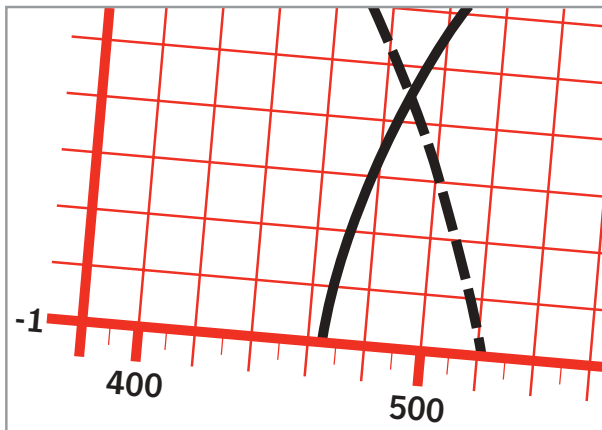


Technical Data

Agfa B/W Chemicals – Paper processing



Along with lab equipment and film and paper quality, chemicals are a major factor for the efficient operation of a photographic lab. They contribute to the smooth running of both finisher and amateur labs. Fluctuations in print quality and unnecessary costs caused by rejects and wasted time must be prevented.

The variety of a photographic lab's work calls for a wide range of developers, fixers and auxiliaries to guarantee the consumer reliability, safety, consistency and economy. Agfa's range of photochemicals meets these requirements.

Black-and-white positive developers need the characteristics essential for paper processing:

- development latitude
- control of contrast
- print tone consistency
- high yield
- storage life
- replenishability

A positive developer's development latitude is especially important, i. e. it must be possible to compensate under- and over-exposures by lengthening developing time without visible drops in quality. A good positive developer should be able to vary print contrast within narrow limits, and the print tone must also stay uniform with large batches and over- and underdevelopment. A feature of a high quality positive developer is its good yield. Another measure of positive developer quality is a long storage life with contrast as constant as possible, uniform speed yield and consistency of print tone.

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1. Storage, safety at work, handling the photochemicals

Storage

The chemicals should be stored in their original packaging at temperatures of between 8 °C and 25 °C. If the temperature is too low, certain substances may crystallise in the liquid concentrates, which could result in wrong bath mixtures if this is not taken into account when making up the mixing. The effects of direct heat must also be avoided because high temperatures can trigger a premature chemical reaction in concentrates that are prone to oxidation, and this in turn can lead to the bath becoming spoilt.

Safety aspects when working with photochemicals

There are certain precautions (e.g. avoiding contact with food and drinks) and safety measures which should be observed when working with photographic processing chemistry. They include adequate ventilation at the workplace and, where necessary, the wearing of protective gloves and goggles.

Observing all the safety precautions will ensure a high level of safety at work. Nevertheless, with particularly sensitive people, the possibility of irritation to the skin and mucous membranes and, in isolated cases, allergic skin reactions, cannot be excluded when working with photographic chemicals.

There are special regulations concerning the transport and handling of dangerous substances which apply to certain photochemicals. This is shown on the packs of all products which are subject to such labelling. The instructions enclosed with the products or the labels on the packs contain extra safety recommendations.

Safety data sheets in several languages are available for all photochemical products from the appropriate Agfa sales organisation. These safety data sheets also contain specific information on the substances contained in the products.

2. Short product description

Developers

- **Agfa Multicontrast Developer**
Developer/replenisher system for the processing of black and white papers. Ideal for Agfa Multicontrast Premium and Classic. Very good storage life and yield, also for processing without replenishment.
- **Neutol plus**
New high-yield developer without hydroquinone for processing with dishes, drums and roller transport machines without replenishment.
- **Neutol plus / LOR**
New developer/replenisher system without hydroquinone, which has been especially designed for machine processing black and white papers with a very low replenishment rate and so extremely low overflow. High activity, good health safety characteristics.
- **Neutol, Neutol Liquid NE and WA**
Standard developer concentrates for processing in trays, drums and roller transport machines without replenishment, but with extremely high yields.

Fixers

- **Agefix**
Liquid fixer concentrate. Can be used as standard or fast fixer, depending on dilution.
- **MC Fixer**
Liquid fixer concentrate. Ideally matched to the Agfa Multicontrast Premium and Classic papers.
- **Acidofix**
Acid fast fixing salt on ammonium thiosulphate basis.

Auxiliary products

- **Agepon**
Wetting agent concentrate for making up final bath. Cuts the drying time and enhances the high gloss of baryta papers which are hot-dried.
- **Algezid II**
Highly active biocide to stop the formation of microorganisms in washing tanks and wash water silver recovery units.
- **Sistan**
Image silver stabilizer. Protects prints against image silver deterioration caused by environmental pollution.
- **Viradon**
Brown toner for black and white photo papers. Has the advantage over other toning solutions that the contrast of the prints is unaffected. Toning with Viradon substantially improves the archive life of prints.

3. Print tone

The print tone of black and white photographic papers is determined primarily by the emulsion. Within narrow limits the tone can be varied by the developer chosen.

The following table shows the effect of Agfa positive developers on the print tone of silver bromide and silver chlorbromide emulsions.

Developers	Silver bromide papers Brovira-Speed	Silver chlorbromide papers Multicontrast Premium Multicontrast Classic
Multicontrast Developer	neutral black print tone	neutral to warm black print tone
Neutol plus		
Neutol plus/LOR		
Neutol Liquid NE		
Agetol Liquid		
Neutol	neutral to warm black print tone	warm black print tone
Neutol Liquid WA		

Other standard black and white paper developers and fixers are also suitable, bearing in mind their special characteristics.

For further details see Technical Data P-SW50 (Agfa black-and-white papers with fixed contrast), P-SW51 (Multicontrast Premium and Classic).

Note for warm tone development

To ensure perfect processing of warm tone papers, care must be taken to avoid contamination of developer with fixer. In addition there must be a stop bath (2 % acetic acid solution) between developer and fixer.

4. Use of the developer liquid concentrates

4.1 Multicontrast Developer

- Developer concentrate. After dilution with water, the developer is ready for immediate use.
- Suitable for processing with replenishment in continuous and roller transport machines, and for processing without replenishment in trays and developing drums.
- Neutral print tone.
- Highly active, to ensure rapid initial development, a high speed yield and contrast differentiation with variable-contrast papers.
- Very good maximum density of both variable contrast papers: Agfa Multicontrast Premium and Classic.
- Processing possible with shortened developing time or lower developer temperature.
- Above-average storage life, processing stability and yield.
- Reduced replenishment rate, so less waste.
- New anti-calcifier with bio-degradable complexing agents, so more environment-friendly.

Mixing instructions

The concentrate is topped up with water to the end volume required and well mixed. The normal 1 + 4 dilution can be used both as tank solution and replenisher.

Concentrate	Normal dilution 1 + 4	Economy dilution 1 + 6
500 ml	2.5 litres	3.5 litres
1 litre	5 litres	7 litres
5 litres	25 litres	35 litres
20 litres	100 litres	140 litres

Specific gravities of freshly mixed solutions (at 20 °C / 68 °F):

Normal dilution 1 + 4 = 1.072 – 1.078

Economy dilution 1 + 6 = 1.051 – 1.057

Processing with replenishment* in machines and manual processing in trays and drums

Dilution 1 + 4

Paper type	Developing times** in sec. at			Yield per litre
	20 °C	25 °C	30 °C	
RC	50 ± 10	30 ± 10	15 – 20	200 sheets 17.8 × 24 cm (= approx. 8.5 m ²)
Baryta	90 ± 10	70 ± 10	50 ± 10	depends on solution absorption

Processing without replenishment in trays and drums

Dilution 1 + 6

Paper type	Developing times** in sec. at			Yield per litre
	20 °C	25 °C	30 °C	
RC	75 ± 15	50 ± 10	30 ± 5	150 sheets 17.8 × 24 cm (= approx. 6.5 m ²)
Baryta	110 ± 10	90 ± 10	70 ± 10	depends on solution absorption

* Replenishment rate: 150 ml/m².

** The precise developing time depends on the type of paper and the processing conditions, and has to be found individually. Longer developing times are relatively uncritical. In the Agfa PRO processor the developing time is approx. 30 seconds (at 25 °C/77 °F). In the Ifospeed 2050-RC or 2150-RC processors the developing time is between 10 and 20 seconds. The developer temperature is 35 °C and cannot be adjusted. Standard results are produced with the MC developer at the dilution 1 + 4.

Storage life

The life of the concentrate in the unopened original pack is at least 12 months. Mixed developer should be kept in airtight capped bottles or in tanks with floating lids. The storage life at the 1 + 4 dilution is:

- 6 weeks in brimful airtight glass bottles
- 3 weeks in half-full glass bottles
- 4 weeks in tanks with floating lids
- 2 weeks in open tanks without floating lids

At the 1 + 6 dilution the life is 20 % less.

4.2 Neutol plus

New type of developer concentrate without hydroquinone. After dilution with water ready for processing with dishes, drums and roller transport machines.

- Neutral print tone
- Outstanding activity, so rapid response and high speed yield
- Very good maximum blacks
- Very low fog level
- Processing with shortened developing time or lower developer temperature possible

Mixing instructions

The concentrate is topped up with water to the end volume and diluted.

	Normal dilution 1 + 4	Economy dilution 1 + 9
Water added	800 ml	900 ml
Add Neutol plus	200 ml	100 ml
Produces	1 litre	1 litre

Normal dilution 1 + 4: This dilution is recommended if the developer is going to be used for a lengthy period with a relatively low daily throughput. The storage life of the normal dilution is about one week.

Economy dilution 1 + 9: The economy dilution is strongly recommended for high daily throughputs and when the dish contents are exhausted very quickly. It enables the yield to be fully exploited. To ensure consistent results, the carried-over developer should be replenished as necessary several times daily, by adding the same quantity of fresh solution. The storage life of the economy solution is two days.

Processing without replenishment with dishes, drums and roller transport machines

Dilution 1 + 4

Paper type	Developing time in sec.* at			Yield per litre
	20 °C	25 °C	30 °C	
RC	50 ± 10	30 ± 10	15 – 20	117 sheets 17.8 × 24 cm (= approx. 5 m ²)
Baryta	90 ± 10	70 ± 10	50 ± 10	depends on solution absorption

Dilution 1 + 9

Paper type	Developing time in sec.* at			Yield per litre
	20 °C	25 °C	30 °C	
RC	70 ± 10	50 ± 10	30 ± 5	94 sheets 17.8 × 24 cm (= approx. 4 m ²)
Baryta	100 ± 10	80 ± 10	60 ± 10	depends on solution absorption

* The precise developing time depends on the type of paper and the processing conditions, and has to be found individually. Longer developing times are relatively uncritical.

Storage life

- Concentrate in the original pack, with lightproof closure: 6 months.
- Ready 1 + 4 solution: one week (our recommendation is only to mix the day's requirement in the tray; the rest should be kept in an airtight container after use).

4.3 Neutol plus / LOR

Neutol plus/LOR has a higher activity than products which contain hydroquinone. This permits processing at a lower temperature or with a shorter time.

Processing with replenishment in machines

Paper type	Developing time in sec.* at			Replenishment rate per sqm
	20 °C	25 °C	30 °C	
RC	30 ± 5	20 ± 5	18**	100 ml
Baryta	70 ± 5	50 ± 5	30 ± 5	100 ml

* The precise developing time depends on the type of paper and the processing conditions, and has to be found individually. Longer developing times are relatively uncritical.

** A shorter processing time than 18 s is not recommended, because development may then be uneven or developer streaks may occur.

4.4 Neutol, Neutol Liquid NE, Neutol Liquid WA

These are high-quality developer concentrates ready for use after dilution with water, and suitable for processing in tray, drum and roller transport machines. The print tone is neutral to warm black. Rapid action, high speed yield and good fog security are the developer's special quality features. A special calcium stabilizer stops the clouding otherwise occurring in liquid developers, even with a very high throughput.

Mixing instructions

The developer concentrate is topped up to the desired final volume with water at about 30 °C/ 86 °F and stirred well. The developer is ready for use after cooling to working temperature. The concentrate should not be stored in its plastic bottle after part quantities have been removed.

Stock solution (1 + 3): If the complete quantity is not completely used or different dilutions have to be produced, it is advisable to mix a concentrated stock solution (= 1 part concentrate + 3 parts water). This solution can also be used undiluted as a specially powerful developer (see dilution table).

Normal dilution (1 + 7), (1 part stock solution + 1 part water): This dilution is recommended if the developer is to be used for a lengthy period with a low daily throughput. Topping up with the same solution is only necessary if the tray level falls too low. The storage life at the normal dilution is about one week.

Economy dilution (1 + 11), (1 part stock solution + 2 parts water): Economy dilution is particularly efficient if there is a high daily throughput and the tray contents are exhausted fast. They deteriorate faster (within one day) but their yield is higher, so that costs are kept low. To maintain good uniformity developer carry-over should be made up several times daily with the same quantity of fresh solution.

Dilutions

Version	Concentrated stock solution 1 + 3	Normal dilution 1 + 7	Economy dilution 1 + 11
1.25 litres (for 10 – 15 litres)	5 litres	10 litres	15 litres
5 litres (for 40 – 60 litres)	20 litres	40 litres	60 litres

The contents of plastic canister (for 40 – 60 litres solution) can also be divided into part quantities as required.

Specific gravities of freshly mixed solutions (at 20 °C / 68 °F):

Normal dilution 1 + 7 = 1.050 – 1.056

Economy dilution 1 + 11 = 1.034 – 1.040

Processing in trays, drums and roller transport machines*
(Normal dilution 1 + 7)

Paper type	Developing time* in sec. at			Yield per litre
	20 °C	25 °C	30 °C	
RC	60 ± 10	45 ± 10	30 ± 10	117 sheets 17.8 × 24 cm (= approx. 5 m ²)
Baryta	90 ± 10	60 ± 10	45 ± 10	depends on solution absorption

* Replenishment in roller transport machines: approx. 350 ml/m² fresh solution, 1+7 dilution.

Processing in trays and drums
(Economy dilution 1 + 11)

Paper type	Developing time in sec. at			Yield per litre
	20 °C	25 °C	30 °C	
RC	90 ± 10	60 ± 10	45 ± 10	94 sheets 17.8 × 24 cm (= approx. 4 m ²)
Baryta	120 ± 10	90 ± 10	60 ± 10	depends on solution absorption

Choose exposure times which enable the papers to be fully developed in the given time. Longer developing times are as a rule not critical.

Storage life

- Concentrate in the original pack = 2 years.
- Stock solution 1 + 3 in tightly capped glass bottles = 6 months.
- Normal and economy dilution: see mixing instructions.

If crystals form in concentrate which has been stored too cold, they must be completely dissolved in the amount of water specified for mixing. Storage temperatures above 30 °C/86 °F should be avoided as far as possible.

5. Stop bath (interrupter)

For black and white papers a stop bath is recommended after development. This has the following functions:

- It stops post-development.
- It stops alkaline developer being carried over into the fixer. This prevents the formation of dichroitic fog, yellow fog and deterioration of the print tone.
- It permits warm tone development with Neutol Liquid WA (no print tone deterioration due to post-development in the fixer).
- It permits the use of a neutral fixer (e.g. FX-Universal in combination with FX recycling).
- It lengthens the storage life of the fixer.

The stop bath is mixed as follows:

- 1 part acetic acid (60 %) + 30 parts water.

Length of treatment in the 2% acetic acid stop bath:

- 20 – 30 seconds (at 20 – 25 °C).

Longer treatment (more than one minute) would result in incomplete washing, and so reduce the storage lives of prints.

In continuous and roller transport processors, the stop bath can be replenished with a 5 % acetic acid solution:

- 1 part acetic acid (60 %) + 11 parts water.
Replenishment rate: 200 ± 50 ml/m².

In processors for RC papers which do not include a stop bath, the acid Agefix or Acidofix fixers should be used.

6. Use of the fixers

6.1 Agefix

Highly concentrated liquid fixer on ammonium thiosulphate basis with optimum chemistry for fixing speed, yield and storage life. Depending on dilution Agefix can be used as a standard or rapid fixer, and – with replenishment – for processing in roller transport machines.

Mixing instructions

The concentrate is diluted with the quantity of water specified. The fixer is ready for use after stirring.

Standard fixer: 1 part concentrate + 9 parts water

Rapid fixer: 1 part concentrate + 7 parts water

Specific gravities of freshly mixed solutions (at 20 °C / 68 °F):

Dilution 1 + 9 = 1.038 – 1.044

Dilution 1 + 7 = 1.048 – 1.054

Dilution 1 + 5 = 1.062 – 1.068

Dilution 1 + 3 = 1.094 – 1.100

Processing (RC paper) with replenishment in continuous and roller transport machines

Tank solution	Fixing times at 20 – 35 °C	Replenisher dilution	Replenishment rate
Rapid fixer dilution 1 + 5	30 ± 10 s	Agefix 1+3	200 ± 20 ml/m ²
Standard fixer dilution 1 + 7	45 ± 10 s	Agefix 1+5	300 ± 20 ml/m ²

Processing without replenishment in trays, drums, tanks and other processors

Dilution as	Paper type	Fixing times at 20 – 35 °C 1 + 7	Yield per litre 1 + 11
Rapid fixer 1 + 7	RC	45 ± 15 s	60 sheets 17.8 × 24 cm (= approx. 2.5 m ²)
	Baryta	120 ± 60 s	35 sheets 17.8 × 24 cm (= approx. 1.5 m ²)
Standard fixer 1 + 9	RC	75 ± 15 s	60 sheets 17.8 × 24 cm (= approx. 2.5 m ²)
	Baryta	240 ± 60 s	35 sheets 17.8 × 24 cm (= approx. 1.5 m ²)

Storage life (at room temperature)

Concentrate in the unopened original pack = 2 years.

Ready solution and opened packs = max. 3 months.

6.2 MC FIXER

Liquid fixer concentrate on ammonium thiosulphate base. Ideally matched to the Agfa Multicontrast Premium and Classic papers. Can also be used for all other black-and-white papers with variable and fixed contrast.

Mixing instructions

The concentrate is diluted with the quantity of water specified. The fixer is ready for use after stirring.

Tank solution/standard fixer:

1 part concentrate + 7 parts water

Replenisher (tank solution) fast fixer:

1 part concentrate + 4 parts water

Specific gravities of freshly mixed solutions (at 20 °C / 68 °F):

Dilution 1 + 7 = 1.054 – 1.060

Dilution 1 + 4 = 1.078 – 1.084

pH-value: 5.3 (at 20 °C)

Processing (RC paper) with replenishment in continuous and roller transport machines

Dilution as	Fixing times at 20 – 35 °C	Replenisher dilution	Replenishment rate
Rapid fixer dilution 1 + 4	20 ± 5 s*	MC FIXER 1+4	200 ± 20 ml/m ²

* At fixer times of 10 ± 5 s the replenishment rate must be doubled (= 400 ± 20 ml/m²).

Processing without replenishment in dishes, drums, tanks and other processing machines

Dilution as	Paper type	Fixing times at 20 – 35 °C 1 + 7	Yield per litre 1 + 11
Rapid fixer dilution 1 + 4	RC	20 ± 10 s	60 sheets 17.8 × 24 cm (= approx. 2.5 m ²)
	Baryta	60 ± 20 s	35 sheets 17.8 × 24 cm (= approx. 1.5 m ²)
Standard fixer dilution 1 + 7	RC	40 ± 15 s	60 sheets 17.8 × 24 cm (= approx. 2.5 m ²)
	Baryta	120 ± 30 s	35 sheets 17.8 × 24 cm (= approx. 1.5 m ²)

Storage life (at room temperature)

Concentrate in the unopened original pack = 2 years

Ready solution and opened packs = max. 3 months.

6.3 Acidifix

Rapid fixer in powder form on ammonium thiosulphate basis with optimum chemistry for fixing speed, yield and storage life.

Mixing instructions

The pack contents are stirred into the appropriate quantity of water at about 40 °C/104 °F. After cooling to working temperature the fixer is ready for use.

Specific gravity of freshly mixed solution (at 20 °C/68 °F):

1.074 – 1.080

Processing without replenishment

Tank solution	Fixer times at 20 – 35 °C	Yield per litre
RC	60 ± 10 s	60 sheets 17.8 × 24 cm (= approx. 2.5 m ²)
Baryta	150 ± 30 s	35 sheets 17.8 × 24 cm (= approx. 1.5 m ²)

The fixing times depend on the type of paper used (emulsion, silver coating), temperature, agitation and state of exhaustion of the fixer. The shorter times apply to freshly mixed fixers. Used solutions without replenishment require longer times. Too long fixing times cause „bleached“ highlights, and lengthen the final washing of baryta papers.

Storage life (at room temperature)

- Fixer in the unopened original pack = 2 years.
- Ready solution and opened packs = max. 3 months.

6.4 Fixer monitoring

A rising silver content, dilution and changes in acid content reduce the fixer's strength. pH, silver content and specific gravity – particularly in unrefilled processes – should be continuously monitored.

The chemical trade supplies acid test paper for checking pH, e.g. Lyphan Paper L 669 by Fa. Kloz, Hobrechstr. 3, 12043 Berlin. The paper strip is dipped into the solution and the change in colour compared with a test chart. This paper is accurate enough to determine the fixer pH. To test the silver content of used fixers a strip of standard silver test paper about 5 cm long is dipped into the solution. After a few seconds the test strip is compared with the colour chart.

Specific gravity is measured with a hydrometer (areometer). The fixer is poured into a graduated cylinder, into which the hydrometer is then put. The specific gravity can be read on the hydrometer scale from the highest point of the solution level. The viewer's eye should be level with the surface of the solution. The higher the hydrometer floats, the greater the specific gravity of the solution is. The values for ready solution are:

- acidity between pH 4 and pH 8
- silver content over 2 – 3 g/litre, and
- specific gravity only slightly below the gravity of fresh solution. (In properly replenished machine processes the specific gravity of used solution rises to the level of fresh replenisher's gravity.)

If the figures obtained vary to any great degree from those given above, it is advisable to mix fresh fixer to maintain the quality of the results. If the acidity is too low the stop bath should be replaced at the same time.

6.5 Silver recovery

Electrolytic silver recovery is possible from fixers, which can contain up to 4 g silver per litre. If the quantities of fixer are large enough, it may be worthwhile to use a silver recovery unit. Smaller quantities should be dealt with by a suitable external company.

6.6 Fixer recycling

In the same way as with the Agfacolor processes, finishers can also recover the silver from black and white fixer overflow, and recycle the solution to produce replenisher. For this FX-Universal must be used. Detailed information on this subject is available from Agfa agents.

7. Soda interim bath

For processing black and white baryta papers, a soda bath (1% sodium carbonate solution) can be inserted between fixer and final wash, which washes the fixer out of the paper surface faster and better. This not only cuts the final washing time by about 30 %, but also improves the storage life of the prints. Length of treatment: 2 to 3 minutes.

8. Final wash

A thorough final wash is essential to ensure good storage lives for prints. Depending on temperature, agitation, input and output of the washing water, the following washing times are needed:

- With RC papers: 2 – 4 minutes
- With baryta papers: 20 – 40 minutes
- With baryta papers after a soda interim bath: 15 – 30 minutes

Note for PE/RC papers:

Much longer washing times may cause the prints to curl.

9. Use of the auxiliaries

9.1 Agepon

This is a concentrated wetting agent used as a final bath after the last wash. It ensures even draining of the water off the paper surface, so that no droplets, stains or streaks are left. Agepon cuts down drying time and improves high gloss.

Mixing instructions

Agepon is diluted with water 1 + 200 (= 1 capfull to one litre water). Higher concentrations do not improve the results. The papers are agitated in the wetting solution for a half to one minute, and then dried without rinsing.

Yield

The Agepon solution must be replaced when the water does not drain evenly off the paper surface.

Storage life

The concentrate will keep virtually indefinitely in closed bottles. The life of ready solution depends on the type of water used. Diluted Agepon should not be used for longer than two weeks.

9.2 Algezid II

Powerful biocide for stopping fungi and algae formation in wash tanks and silver recovery units. Properly used Algezid II does not have any adverse effects on photographic materials. It must not be put in the processing solutions.

Use

After shut-down 2 ml Algezid II per ten litres is added to the washing tanks. The water does not need to be drained off before the next batch.

Storage life

The concentrate will keep virtually indefinitely in closed bottles.

9.3 Sistan New

Sistan New protects prints from changes in print silver caused by environmental effects. These faults initially appear as reddish to yellowish-brown highlight discoloration, and the complete print may be destroyed by the silver being converted to a colloidal form. Its causes are industrial and traffic fumes, and fumes from heating oil, plastic paints, compressed boarding, cardboard with an acid content, glues, sticky tape, freshly cut PVC and brittle rubber, and also ozone and all substances giving off peroxide.

Mixing instructions

For use 50 ml Sistan New is diluted with 950 ml water. The correctly processed and washed prints are agitated for one minute in Sistan New solution after the final wash.

NB! Too high a Sistan New concentration can lead to stains which take some time to appear – particularly if prints are in close contact (stored stacked). Care should then be taken that the fronts and backs of prints are wiped before drying to avoid partial over-concentration caused by dried drops of Sistan New. Pinch and transport rollers on mechanical processors and continuous dryers should be carefully wiped clean to stop the Sistan New solution crystallising on them.

Yield

Up to 2 m² black and white paper per litre ready solution (equivalent to approx. 45 sheets 17.8 × 24 cm). The solution can be used down to the last drop.

Storage life

The concentrate will keep virtually indefinitely in closed bottles. Ready solution should be kept in capped glass bottles, not left in open trays.

9.4 Toning with Viradon New

The metallic (black) print silver is converted to a single-colour image by toning processes. The print silver is either replaced with coloured metals, or coloured metal compounds accumulate on the silver grains. Toned photographs are especially durable with long storage lives, because these silver compounds are less subject to breakdown by environmental factors.

Only photos which are correctly exposed, developed to specification, fixed in really fresh fixer and well washed are suitable for toning. In principle any black and white paper can be toned, however warm tone papers produce the best results.

Toning can be either direct or indirect. Direct toning converts the silver image to a different silver compound in one operation. With indirect toning the prints have to be bleached first. A new image is produced in a second bath, but it consists of a differently coloured silver compound.

The simplest method is toning with Viradon New. It has the advantage over other toning solutions of not affecting the contrast of the prints. In some cases the prints have to be exposed slightly darker.

Direct toning with Viradon New

Agfa Viradon New 1 + 24	1 – 10 min
(1 part Viradon New + 24 parts water)	(depending on intensity needed)

Stop bath (10% sodium sulphite solution) (only necessary if after-toning in the wash is to be prevented)	1 min
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Final wash
(as given for RC and fibre-base papers)

Indirect toning (with 44 BL bleach)

Bleaching: 44 BL bleach * (1 + 3) (1 part 44 BL concentrate + 3 parts water)	2 – 5 min
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* Process AP 44 (bleach for colour reversal film processing)

or

Bleach (Agfa 501 formula) 500 ml 10% potassium ferricyanide solution 100 ml 10% potassium bromide solution 400 ml water	5 min
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Wash (running)	5 min
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Agfa Viradon New 1 + 24 (possibly stop bath as for direct toning)	3 min
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Final wash
(as given for RC and fibre-base papers)

Process temperature:	20 °C / 68 °F
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If the aim is just to make prints stable for storage (image silver stability), the direct toning method should be used, since it changes the print tone very little. Indirect toning produces much warmer print tones (yellow-red).

Brovira-Speed 310 is less suitable for indirect toning, since this method may result in a matter gloss in the dark to black print areas than in the lighter areas.

NB! To stop staining the prints must be placed individually in the Viradon solution and then well agitated. It is also necessary for prints intended for toning to be treated with fixer which is as fresh as possible and to have been thoroughly washed. Thorough washing is also necessary after toning.

Yield

In one litre of ready solution 2 to 3 m² paper can be toned (equivalent to approx. 45 to 70 sheets 17.8 × 24 cm).

Storage life

The concentrate will keep virtually indefinitely in closed bottles. The solution should be used once and then discarded.

10. Environmental protection and disposal

Wash water from processors containing small quantities of process solutions are subject to local and often general effluent regulations covering disposal into the public sewage system.

If the effluent regulations do not permit used photographic solutions to be discarded into the public sewers even after treatment, they must be disposed of as special waste.

The packaging of Agfa photo-chemicals conforms to the requirements for safety (during transport, storing and handling) and recycling.

Photo-chemical packaging must not contain any harmful impurities if it takes part in collection and recycling systems. For this purpose the packs must be absolutely empty, that is free of leftover powder, sludge and drops. Photo-chemical containers should preferably be rinsed out as well. It is best to use some of the mixing water for this.

Queries on environmental protection and waste disposal can be answered by the environment officers in the Agfa Sales organisations, or referred to the central Environmental Protection Department in Leverkusen, Germany.

11. Further information

The data published here is based on the evaluation of standard products at the time of printing of this brochure. Slight deviations are possible through production tolerances. Agfa-Gevaert is constantly endeavouring to improve the quality of the products and therefore reserves the right to alter the product specifications without notice.

Notification of any technical changes, such as replenishment rate or mixing instructions, will be given immediately in the package inserts and will be updated in all publications.

Additional information on the Agfa black-and-white chemicals is contained in the following publication:

Technical Data C-SW16,

»Agfa B/W Chemicals – Film processing«.

12. Range of chemicals

Processing solution	Product name	Pack size	Code
Positive developers / liquid concentrates	Multicontrast Developer	6 × 500 ml	B3MUS
		6 × 1 litre	B3MVU
		3 × 5 litres	B3MWW
	Neutol plus	6 × 1 litre	5A71M
	Neutol plus / LOR	3 × 5 litres	5BQ43
		1 × 20 litres	5BQ55
	Neutol	10 × 125 ml	BVMD4
		6 × 500 ml	BVME6
	Neutol Liquid NE	for 6 × 10 – 20 litres	BVMF8
		for 3 × 40 – 80 litres	BVMGB
	Neutol Liquid WA	for 6 × 10 – 20 litres	BVMHD
		for 3 × 40 – 80 litres	BVMJF
Stop bath	Acetic acid (60 %)	5 litres	BQEBX
Fixers	Agefix	10 × 125 ml	BVJ6E
		6 × 500 ml	BVJ7G
		6 × 1 litre	BVJ8J
		3 × 5 litres	BVJ9L
	MC Fixer	3 × 5 litres	B8RDN
	Acidofix	for 5 × 5 litres	BVJ4A
Auxiliary products	Agepon	5 × 250 ml	BVMPS
		3 × 1 litre	BVMQU
	Algezid II	1 litre	BUNDZ
		5 litres	BR88G
	Sistan New	500 ml	5G6UL
	Viradon New	8 × 125 ml	5FSXX
Bleach 44 BL	for 3 × 5 litres	BVLLF	

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