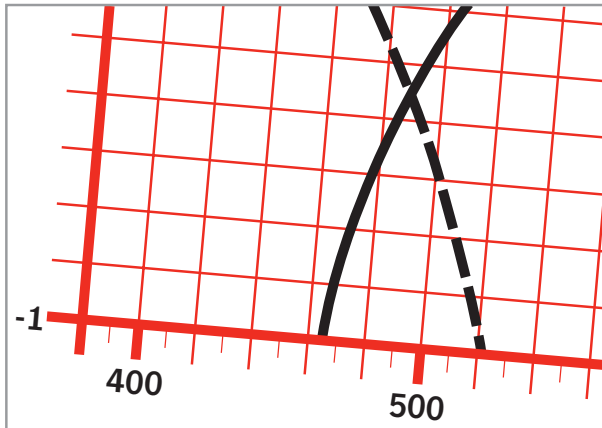


Technical Data

Agfachrome Process 44



The Agfachrome Process 44 is compatible with the Kodak Process E-6. It is intended for processing Agfachrome, Ektachrome and Fujichrome films.

In addition, all the films for which Process E-6 is specified can be developed in the Agfachrome Process 44.

The following instructions for the process AP 44 are intended to serve as a processing guideline. Consistent processing conditions are a prerequisite for good results. This consistency can be ensured by carrying out regular chemical and sensitometric monitoring.

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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 package inserts with the AP 44 products contain additional safety advice on the Agfachrome Process 44.

Safety data sheets in several languages are available for all photochemical products.

2. AP 44 processing with replenishers

2.1 Standard processing with continuous and rack-and-tank machines

Process solution	Processing times		Temperature (°C)	Replenisher	Replenishment rate (ml/m ²)
	standard time	shortest – longest time			
1st developer ⁴⁾	6 min ¹⁾	5 – 7 min	38 ± 0.3 ²⁾	44 FD-R	2150
1st wash	2 min	1.75 – 4 min	38 ± 2	–	40 l/m ² ³⁾
Reversal bath	2 min	1 – 4 min	24 – 39	44 RE	1100
Colour devel. ⁴⁾	6 min	5 – 8 min	38 ± 0.6 ²⁾	44 CD-R	2150
Conditioner	2 min	1 – 4 min	24 – 39 ⁵⁾	44 BC	1100
Bleach ⁴⁾	6 min	6 – 8 min	33 – 39	44 BL-R	140 ⁶⁾
Fixer ⁴⁾	4 min	4 – 6 min	33 – 39	44 FX	1100
2nd wash ⁷⁾	2 min	2 – 4 min	33 – 39	–	80 l/m ²
3rd wash	2 min	2 – 4 min	33 – 39	–	80 l/m ²
Final bath	1 min	0.5 – 4 min	room temp.	44 FI „LF“	1100
Drying	–	–	max. 63	–	–

2.2 Processing with continuous and rack-and-tank machines with LR replenishers

Process solution	Processing times		Temperature (°C)	Replenisher	Replenishment rate (ml/m ²)
	standard time	shortest – longest time			
1st developer ⁴⁾	6 min ¹⁾	5 – 7 min	38 ± 0.3 ²⁾	44 FD-LR	1075
1st wash	2 min	1.75 – 4 min	38 ± 2	–	40 l/m ² ³⁾
Reversal bath	2 min	1 – 4 min	24 – 39	44 RE	1100
Colour devel. ⁴⁾	6 min	5 – 8 min	38 ± 0.6 ²⁾	44 CD-LR	1075
Conditioner	2 min	1 – 4 min	24 – 39 ⁵⁾	44 BC	1100
Bleach ⁴⁾	6 min	6 – 8 min	33 – 39	44 BL-R	140 ⁶⁾
2nd wash ⁷⁾	2 min	1 – 4 min	33 – 39	–	40 l/m ²
Fixer ⁴⁾	4 min	4 – 6 min	33 – 39	UNIFIX-J * (1 + 4)	450
3rd wash ⁷⁾	2 min	1.5 – 4 min	33 – 39	–	80 l/m ²
4th wash	2 min	1.5 – 4 min	33 – 39	–	80 l/m ²
Final bath	1 min	0.5 – 4 min	room temp.	44 FI „LF“	1100
Drying	–	–	max. 63	–	–

* UNIFIX-J with Closed-Loop desilvering (electro fixer).

- The first developing time required must be found individually for each machine, on the basis of the results of processing AP 44 control strips, and depends on the machine speed and circulation rate or rotations per minute, as well as on the temperature. Once fixed, the time must be kept constant with an accuracy of ± 3 seconds.
- To match the film speed, the developer temperature can be set between 36.5 °C and 39.5 °C. Once fixed, the temperature must be kept constant with an accuracy of ± 0.3 °C (first developer) and ± 0.6 °C (colour developer).
- Water rate: 1.4 litres per metre 135 film.
The water rate in the first wash should be at least 7.5 litres per minute.
- Solution agitation/turbulence only during film processing.
Reversal bath and conditioner should not be circulated and filtered, to prevent oxidation of the solutions. If the solutions are nevertheless circulated and filtered, ensure that air is not drawn in and pumped into the solutions.
- In the interests of keeping oxidation down, the temperature of the conditioner should be set as low as possible. At a high machine speed (= increased carry-over) and simultaneously shorter processing time than 2 minutes, a minimum temperature of 33 °C is recommended, or raising the replenishment rate for the conditioner.
- Replenishment rate for continuous machines. The replenishment rate in rack-and-tank machines is 215 ml/m².
- Water rate 2.7 l/m 135 film
Minimum washing rate: 7.5 l/min
A cascade layout is recommended. This enables the water rate to be lowered to about 1.4 l/m 135 film (40 l/m²). For rack-and-tank machines the water rate should be raised by a factor of 1.5, due to the increased carry-over. If the fixer is to desilvered, an extra interim wash is needed between the bleach and fixer.

Circulation, filtration and gas agitation in rack-and-tank machines

Extra agitation with compressed air is recommended for all the washes, since the normal air intake is governed by the amount of water and is often insufficient.

Process solution	Circulation	Filtration	Gas agitation		
			Gas	Length of burst	Interval
1st developer	yes	yes	nitrogen	2 s	10 s
1st wash	–	–	compressed air	2 s	10 s
Reversal bath	–	–	–	–	–
Colour developer	yes	yes	nitrogen	2 s	10 s
Conditioner	–	–	–	–	–
Bleach	yes	yes	compressed air	2 s	10 s
Fixer	yes	yes	compressed air	2 s	10 s
2nd wash	–	–	compressed air	2 s	10 s
3rd wash	–	–	compressed air	2 s	10 s
Final bath	not necessary	not necessary	–	–	–

2.3 Processing in roller transport machines

Depending on machine loading, oxidation will proceed at varying rates in each of the process baths. In order to achieve consistent processing, it is advisable to increase replenishment in these cases, as indicated below.

First developer and colour developer

Instead of 2150 ml replenisher per square metre of film, the developers should each be replenished with 4300 ml replenisher, to which 2.5 ml 44 FD-S starter per litre has been added for the first developer, and 2.5 ml 44 CD-S starter per litre for the colour developer (this is equivalent to a mix of 1 part 44 FD replenisher and 1 part 44 CD tank solution resp. 1 part 44 CD replenisher and 1 part 44 CD tank solution).

Reversal bath, conditioner, fixer

Increase in replenishment rate from 1100 ml to 1700 ml – 2200 ml per square metre film.

Bleach

Generally no change in the given replenishment rate of 215 ml per square metre film is necessary.

2.4 Replenishment rates for individual film formats

Replenishment rates (in ml) for continuous processing and roller transport machines

per metre film	Replenisher 44 FD-R/44 CD-R	Replenisher 44 FD-LR/44 CD-LR	Replenisher 44 BL-R continuous roller transp.		Replenisher 44 RE/BC/FX*/FI
135	75	38	5	7.5	38
120/220	135	68	9	13.5	68
35 mm leader	4.1	4.1	4.1		4.1
61.5 mm leader	7.2	4.1	7.2		7.2

Replenishment rates (in ml) for rack-and-tank machines

per film	Replenisher 44 FD-R/44 CD-R	Replenisher 44 FD-LR/44 CD-LR	Replenisher 44 BL-R	Replenisher 44 RE/BC/FX*/FI
135-12	50	26	5	26
135-24	84	42	8.3	42
135-36	118	61	12	61
120	108	55.5	11	55.5
220	219	112	22	112
4 × 5 inch	28	14	3	14
5 × 7 inch	49	25	5	25
8 × 10 inch	111	57	11	57
11 × 14 inch	214	109	21.5	109
6.5 × 9 cm	13	6.5	1.5	6.5
9 × 12 cm	23	12	2.5	12
12 × 16.5 cm	43	22	4.5	22
13 × 18 cm	50	26	5	26
18 × 24 cm	93	48	9.5	48

* For UNIFIX-J with Closed-Loop desilvering multiply the figures given by a factor of 0.4.

2.5 Manual processing in tank machines

Processing without replenishment

For processes without replenishment the yield of first and colour developers is about 0.45 square metres per litre (equivalent to about eight 135-36 films or nine 120 roll films). The other process solutions have a maximum yield of up to 1.35 square metres per litre. The first developing time must be lengthened by thirty seconds after a throughput of 0.3 square metres per litre (equivalent to about five 135-36 films or six 120 roll films).

Processing with replenishment

If the process is replenished, the replenisher should be added to each of the baths after each batch. If there is an interval of a few days after the first batch, it is advisable to wait and add the replenisher until just before the next one, as this will improve consistency and stability. However, you should make sure that the specified temperatures have been reached in each solution before the start of development, since the addition of quantities of unheated replenisher may cause a fall in temperature.

2.6 ALGEZID II

When a processor is to be idle for some time, for example at weekends, 2 ml ALGEZID II is added to the wash tanks per 10 litres tank contents, in order to prevent the formation of algae. The rate is 2 ml ALGEZID II per 10 litres tank volume. Mix the ALGEZID II well with the water.

3. Recycling

Rejuvenating the solution overflows (developer and fixer) enables the effluent pollution to be substantially decreased in respect to COD, BOD, developer substance, ammonium, complexing agents, and sulphate.

Process data for the solutions differing from the standard process

Process solution	Time (min)	Temperature (°C)	Replenisher/rejuvenator	Replenishment rate	
				ml/m 135 film	ml/m ² film
1st developer 1st wash Reversal bath			see points 2.1 and 2.2		
Colour developer	5 – 7	38 ± 0.6	44 CD-J	75	2150
Conditioner	1.5 – 4	24 – 39	44 BC	38	1100
Bleach	6 – 8	33 – 39	44 BL-R	5 – 7.7	140 – 215
2nd wash	1.5 – 4	33 – 39	–	cascade wash in counter-current (7.5 l/min)	
3rd wash	1.5 – 4	33 – 39	–	1400*	40 l*/m ²
Fixer	4 – 6	33 – 39	FX-UNIVERSAL (ON-LINE)	desilvering with ON-LINE method 250 ml pro 10 Ah	
			UNIFIX-J (OFF-LINE)	0.8	22
				35 ml/l overflow	
4th wash	1.5 – 4	33 – 39	–	1400*–2800	40*–80 l/m ²
5th wash	1.5 – 4	33 – 39	–	1400*–2800	40*–80 l/m ²
Final bath	0.5 – 4	room temp.	44 FI „LF“	38	1100
Drying					

* two-tank cascade

3.1 Colour developer recycling with ion exchanger

1. collect colour developer overflow and put through the AR-1 ion exchanger Resin capacity: 30 l 44 CD per litre resin or 7.5 l 44 CD per litre resin and hour ¹⁾	1 litre
2. add rejuvenator parts ²⁾ 44 CD-J/Part A Combipart I New ³⁾ 44 CD-J/Part C	44 ml 8.6 ml 6 ml
3. add water	approx. 111.4 ml
produces recycled CD replenisher	approx. 1170 ml
Analytical target value	pH value 12.2 ± 0.1
	specific gravity 1.041 ± 0.007

1) The exhausted ion exchanger resin is regenerated with 7.5 % sodium chloride solution and water.

2) The exact amount of rejuvenator concentrate added depends on the analysis of the developer overflow and the specified analytical targets (obtainable from Agfa sales organisations).

3) Combipart I New responds Part B.

3.2 Fixer recycling

If the process includes electrolytic desilvering of the fixer followed by rejuvenation and reuse as replenisher, an extra wash between bleach and fixer is recommended – unlike the standard process. This greatly reduces the carry-over of bleach into the fixer, so that problems with the electrolytic desilvering of the fixer are prevented.

OFF LINE method

1. collect fixer tank overflow and desilver electrolytically	1 litre
2. add UNIFIX-J*	approx. 30 ml
3. check pH value and (if necessary) set to target figure with ammonia water solution	pH 7.5 ± 0.5
produces	approx. 1030 ml

* At a higher carry-over than 80 ml/m², the amount of rejuvenator added is increased accordingly.

ON LINE method

Continuous addition of FX-UNIVERSAL according to the throughput or ampere hours consumed:

per m ² :	17 ml
per 10 Ah:	250 ml (± 15 %)

If the FX is jointly circulated with other Agfa colour processes, the highest recommended rate must be used.

The rate of addition is affected by the concentration of bleaching agent carried over into the fixer.

4. One-shot development without replenishment

4.1 Processing in rotary machines

Process solution	Time ¹⁾ (min)	Temperature (°C)	Remarks
Pre-heating	8 – 12	40	set machine heater to 40 °C. Films are loaded but no solution is added.
1st developer	5 – 6½ ²⁾	38 ± 0.3 ³⁾	44 FD
Wash	2 – 4	38 ± 1	wash rate 7.5 l/min
Reversal bath	2 – 4	38 ± 1	44 RE
Colour developer	4 – 5	38 ± 1	44 CD rotation ⁴⁾
Conditioner	1½ – 4	20 – 40	44 BC
Bleach	6 – 8	33 – 40	44 BL
Fixer	3 – 6	33 – 40	44 FX
Wash ⁵⁾	3 – 6	33 – 40	wash rate 7.5 l/min
Final bath 44 FI	½ – 2	Room temp.	outside processor ⁶⁾
Drying	-	max. 63	-
Machine cleaning ⁷⁾	5 – 10	24 – 30	with running water

Notes:

- 1) The processing times given include a draining time of 15 seconds.
- 2) The first development time required should be established individually for each machine. It depends both on temperature and the rotations per minute. This time should be kept constant with an accuracy of ± 3 seconds.
- 3) During the first development time the temperature falls by approx. 2 – 2.5 °C, depending on the type of machine used. This fall in temperature is generally constant, provided that pre-heating was accurate.
- 4) Instead of the 44 CD colour developer specified for tank equipment and machines, for rotary processing the 44 CD-Rotation colour developer should be used. Depending on the type of equipment used, an adjustment to the colour developer pH may be necessary. This pH adjustment should be established individually for each type of film.
- 5) If possible it is advisable to drain the tray for about 10 seconds after each minute of washing, so that the water is subsequently completely renewed.
- 6) The films are always treated in the final bath outside the machine, in order to eliminate the smell of formalin (the rotating drum has a large surface area), and to prevent contamination of the machine with final bath.
- 7) After each processing operation it is imperative to thoroughly clean the machine, reels and film holders, in order to remove any traces of the solutions remaining (fixer), and to prevent contamination of the first developer in the next batch. Cleaning should be carried out immediately to prevent chemicals drying on the equipment.

Rate of rotation

The rate of rotation should be set to the higher figure (rate for paper development as specified by the equipment manufacturer). Changing the direction of rotation (reversing the polarity) during processing improves the evenness of development. The direction of rotation should be changed several times per minute, e.g. during the first minute in cycles of about three rotations **forwards** and about two **backwards** at the lower speed of 12 to 16 revolutions per minute. After the first minute rotation needs to be in one direction (forwards) only.

Quantities of chemicals necessary

The quantities of chemicals used should not be below the minimums given in the table in order to ensure perfect and uniform (reproducible) results.

Process solution	Chemical quantities		
	per m ² film	per roll film 120	per sheet film 13 × 18 cm
1st developer	2750 ml	140 ml	65 ml
Reversal bath	2000 ml	100 ml	47 ml
Colour developer	2750 ml	140 ml	65 ml
Conditioner	2000 ml	100 ml	47 ml
Bleach	1650 ml	85 ml	39 ml
Fixer	1650 ml	85 ml	39 ml

The minimum quantity of solution per batch is governed by the equipment used. Follow the equipment manufacturer's instructions.

Using less than the specified quantities of chemicals may result in variations of speed and colour. With certain rotary equipment and inserts it may be necessary to increase the solution quantities to achieve uniform results. Process solutions can be subject to a high rate of oxidation, particularly if the equipment contains big air filled spaces. Greater quantities of solution must then be used.

4.2 AP 44 KIT with bleach-fix

Process sequence	Time	Temperature (°C)
Pre-heating	5 min	38
1st developer	5 – 7 min	38 ± 0.3
1st wash	1 – 2 min	38 ± 1
Reversal bath	1 min	38 ± 1
Colour developer	4 – 5 min	38 ± 1
Bleach-fix	5 – 7 min	38 ± 1
2nd wash	3 – 4 min	38 ± 2
Final bath	½ – 1 min	Room temperature

This short process with the AP 44 KIT is only possible with exact temperature control, i.e. a water jacket must be installed.

If the five-litre version is used, the times are 1 – 2 minutes for the conditioner, 5 – 6 minutes for the bleach and 3 – 4 minutes for the fixer (each at 31 ± 1 °C). The process times can be lengthened for all solutions and washes by up to 50 % – except for the first developer.

Agitation: In a small tank continuous agitation for the first minute, then tilt once every 30 seconds; in a drum continuous rotation with changing direction.

Yield: With the process in small developing tanks and developing drums the yield of first and colour developers is about four 35 mm films (135 – 36) per 500 ml solution (AP 44 KIT). In the interests of uniform results the first developing time should be lengthened by thirty seconds each for the third and fourth film.

5. Push processing

The practical speed can be increased by one stop (3 DIN) by lengthening the first development time by three minutes.

Further lengthening of the first development time is not recommended in the interests of acceptable processing quality. This restriction does not concern the Agfachrome RS Plus and Agfachrome RSX-II films (see remarks mentioned below).

Pushing the film speed by more than one stop may lead to colour deviations, as well as a fall in maximum density, so that a visible fall in quality cannot be ruled out. As well as pushed development, "pulled" development is also possible – within certain limits – for wrongly exposed films. The exact first developing time depends on the developing conditions. The following are guides.

Development pushed by 1 DIN:
FD time **lengthened** by approx. 1 min

Development pulled by 1 DIN:
FD time **shortened** by approx. 40 s

Variations of more than ± 3 DIN (± 1 stop) lead to a distinct fall in quality, and can therefore not be recommended.

Especially for Agfachrome RSX-II Professional films guides:

Development pushed by 1 DIN:
FD time **lengthened** by approx. 1 min

The film speed can be pushed up to + 6 DIN.

Development pulled by 1 DIN:
FD time **shortened** by approx. 30 s

6. Minilab process in Agfa FP 1-44

Process solution	Time	Temperature (°C)	Replenisher	Replenishment rates per film 135-24
1st developer	6 min	38 ± 0.3	44 FD-R	84 ml
Reversal bath	4 min 36 s	room temp.	44 RE	86 ml
Colour devel.	6 min	38 ± 0.6	44 CD-R	84 ml
Conditioner	2 min 18 s	room temp.	44 BC	86 ml
Bleach	6 min	33 – 39	44 BL-R	8,4 ml
Fixer	4 min 31 s	33 – 39	44 FX	43 ml
Final bath	6 min 54 s	33 – 39	44 FI „LF“	86 ml

The conventional process for slide film processing consists of several steps with washes. The use of Agfachrome Process 44 in the Agfa FP 1-44 minilab has the following advantages.

- No interim and final wash, i.e. a drastic saving in energy for water and no plumbing needed.
- The pack sizes of the individual solutions are matched to the replenisher tank volumes.
- The formalin content is lowered by 45 % in the 44 FI "LF" final bath, which makes a contribution to environmental preservation, and high effluent volumes do not arise for interim washes.

The AP 44 is of course also suitable for the minilabs on the market with washes.

To prevent the rising of the thiosulphate concentration in the final bath, the first final bath tank (cascade 1 = STB 1) should be mixed freshly once a week. To prevent a rise in bleach and fixer tank concentrations, 100 ml water per day should be added to these solutions to make up for compensation.

With an average throughput of more than 15 films per day, the replenishment rates for 44 FD-R, 44 RE and 44 CD-R should each be increased by 20 %.

7. Mixing instructions for replenishers and tank solutions

We recommend a water temperature of approx. 30° C for mixing the tank solutions. Use part of the mixing water to rinse out the chemical containers. This removes leftover chemicals from the containers, so that they can be reused without problems.

The mixing instructions published here refer to an end volume of 1 litre. It is perfectly possible to make up part-mixtures of liquid concentrates.

It is unnecessary to measure the concentrate volumes if the given pack size volume is mixed.

The mixing instructions – in relation to the relevant pack sizes – are given in the directions enclosed with each pack of chemicals.

7.1 First developer

Mixing first developer made with 44 FD-R			
for	Replenisher	Tank solution with concentrate	Tank solution with replenisher
Water first	800 ml	800 ml	–
Mixed replenisher	–	–	1 litre
Add 44 FD-R	200 ml	200 ml	–
Add 44 FD-R starter	–	5 ml	5 ml
Produces	1 litre	1005 ml	1005 ml

Mixing first developer made with 44 FD-LR			
for	Replenisher	Tank solution with concentrate	Tank solution with replenisher
Water first	800 ml	795 ml	–
Mixed replenisher	–	–	995 ml
Add 44 FD-LR	200 ml	200 ml	–
Add 44 FD-LR starter	–	5 ml	5 ml
Produces	1 litre	1 litre	1 litre

7.2 Reversal bath

Mixing reversal bath made with 44 RE

for	Replenisher = Tank solution
Water first	900 ml
Add 44 RE	50 ml
Top up with water to	1 litre

7.3 Colour developer

Mixing colour developer made with 44 CD-R (does not apply to Cube chemicals)

for	Replenisher	Tank solution with replenisher	Tank solution with concentrate
Water first	750 ml	–	800 ml
Mixed replenisher	–	1 litre	–
Add 44 CD-R/Part A	150 ml	–	150 ml
Add 44 CD-R/Part B	47.3 ml	–	47.3 ml
Add 44 CD starter	–	5 ml	5 ml
Produces	approx. 1 litre	1005 ml	approx. 1 litre

Mixing colour developer made with 44 CD-R Cube

for	Replenisher	Tank solution with replenisher	Tank solution with concentrate
Water first	600 ml	–	600 ml
Mixed replenisher	–	1 litre	–
Add 44 CD-R/Part A Cube	200 ml	–	200 ml
Add 44 CD-R/Part B Cube	200 ml	–	200 ml
Add 44 CD starter	–	5 ml	5 ml
Produces	1 litre	1005 ml	1005 ml

Mixing colour developer made with 44 CD-LR

for	Replenisher	Tank solution with replenisher	Tank solution with concentrate
Water first	600 ml	241 ml	691 ml
Mixed replenisher	–	750 ml	–
Add 44 CD-LR/Part A	200 ml	–	150 ml
Add 44 CD-LR/Part B	200 ml	–	150 ml
Add 44 CD starter	–	9 ml	9 ml
Produces	1 litre	1 litre	1 litre

7.4 Conditioner

Mixing conditioner made with 44 BC

for	Replenisher = Tank solution
Water first	700 ml
Add 44 BC	200 ml
Top up with water to	1 litre

7.5 Bleach

Mixing bleach replenisher with 44 BL-R

- The 44 BL-R bleach replenishers are used undiluted.
- The Cube pack for 30 litres contains 20 litres of concentrate. It must only be diluted when a bleaching time of 6.5 minutes (and longer) is applied:

2 parts 44 BL-R concentrate + 1 part water (= 30 litres)

At shorter bleaching times this dilution does not bleach properly.

Mixing bleach tank solution made with 44 BL-R

1. 500 ml initial 44 BL-R
2. top up with water to 1 litre

7.6 Fixer

Mixing fixer made with 44 FX

for	Replenisher	Tank solution
Water first	900 ml	875 ml
Add 44 FX	150 ml	125 ml
Produces	1050 ml	1 litre

Mixing fixer made with 44 FX-Cube

for	Replenisher = Tank solution
Water first	889 ml
Add 44 FX Cube	111 ml
Produces	1 litre

Mixing fixer made with FX-UNIVERSAL

for	Replenisher	Tank solution
Water first	900 ml	875 ml
Add FX-UNIVERSAL	150 ml	125 ml
Produces	1050 ml	1 litre

Mixing fixer made with UNIFIX-J

for	Replenisher	Tank solution
Water first	800 ml	830 ml
Add UNIFIX-J	200 ml	170 ml
Produces	1 litre	1 litre

7.7 Final bath

Mixing final bath made with 44 FI "LF"

for	Replenisher = Tank solution
Water first	800 ml
Add 44 FI "LF"	10 ml
Top up with water to	1 litre

8. Applications and mixing instructions cube chemicals

Note: The cube chemicals differ in concentration from the standard version. The different mixing ratios must be applied to avoid faulty solutions.

8.1 For automatic in-line replenishment with metering pumps

Process solution	Adjustment quantities per m ² film			Mixing proportions water + concentrate
	Water	Concentrate		
1st developer	1720 ml	430 ml	44 FD-R *	4 + 1
Reversal bath	1045 ml	55 ml	44 RE	19 + 1
Colour developer	1290 ml	430 ml + 430 ml	A 44 CD-R * B	3 + 1 Part A + 1 Part B
Conditioner	880 ml	220 ml	44 BC	4 + 1
Bleach **	72 ml	143 ml	44 BL-R	1 + 2
Fixer	977 ml	123 ml	44 FX	8 + 1
Final bath	1089 ml	11 ml	44 FI „LF“	99 + 1

* Alternatively 44 FD-LR/44 CD-LR with half the replenishment rate set.

** The figures given apply to bleaching times of 6.5 minutes and more. For shorter bleaching times 215 ml undiluted concentrate must be used.

8.2 Production of replenisher for the conventional replenishment processes

Process solution	Water first	Addition of chemicals (Cube) under stirring	End volumes	Concentrate per litre solution
1st developer	80 l	44 FD-R for 100 l *	100 l	200 ml
Reversal bath	380 l	44 RE for 400 l	400 l	50 ml
Colour developer	60 l	44 CD-R/A for 100 l + 44 CD-R/B for 100 l	100 l	200 ml
Conditioner	80 l	44 BC for 100 l	100 l	200 ml
Bleach **	10 l	44 BL-R for 30 l	30 l	667 ml
Fixer	160 l	44 FX for 180 l	180 l	111 ml
Final bath	495 l	44 FI „LF“ for 500 l	500 l	10 ml

* Alternatively 44 FD-LR with half the replenishment rate set.

** The figures given apply to bleaching times of 6.5 minutes and more. For shorter bleaching times the concentrate must be used undiluted.

8.3 Production of tank solution (per 100 l) for rack-and-tank, continuous, and roller transport machines*

Process solution	Water first	Addition of concentrate	Addition of Starter
1st developer	80 l	20 l 44 FD-R	500 ml 44 FD-S
	80 l	20 l 44 FD-LR	500 ml 44 FD-LR-S
Reversal bath	95 l	5 l 44 RE	–
Colour developer	60 l	20 l 44 CD-R/A Cube + 20 l 44 CD-R/B Cube	– 500 ml 44 CD-S
Conditioner	80 l	20 l 44 BC	–
Bleach	50 l	50 l 44 BL-R	–
Fixer	89 l	11 l 44 FX Cube	–
Final bath	99 l	1 l 44 „LF“	–

* also applies to tank processors

8.4 Production of tank solution (per 10 litres) for rotary processors

Process solution	Water first	Addition of concentrate	Addition of Starter
1st developer	8 l	2 l 44 FD-R	50 ml 44 FD-S
Reversal bath	9.5 l	0.5 l 44 RE	–
Colour developer (Cube) or Colour developer (44 CD-Rot.)	6 l 7.5 l	2 l 44 CD-R/A + 2 l 44 CD-R/B oder 2 l 44 CD-Rot./A + 0.5 l 44 CD-Rot./B	–
Conditioner	8 l	2 l 44 BC	–
Bleach	5 l	5 l 44 BL-R	–
Fixer	8.9 l	1.1 l 44 FX Cube	–
Final bath	9.9 l	0.1 l 44 FI	–

9. Mixing instructions for one-shot development

9.1 Processing in rotary machines

Mixing first developer made with 44 FD

for	5 litres	1 litre
1. Water first	4 litres	800 ml
2. Add 44 FD concentrate	1 litre	200 ml

Mixing colour developer made with 44 CD-Rotation

for	5 litres	1 litre
1. Water first	3.5 litres	700 ml
2. Add 44 CD-Rot. / Part A	1 litre	200 ml
3. Add 44 CD-Rot. / Part B	250 ml	50 ml
4. Top up with water to	5 litres	1 litre

Mixing reversal bath made with 44 RE

for	5 litres	1 litre
1. Water first	4 litres	900 ml
2. Add 44 RE concentrate	250 ml	50 ml
3. Top up with water to	5 litres	1 litre

Mixing conditioner made with 44 BC

for	5 litres	1 litre
1. Water first	3 litres	700 ml
2. Add 44 BC concentrate	1 litre	200 ml
3. Top up with water to	5 litres	1 litre

Mixing bleach made with 44 BL

for	5 litres	1 litre
1. Water first	2 litres	400 ml
2. Add 44 BL concentrate	2.5 litres	500 ml
3. Top up with water to	5 litres	1 litre

Mixing fixer made with 44 FX

for	5 litres	1 litre
1. Water first	4 litres	800 ml
2. Add 44 FX concentrate	625 ml	125 ml
3. Top up with water to	5 litres	1 litre

Mixing final bath made with 44 FI "LF"

for	5 litres	1 litre
1. Water first	4 litres	800 ml
2. Add 44 FI "LF" concentrate	50 ml	10 ml
3. Top up with water to	5 litres	1 litre

9.2 AP 44 KIT with bleach-fix

Mixing first developer made with 44 FD

for	0.5 litre
1. Water first	400 ml
2. Add 1 pack 44 FD	100 ml

Mixing colour developer made with 44 CD

for	0.5 litre
1. Water first	250 ml
2. Add 1 pack 44 CD/Part A	125 ml
3. Add 1 pack 44 CD/Part B	125 ml

Mixing reversal bath made with 44 RE

for	0.5 litre
1. Water first	485 ml
2. Add 1 pack 44 RE	15 ml

Mixing bleach-fix made with 44 BX

for	0.5 litre
1. Water first	250 ml
2. Add 1 pack 44 BX/Part A	125 ml
3. Add 1 pack 44 BX/Part B	125 ml

Mixing final bath made with 44 FI "LF"

for	0.5 litre
1. Water first	375 ml
2. Add 1 pack 44 FI "LF"	125 ml

10. Mixing instructions for AP 44 minilab

10.1 Replenishers

Mixing first developer replenisher 44 FD-R			
for	10 litres	1 litre	
1. Water first	8 litres	800 ml	
2. Add 44 FD-R	1 pack	200 ml	
for 10 litres			

Mixing reversal bath replenisher 44 RE			
for	10 litres	5 litres	1 litre
1. Water first	9.5 litres	4.75 litres	950 ml
2. Add 44 RE	2 packs for 5 litres	1 pack for 5 litres	50 ml

Mixing colour developer replenisher 44 CD-R			
for	10 litres	1 litre	
1. Water first	8.03 litres	803 ml	
2. Add 44 CD-R/Part A	1 pack for 10 litres	150 ml	
3. Add 44 CD-R/Part B	1 pack for 10 litres	47 ml	

Mixing conditioner replenisher 44 BC			
for	10 litres	5 litres	1 litre
1. Water first	8 litres	4 litres	800 ml
2. Add 44 BC	2 packs for 5 litres	1 pack for 5 litres	200 ml

Mixing bleach replenisher 44 BL-R			
for	7.5 litres	1 litre	
1. Water first	2.475 litres	330 ml	
2. Add 44 BL-R	5.025 litres	670 ml	

Mixing fixer replenisher 44 FX			
for	10 litres	5 litres	1 litre
1. Water first	8.57 litres	4.285 litres	857 ml
2. Add 44 FX-R	2 packs for 5 litres	1 pack for 5 litres	143 ml

Mixing final bath replenisher 44 FI "LF"			
for	10 litres	5 litres	1 litre
1. Water first	9.8 litres	4.9 litres	980 ml
2. Add 44 FI "LF"	2 packs for 5 litres	1 pack for 5 litres	20 ml

10.2 Tank solutions

Mixing first developer tank solution 44 FD (with 44 FD-R and 44 FD-S)		
	with mixed replenisher	with the single concentrates
1.	995 ml initial mixed replenisher 44 FD-R	795 ml initial water
2.	Add 5 ml 44 FD-S	Add 200 ml 44 FD concentrate
3.		Add 5 ml 44 FD-S
produces 1 litre		

Mixing reversal bath tank solution 44 RE (tank solution = replenisher)		
for	10 litres	1 litre
1. Water first	9.5 litres	950 ml
2. Add 44 RE	2 packs	50 ml for 5 litres

Mixing colour developer tank solution 44 CD (with 44 CD-R and 44 CD-S)		
	with mixed replenisher	with the single concentrates
1.	995 ml initial mixed replenisher 44 CD-R	798 ml initial water
2.	Add 5 ml 44 FD-S	Add 150 ml 44 CD-R/Part A
3.		Add 47 ml 44 CD-R/Part B
4.		Add 5 ml 44 CD-S
produces 1 litre		

Mixing conditioner tank solution 44 BC (tank solution = replenisher)		
for	10 litres	1 litre
1. Water first	8 litres	800 ml
2. Add 44 BC	2 packs	200 ml for 5 litres

Mixing bleach tank solution 44 BL		
for	10 litres	1 litre
1. Water first	5 litres	500 ml
2. Add 44 BL concentrate	5 litres	500 ml

Mixing fixer tank solution 44 FX (with 44 FX)		
for	10 litres	1 litre
1. Water first	8.75 litres	875 ml
2. Add 44 FX	1.25 litres	125 ml

Mixing final bath tank solution 44 FI "LF" (tank solution = replenisher)		
for	10 litres	1 litre
1. Water first	9.8 litres	980 ml
2. Add 44 FI "LF"	1 pack for 5 × 5 l	20 ml for 5 litres

10.3 Mixing tank solution AP 44 ML in Agfa FP 1-44

AP 44 ML + Agfa FP 1-44	Water (litres)	Concentrate	Starter	Tank volumes (litres)
44 FD	9.7	+ 2.44 l	+ 61 ml (44 FD-S)	12.2
44 RE *	6.93	+ 370 ml	–	7.3
44 CD	7.02	+ Part A: 1.32 l + Part B: 413 ml	+ 44 ml (44 CD-S)	8.8
44 BC *	3.28	+ 820 ml	–	4.1
44 BL	4.36	+ 4.36 l	–	8.7
44 FX *	6.2	+ 900 ml	–	7.1
44 FI „LF“ *	10.4	+ 200 ml	–	10.6
for 5 × 5 l	3.04	+ 60 ml	–	(= STB 1-3) 3.1** (= STB 1)

* Since tank solution = replenisher, it is advisable to mix 5 resp. 10 litres replenisher, then top up the tank and put the remainder in the replenisher tanks.

** STB1 gives the tank volume for the first tank of the final bath, which should be mixed freshly once in a week.

11. Stability, pH-values and specific gravity of the mixed solutions

Storage life of the mixed solutions

Process solution	Haltbarkeit in Tanks bzw. Vorratsbehältern		
	Tank solution	Replenishers *	
		fresh mix	rejuvenated
1st developer	1 week	2 weeks	–
Reversal bath	1 week	2 weeks	–
Colour developer	1 week	4 weeks	2 weeks
Conditioner	1 week	2 weeks	–
Bleach	8 weeks	16 weeks	–
Fixer	4 weeks	8 weeks	6 weeks
Stabilizer	4 weeks	8 weeks	–
Final bath	4 weeks	8 weeks	–

* with floating lid

pH and specific gravity of freshly mixed solutions

Processing solution	Code	pH (at 20 °C)	Specific gravity (at 20 °C)
1st developer	44 FD-R	9.75 ± 0.1	1.065 ± 0.003
replenisher	44 FD-LR	9.75 ± 0.1	1.065 ± 0.003
1st developer	44 FD-(R)	9.65 ± 0.1	1.065 ± 0.003
tank solution	44 FD-(LR)	9.65 ± 0.1	1.065 ± 0.003
Reversal bath	44 RE	5.5 ± 0.1	1.016 ± 0.003
Colour developer	44 CD-R	12.2 ± 0.1	1.040 ± 0.003
replenisher	44 CD-LR	12.3 ± 0.1	1.045 ± 0.003
Colour developer	44 CD	12.1 ± 0.1	1.040 ± 0.003
tank solution	44 CD-Rot.	12.2 ± 0.1	1.039 ± 0.003
conditioner	44 BC	6.2 ± 0.1	1.015 ± 0.002
Bleach replenisher	44 BL-R	5.5 ± 0.1	1.300 ± 0.01
Bleach	44 BL	5.7 ± 0.1	1.155 ± 0.01
Fixer replenisher	44 FX-R	7.3 ± 0.1	1.065 ± 0.01
	with UNIFIX-J	8.7 ± 0.3	1.082 ± 0.01
	with FX-UNIVERSAL	7.3 ± 0.3	1.065 ± 0.01
Fixer tank solution	44 FX	7.3 ± 0.1	1.060 ± 0.01
	with UNIFIX-J	8.5 ± 0.3	1.075 ± 0.01
	with FX-UNIVERSAL	7.3 ± 0.1	1.055 ± 0.01
Final bath *	44 FI „LF“	7.0 ± 0.1	not significant

* replenisher = tank solution

12. 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.

13. Process control AP 44

Sensitometric monitoring of the Agfachrome Process 44 is carried out using the AP 44 control strips from Agfa-Gevaert. These control strips are regularly processed and the densitometric measurements compared with the reference strips supplied by Agfa.

For process monitoring and process control, Agfa can supply

- Sensitometric strips AP 44 (25 per pack).

14. Further information

The information given here is based on the evaluation of typical products at the time when this technical data was printed. 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 is contained in the Manual Processing control AP 44.

15. Range AP 44

15.1 AP 44 process for Wholesale Finishing labs

Process solution	Product name	Packing size		Code
First developer replenisher	44 FD-R Cube	for	100 litres	BQ30G
	44 FD-R	for	300 litres	BV4T3
Low Replenishment:	44 FD-LR	for	150 litres	B6DVM
	44 FD-LR	for	600 litres	5FFFG
	44 FD-LR	for	1000 litres	B6KB6
First developer starter	44 FD-S	for	200 litres	BNYAG
	44 FD-LR starter	for	150 litres	B6GTU
Reversal bath *	44 RE	for	100 litres	BNYDN
	44 RE Cube	for	400 litres	BQ3PJ
	44 RE		60 litres	B4JSK
Colour developer replenisher	44 CD-R/Part A Cube	for	100 litres	BQ3QL
	44 CD-R/Part B Cube	for	100 litres	BQ3RN
	44 CD-R	for 4 ×	400 litres	BWVAA
Low Replenishment:	44 CD-LR/Part A	for	300 litres	5AK8D
	44 CD-LR/Part B	for	300 litres	5AK9F
Colour developer starter	44 CD-S	for	200 litres	BNYJX
Colour developer rejuvenator	44 CD-J/Part A	conc.	60 litres	BZM7S
	Combipart I NEW	conc.	60 litres	5JCN8
	44 CD-J/Part C	conc.	60 litres	BZEEB
Conditioner *	44 BC Cube	for	100 litres	BQ3SP
	44 BC	conc.	60 litres	BZSQK
Bleach replenisher	44 BL-R Cube	for	30 litres	BQ3TR
	44 BL-R	conc.	60 litres	B5ELV
Bleach starter	BL-S UNIVERSAL		3 litres	5FXEG
Fixer	44 FX Cube	for	180 litres	BR9J4
FX IN-LINE replenisher **	UNIFIX-J	conc.	60 litres	5GX7C
Low Replenishment (electro fixer)	UNIFIX-J	conc.	200 litres	5GX8E
FX rejuvenator (ON-LINE)	FX-UNIVERSAL	conc.	60 litres	BPBZQ
	FX-UNIVERSAL	conc.	210 litres	B5PUN
FX rejuvenator (OFF-LINE)	UNIFIX-J	conc.	20 litres	5GX6A
	UNIFIX-J	conc.	60 litres	5GX7C
Final bath * "LF"	44 FI "LF"	for	100 litres	BNYXS
Low Formaldehyde (low formalin content 40 %)	44 FI "LF" Cube	for	500 litres	BQ3VV
Wetting agent	AGEPON SUPER	for	100 litres	BQJQA
Biocide ***	ALGEZID II		1 litre	BUNDZ
			5 litres	BR88G
Anti-calcium agent ****	AC 394		25 Kg	BQMME
Sentitometric strips AP 44			25 units	BRACK

* Replenisher and tank solution are identical

** With Closed-loop desilvering

*** To prevent microorganisms forming in the water (2 ml per 10 litres water)

**** To prevent calcium deposits

15.2 AP 44 for amateur and professional labs

Process solution	Product name		Packing size		Code
KIT	Process 44	for	5 ×	0.5 litre	BVLE2
First developer tank solution	44 FD	for	3 ×	5 litres	BVLF4
Reversal bath	44 RE	for	3 ×	5 litres	BVLG6
Colour developer tank solution	44 CD	for	3 ×	5 litres	BVLH8
	44 CD-Rotation	for	3 ×	5 litres	BVLJB
Conditioner	44 BC	for	3 ×	5 litres	BVLKD
Bleach tank solution	44 BL	for	3 ×	5 litres	BVLLF
Fixer	44 FX	for	3 ×	5 litres	BVLMH
Final bath	44 FI "LF"	for	3 ×	5 litres	BVLNK
First developer replenisher	44 FD-R	for	2 ×	25 litres	BPWUU
Reversal bath	44 RE	for	2 ×	25 litres	BNYCL
Colour developer replenisher	44 CD-R	for	2 ×	25 litres	BPWWY
Conditioner	44 BC	for	2 ×	25 litres	BNYL2
Bleach replenisher	44 BL-R Cube	for		30 litres	BQ3TR
Fixer replenisher	44 FX Cube	for		180 litres	BR9J4
Final bath	44 FI "LF"	for		100 litres	BNYXS

15.3 AP 44 for minilabs

Process solution	Product name		Packing size		Code
First developer replenisher	44 FD-R	for	4 ×	10 litres	B4XWH
First developer starter	44 FD-S	for		200 litres	BNYAG
Reversal bath replenisher	44 RE	for	3 ×	5 litres	BVLG6
Colour developer replenisher	44 CD-R	for	4 ×	10 litres	B4XVF
Colour developer starter	44 CD-S	for		200 litres	BNYJX
Conditioner replenisher	44 BC	for	3 ×	5 litres	BVLKD
Bleach replenisher	44 BL-R	for	2 ×	7.5 litres	B4XUD
Bleach starter	BL-S UNIVERSAL			3 litres	5FXEG
Fixer replenisher	44 FX	for	3 ×	5 litres	BVLMH
Final bath replenisher	44 FI "LF"	for	5 ×	5 litres	5F2BR

