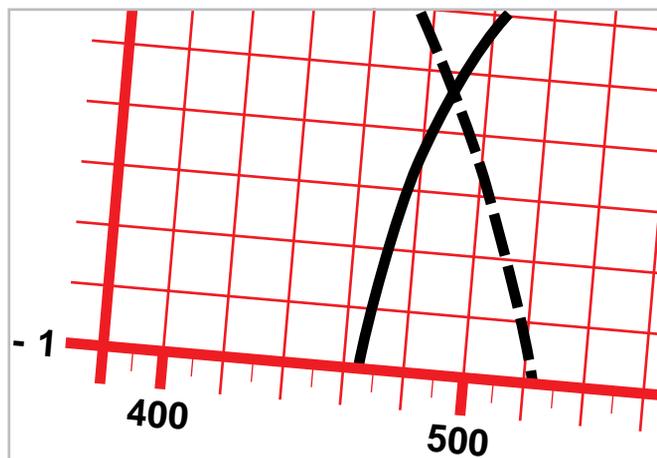


TECHNICAL DATA



AGFA MULTICONTRAST PREMIUM

AGFA MULTICONTRAST PREMIUM is a variable-contrast black-and-white photo paper on resin coated base.

Characteristics

- MULTICONTRAST PREMIUM is an all-purpose B/W enlargement paper, whose contrast can be varied with colour filters.
- Features a similar contrast range to conventional fixed-contrast papers, and so can replace the grades of conventional B/W papers.
- When used with the special contrast control filters, it permits simple exposure control without complicated exposure time conversions.
- Can be exposed in all enlargers and printers, and processed like conventional resin-coated B/W papers.
- Is suitable both for dish and machine processing.
- Achieves the same print quality as conventional B/W papers.

Consequently, even the most discriminating consumer can now enjoy the advantages and convenience of a black-and-white paper with variable contrast for all areas of pictorial photography.

AGFA 

The range

- AGFA MULTICONTRAST PREMIUM MCP 310 RC glossy (natural high gloss)
- AGFA MULTICONTRAST PREMIUM MCP 312 RC semi-matt

AGFA MULTICONTRAST PREMIUM is available both in sheets and rolls, in the standard commercial sizes.

Special formats are available on request.

Minimal variations in the dimensions/sizes are possible – due to cutting tolerances and expansion effects (to DIN 4506 Part 1 and ISO 1008).

Information on the black-and-white photo papers with fixed contrast are given in the Technical Data sheet P-50-P. Information on AGFA MULTICONTRAST CLASSIC (variable-contrast BW paper on fibre base) is summarised in the Technical Data sheet P-54-P.

Packaging

The original packaging protects the paper from light and brief exposure to humidity and fumes.

The inside packaging for sheets and rolls consists of lightproof PE bags or PE foils. The outside packaging is an orange cardboard wallet or a box with a tongued lid for sheets, and a corrugated cardboard tongued box for rolls.

The outside packaging alone does not provide adequate protection from light. Use both the inside and outside packaging for storing paper in opened packs.

Emulsion number

A product coding is printed on the label. It consists of the five-place ABC code. This is followed by the emulsion number and some code letters serving internal inspection purposes.

An internal order number starting with an X is printed on the second line.

The first code line should always be given in enquiries and complaints. The second code line provides helpful information for internal investigations.

Paper coding

Base weight, paper tint and surface characteristics are indicated by a numerical code. This is as follows:

- 3 . . = polyethylene / resin-coated paper (RC)
- . 1 . = white paper tint
- . . 0 = glossy (natural high gloss)
- . . 2 = semi-matt surface

Example:

- MCP 310 RC = MULTICONTRAST PREMIUM, RC/PE base, white, glossy
- MCP 312 RC = MULTICONTRAST PREMIUM, RC/PE base, white, semi-matt

The labels are colour-coded as follows:

- RC paper = colour bar, crosswise orange
- Surface 310 = colour bar, lengthwise mauve
- Surface 312 = colour bar, lengthwise yellow

A UPC bar code is printed on the labels (sheets).

Storage

Black and white photo papers should be kept cool, dry and protected from harmful fumes. Temperatures under 20 °C/ 68 °F and a relative humidity of 50 % to 60 % ensure that the papers will keep well over a very long period.

Opened packs should be closed well after use (inside and outside packaging), and if possible not stored in darkrooms or other wet rooms, only in cool and dry areas.

The natural ageing process of photopapers is considerably retarded by refrigeration or deep freezing. The paper must however be taken out of cold storage some hours before use, and brought up to room temperature.

Paper design

Base

Sandwiched paper coated on both sides with polyethylene.

Thickness: approx. 252 μm
 Weight: approx. 270 g/m^2

Emulsion

The light-sensitive layer contains a fine-grain silver chlorobromide emulsion.

Silver content: approx 1.5 g/m^2

Protective layers

The two protective layers protect the paper from friction fogging and physical damage.

Maximum density

Both surfaces achieve at least the following maximum densities, assuming that the exposure and development are correct.

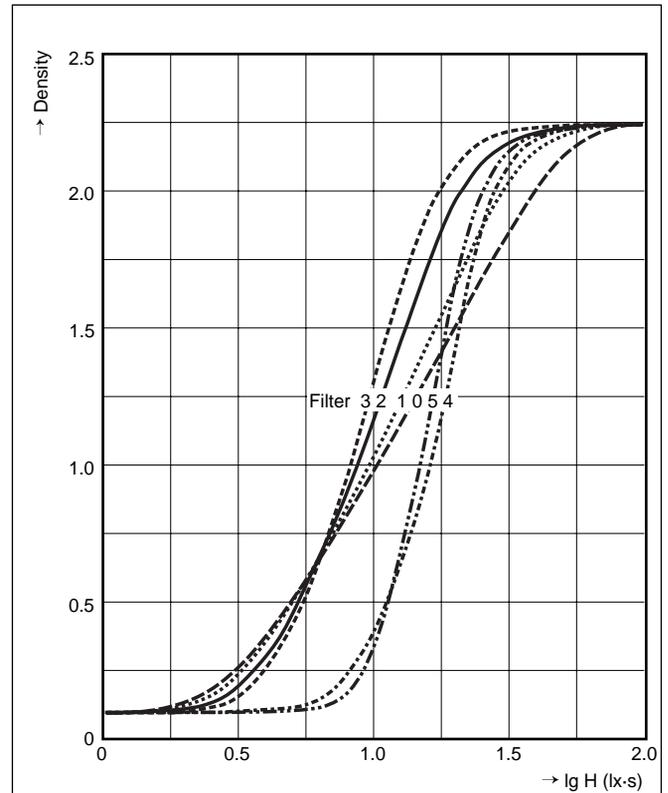
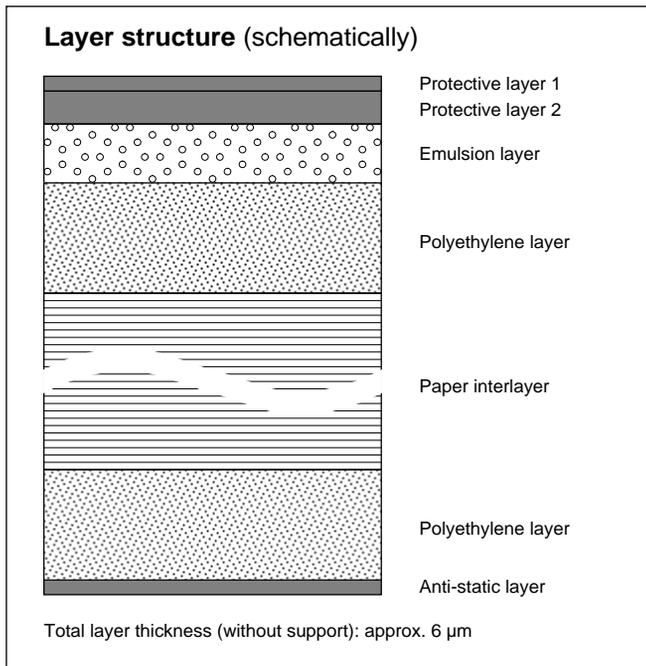
MULTICONTRAST PREMIUM MCP 310 RC: $D_{\text{max}} = 2.25$

MULTICONTRAST PREMIUM MCP 312 RC: $D_{\text{max}} = 2.25$

Density curves

Exposure: tungsten light 3000 K, time 10 s
 Filters: contrast control filters 0, 1, 2, 3, 4, 5 and UV blocking filter
 Development: AGFA MULTICONTRAST DEVELOPER
 Densitometry: read with visual filter (V_λ)

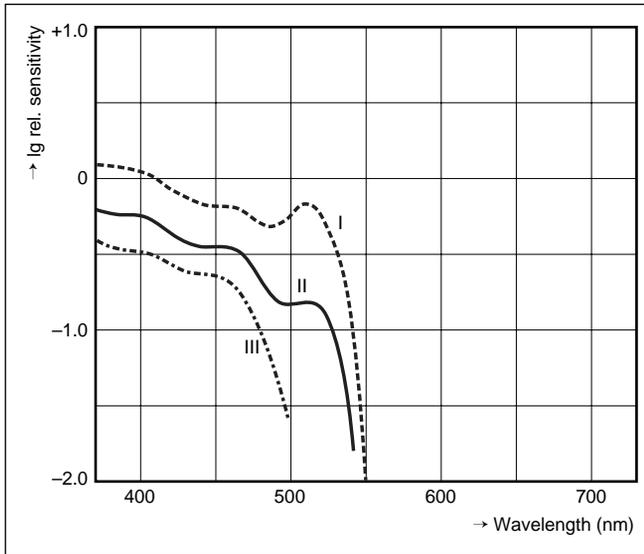
The exposure given in lux seconds applies to the combination of paper and filter.



Spectral sensitivity

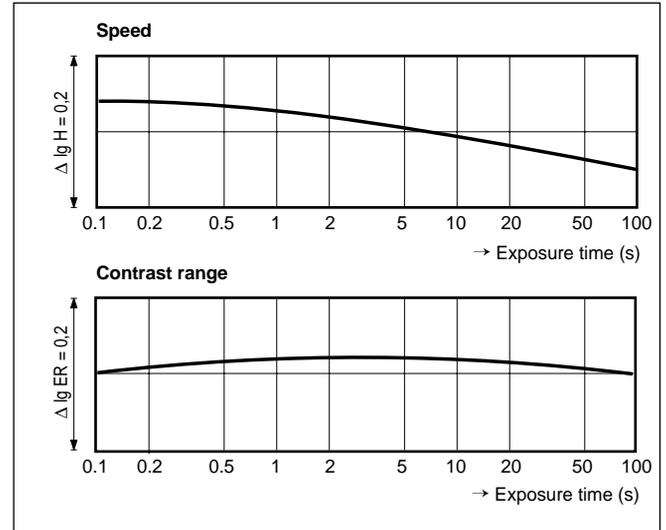
(related to equal-energy spectrum)

The graph below shows the densities of 0.5 (I), 1.0 (II) and 1.5 (III) measured in reflection. The sensitivity is the reciprocal of the exposure (in ml/m²) needed to produce the relevant densities.



Reciprocity

The reciprocity characteristics of AGFA MULTICONTRAST PREMIUM are virtually unrelated to the filtration. The photographic speed falls slightly as the exposures lengthen, while the contrast remains nearly constant.



Sensitivity (speed)

(to ISO Standard 6846)

AGFA MULTICONTRAST PREMIUM has a speed of **ISO P 400** when exposed to white light (without filter). The contrast then reached is about equivalent to the contrast with filter "2".

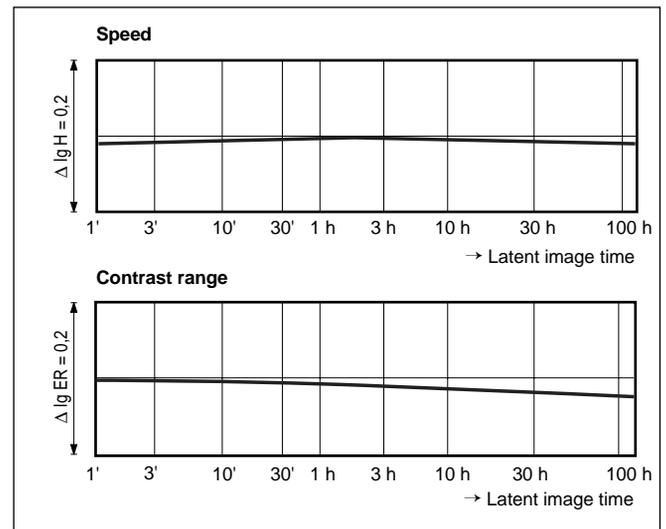
If contrast control filters are used, the speed is:

- for the "0" to "3½" filters = ISO P 160
- for the "4" to "5" filters = ISO P 80

Halving the ISO figure corresponds to halving the speed, and doubling it doubles the speed.

Latent image

AGFA MULTICONTRAST PREMIUM has outstanding latent image features. The speed and contrast remain virtually unchanged, regardless of the filtering, for a period of up to three days.



Exposure and contrast grading

AGFA MULTICONTRAST PREMIUM can be exposed on all standard enlargers (with or without colour mixing heads), and on enlargers with special modules for variable-contrast papers.

As can be seen from the spectral sensitivity curves (see page 4), MULTICONTRAST PREMIUM is sensitized both for the blue and green spectral ranges. The contrast grading is set by selective colour exposure:

- Magenta filtration affects only the blue spectral range and produces **steep** contrast.
- Yellow filtration affects the green spectral range and produces **flat** contrast.

The contrast grading can therefore be varied virtually continuously, from extra-hard to extra-soft, depending on the blue and green light content of the exposure.

The following methods are suitable for varying the contrast:

1. Standard commercial filter sets for variable-contrast black-and-white papers

They are available as:

- filter foils for use in the filter drawer of the enlarger (in several formats), or
- filter set with adapter for mounting under the enlarger lens, or on the red filter pin of the enlarger.

The "0" to "5" filter designations correspond to the grade numbers of conventional black-and-white photo papers. Each filter set includes extra filters with intermediate values, for fine corrections.

The right grade is found by producing a series of test exposures with different filters:

- for contrasty negatives filters "0" to "1"
- for negatives with normal contrast range filters "2" to "3"
- for low-contrast negatives filters "4" to "5"

The filters are designed to require the same exposure time, as found by testing, when the "0" to "3½" filters are used. This time has to be doubled for the "4", "4½" and "5" filters. If the exposure time is found with the "4", "4½" or "5" filters, the time for a softer grade (i.e. filters "3½" to "0") has to be halved.

Partial filtering

MULTICONTRAST PREMIUM offers the great advantage that individual areas of negatives which are tricky to enlarge can be exposed with different contrast control filters (e.g. for landscapes the sky areas with the "1" filter, and the rest of the image with "4" filter). Partial re-exposure and shading with filters will not only balance differences in brightness within one negative, they will also produce partial variations in contrast.

Exposure without filters

MULTICONTRAST CLASSIC can also be exposed without filters. In this case the resulting contrast grade is "2", and the speed is more than doubled or the exposure time shortened by more than half (see also the table on page 6).

2. Yellow and magenta filters in colour mixing heads

The manufacturers' filter density ratings are not identical. The exposure time has to be converted or found for each filter. The entire contrast range is not covered by some colour heads.

3. Vario-contrast modules

Vario-contrast modules with filters and computer logic are available as add-ons for enlargers, to find the exposure time required in each case.

4. Colour printing filters (yellow and magenta)

The contrast of MULTICONTRAST PREMIUM can also be varied with the subtractive printing filters in a printing filter set. The disadvantages of this method are a partial reduction in the contrast range, and the necessity to convert the exposure times.

Exposure on colour printers

AGFA MULTICONTRAST PREMIUM can be exposed on modified colour printers. The equipment manufacturers provide special instructions for modification.

A suitable programme is already installed in the Agfa printers COLORMATOR C 8 and COLORMATIC 30 MC, which permits the use of AGFA MULTICONTRAST PREMIUM.

A "black-and-white process 135" kit (hardware and special software) is available for the Agfa high-output MSP/MSP Plus printers.

Exposure on printers with pre-exposure systems

AGFA MULTICONTRAST PREMIUM can be exposed in usual BW printers with a pre-exposure system (e. g. with AGFA VARIOGRAD) without major changes to the equipment. Further informations on request.

Exposing and filtering MULTICONTRAST PREMIUM

Grade and grade numbers as for graded papers	ES 0		S 1		S* 2		N 3		H 4		EH 5	
Real speed of AGFA MULTICONTRAST PREMIUM (ISO 6846) without filter	ISO P 400											
Contrast control filters	0	½	1	1 ½	2	2 ½	3	3 ½	4	4 ½	5	
Effective speed of AGFA MULTICONTRAST PREMIUM (ISO 6846) with filter	ISO P 160								ISO P 80			

* Basic grade ("Special") of AGFA MULTICONTRAST PREMIUM which can also be achieved without filtering.
The effective speed is then ISO P 400.

Filtration with colour printing filters or colour mixing heads

Contrast control filter	0	½	1	1 ½	2	2 ½	3	3 ½	4	4 ½	5
Filtration with Kodak CP or CC filters *	80 Y	55 Y	30 Y	15 Y	–	25 M	40 M	65 M	100 M	150 M	200 M
Filtration with Durst colour mixing head * (test with Durst CLS 501)	60 Y	45 Y	30 Y	10 Y	–	20 M	30 M	50 M	70 M	100 M	130 M

* Exposure factors must be individually found by test exposures.
(Y = yellow filter, M = magenta filter)

All the filtrations are guides only. They depend on the combination of the characteristics and state of the filters, the enlarging lamp (age) and the enlarger (plus mixing head).

Further filter characteristics can be obtained from the equipment manufacturers.

Constant exposure times for grades 0 to 5

(The second filter serves to balance the density)

Contrast control filter	0	1	2	3	4	5
Filtration with Durst colour mixing head *	80 Y 10 M	48 Y 20 M	32 Y 40 M	16 Y 45 M	5 Y 88 M	– 130 M

* Our tests were made with a Durst CLS 501.

These figures are guides only, and may vary with the mixing head used.

Print tone

The print tone is primarily a characteristic of the emulsion. It depends on the size and structure of the processed image silver. Large grains of silver produce a colder print tone, and finer grain structures a warmer tone. The tone of black-and-white photo papers can be varied within narrow limits by the development and by special treatment.

The print tone of AGFA MULTICONTRAST PREMIUM is neutral-black to slightly warm-black, depending on the developer. When processed with AGFA MULTICONTRAST DEVELOPER, MULTICONTRAST PREMIUM has a neutral-black print tone, and with NEUTOL LIQUID WA a more warm-black print tone.

The print tone of black and white photo papers can in addition be influenced by the following factors.

- When the paper hardens during lengthy storage, the print tone becomes generally slightly colder.
- The tone may change as the developer becomes exhausted.
- The slightest contamination of the developer with thiosulphate makes the tone initially slightly warmer. Worse contamination on the other hand makes the tone colder, and there is also an increased tendency to fogging.
- If the intermediate wash is insufficient, or the stop bath is very exhausted, the blacks may turn blue.
- Too long fixing times, variations in concentration and contamination of the fixer affect the original tone.
- Too short or much too long final washes (several hours) may change the print tone.
- Drying in room climate or in hot air produce different print tones (hot drying much warmer).

Printing range

The printing range of a photo paper is defined as the ratio of the exposure times necessary to produce a defined maximum and minimum blackness. Normally this ratio is not given arithmetically, e.g. 4:1, 10:1 or 32:1, but logarithmically, that is for the examples given 0.6, 1.0 and 1.5. These figures simultaneously correspond to the maximum difference in density of a suitable negative.

The printing range is therefore the greatest permissible exposure interval in which you can still identify details, both in the shadows and highlights. It provides information on the negative contrast - that is the maximum difference in density that can be rendered on a photo paper, making use of the complete grey scale from white to black.

Paper with soft grade has a wide printing range. It can render the great variations in density of a contrasty (hard) negative. Paper with hard grade has a small printing range, and is therefore suitable for low-contrast (soft) negatives with small variations in density.

To avoid decimal figures for the printing range, the logarithmic figures to the ISO Standard 6846 are multiplied by 100 and suffixed with an "R" (= range). The printing ranges in the examples given above are therefore standardized at R 60, R 100 and R 150.

The printing range (ISO range) of AGFA MULTICONTRAST PREMIUM is shown in the following table. When exposed to white light (without filters), MULTICONTRAST PREMIUM has an ISO range of R 90.

Printing range of MULTICONTRAST PREMIUM

Filter	0	1	2	3	4	5
ISO range	R 130	R 110	R 90	R 75	R 60	R 50

These figures are averages in used state depending on ageing, storage and processing.

Darkroom safelights

Since AGFA MULTICONTRAST PREMIUM is an orthochromatically sensitized black-and-white photo paper (sensitive to blue and green light), special care must be taken in choosing the right darkroom safelights. The following filter screens or lights can be recommended as direct lighting for the working area.

- Light with AGFA / Meteor darkroom filter "G7" and 15 watt incandescent lamp, minimum distance 1 m, max. period of action 3 minutes.
- Light with Kodak filter "OC" and 15 watt incandescent lamp, minimum distance 1 m, max. period of action 4 minutes.
- Light with Ilford filter "902" and 15 watt incandescent lamp, minimum distance 1.2 m, max. period of action 2 minutes.
- Osram "Duka 50" with red filter, minimum distance 1 m, max. period of action 4 minutes.
- Kindermann "Dukalux Electronic", minimum distance 1 m, max. period of action 4 minutes.
- Ilford SL 1 lamp, minimum distance 1.2 metres, max. period of action 2 minutes.

Other lights can also be used, but a test should always be made before use as a precaution. Since the contrast is affected before any fogging occurs (a shift to "soft"), the test should be carried out as follows:

- Two prints are exposed with the same exposure time of a negative with medium contrast or of a stepped grey wedge. One print is processed immediately, and the second after it has been exposed to the safelight for the recommended time.
- If both prints have the same contrast, the safelight is acceptable.
- If the second print is softer, this must be remedied by dimming the light, increasing the distance from the working area, indirect lighting, shortening the period of exposure, or using a different filter.

Processing in roller transport machines

AGFA MULTICONTRAST PREMIUM is also suitable for processing in machines of the roller transport type, if the solutions are properly replenished. (For further details see the P-56-C Technical Data brochure.)

Processing in dishes

Processing sequence	Process solution	Process times	
		20 °C / 68 °F	25 °C / 77 °F
Developer	MULTICONTRAST DEVELOPER Standard dilution 1 + 4 Economy dilution 1 + 6	50 ± 10 s 75 ± 15 s	30 ± 10 s 50 ± 10 s
	NEUTOL plus	50 ± 15 s	30 ± 10 s
	NEUTOL NEUTOL LIQUID NE, WA Standard dilution 1 + 7 Economy dilution 1 + 11	60 ± 10 s 90 ± 10 s	45 ± 10 s 60 ± 10 s
	NEUTOL NE, WA, BL	60 ± 10 s	45 ± 10 s
Stop bath	2 % acetic acid	10 s	
Fixer	MULTICONTRAST FIXER 1 + 4	20 ± 10 s	
	MULTICONTRAST FIXER 1 + 7	40 ± 15 s	
Wash	running water, over 12 °C/ 54 °F	2 min.	
	running water, under 12 °C/ 54 °F	4 min.	

Use exposure times which allow the prints to be fully developed in the specified times. Slightly longer developing times (up to 3 min.) are not critical as a rule.

The specified fixing times should if possible not be exceeded.

The ADAPTOL, AGETOL LIQUID and METINOL developers and the AGEFIX and ACIDOFIX fixers can also be used, bearing in mind their special features. Other standard black-and-white paper developers and fixers are also suitable. (For further details refer to the P-56-C Technical Data brochure.)

Toning

Toning processes convert the black image to a different colour. They deposit coloured metal compounds on the silver grain. Toned photos keep particularly well (archive proofing), because these silver complex compounds are more stable against pollutants. Toning is the best print silver stabilisation method.

Only prints which are correctly exposed, developed as specified, fixed in as fresh fixer as possible and well washed are suitable for toning. In principle, any black and white papers can be toned. However, papers with warm-black print tone are most suitable.

There are two toning methods, direct and indirect. **Direct** toning converts the silver image to a different silver compound in one operation. **Indirect** toning involves bleaching first. A second solution creates a new image, consisting of a silver compound with a different colour.

The simplest method is toning with AGFA VIRADON. It has the advantage over other toning solutions that the contrast of the prints is unaffected. In some cases the original print should be slightly overexposed (darker).

Direct toning

VIRADON 1 + 50
(1 part AGFA VIRADON
+ 50 parts water)

1 – 10 min
(depending on intensity
needed)

Stop bath (10% sodium sulphite solution)
(only necessary to prevent post-toning
in the wash) **1 min**

Final wash (see table above)

Indirect toning

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

or

Bleach (AGFA 501 formula) **5 min**
500 ml 10 % potassium ferricyanide solution
100 ml 10 % potassium bromide solution
400 ml water

Wash (running) **5 min**

VIRADON 1 + 50 **3 min**
(possibly stop bath as for direct toning)

Final wash (see table above)

Process temperature 20 °C / 68 °F

If the only consideration is a long archive life (image silver stability), the direct toning method should be used, since this changes the print tone less (towards reddish-brown). Indirect toning produces much warmer print tones (yellow-brown).

Permanence of black and white prints

The durability of black and white prints can be adversely influenced by a number of factors: incorrect processing, unsuitable adhesives or mounting and framing materials, as well as environmental influences such as oxydising pollutants in the surrounding air. In such cases a reddish to yellow-brown discolouration of the image silver or the formation of a silver mirror effect will be observed.

Prints which are exhibited for a longer period of time, especially those framed behind glass or plastic are particularly susceptible. For prints intended for exhibition or archive purposes, a suitable post-treatment designed to avoid oxydation of the image silver is necessary.

A post-treatment of this kind is the use of the print stabilizing agent AGFA SISTAN. After the final rinse, prints should be bathed for one minute in a solution of 25 ml SISTAN to 975 ml water, front and rear side should be wiped off and then dried. Up to 2 m² of paper can be treated in 1 litre of SISTAN solution. The common toning methods, using selenium or sulphur toning (AGFA VIRADON) also provide effective protection. The advantage of SISTAN, as opposed to toners, is that the image tone is preserved.

It must however be stressed that even the image silver of suitably post-treated prints can still be subject to chemical reactions under unfavourable conditions over a longer period of time. Consequently no responsibility can be accepted for changes in the image silver of black and white prints.

Further information about image silver stability under "Toning".

Drying

The following drying methods are possible.

- Drying in special infrared dryers. This type of drying lends high-gloss papers a specially good gloss.
- Drying in RC paper dryers which blow warm air on the prints passing through.
- Warm-air drying in drying cabinets.
- Atmospheric drying on racks (wipe down the surface of the prints beforehand with a damp cloth, to stop drying stains).

It is not possible to dry the paper on drying drums or in glazing presses, as is the case with all resin-coated papers.

Mounting the prints

Standard contact glues or double-sided cold or warm adhesive foils can be used. It is advisable to test the adhesives before use.

Replacements

Complaints should be accompanied by the processed and unprocessed material concerned (if possible in the original packing). The complete emulsion number must be given. Material with manufacturing defects will be replaced by the same quantity. No further claims will be entertained, except in cases of proven negligence. Since chemical reactions may discolour the image silver in the course of time, no liability is accepted for deterioration of the silver.

Note

The data published here are based on an evaluation of a standard product made in 1997. Slight variations are possible, due to manufacturing tolerances. Product improvement is a continuous process, and Agfa-Gevaert therefore reserves the right to make any necessary changes in product specifications without notice.

Agfa, the Agfa Rhombus, ACIDOFIX, ADAPTOL, AGEFIX, AGETOL, AGFACOLOR, COLORMATIC, COLORMATOR, METINOL, MULTICONTRAST, NEUTOL, SISTAN, VARIOGRAD and VIRADON are registered trademarks of Agfa-Gevaert AG, Leverkusen.

Further information

Technical Data P-50-P:
AGFA B/W PHOTOPAPERS (fixed contrast)

Technical Data P-54-P:
AGFA B/W PHOTO PAPER MULTICONTRAST CLASSIC

Technical Data P-56-C:
AGFA B/W CHEMICALS FOR PAPER PROCESSING

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