Exposure and contrast grading of ADOX MCP 310 / 312 RC Paper

ADOX MCP can be exposed on all standard enlargers (with or without colour mixing heads), and on enlargers with special modules for variable-contrast papers. ADOX MCP 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 a high contrast. Yellow filtration affects the green spectral range and produces a low 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 papers 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. Some filter sets include extra filters with intermediate values, for fine corrrections. 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 "31/2" filters are used. This time has to be doubled for the "4", "41/2" and "5" filters. If the exposure time is found with the "4", "41/2" or "5" filters, the time for a softer grade (i.e. filters "31/2" to "0") has to be divided by 2.

Partial filtering

MCP 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 oft he 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

MCP 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.

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.

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

Colour printing filters (yellow and magenta). The contrast of MCP can also be varied with the subtractive printing filters in a printing filter set. The disadvantages of this method are a partial reductionin the contrast range, and the necessity to convert the exposure times.

Processing in dishes

In liquid developing concentrates diluted to their economic dilution ratio (about 1+10) MCP should be developed for 90 ± 10 s at 20 °C / 68 °F.

In powder devlopers mixed to their standard dilution or in liquid concentrates mixed to their professional dilution (about 1+5) MCP shopuld be developed for 60 ± 10 s at 20 °C / 68 °F.

Stop the print for 10 s in acedic acid diluted to 2% strength (e.g. ADOSTOP diluted 1+20).

The recomende Fixing time is 30 s in rapid fixers such as ADOFIX diluted 1+4 or 60 s in rapid fixers diluted 1+7 to 1+10.

Washing should be carried out for 2 minutes in running water above 12 °C / 54 °F.

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 MCP is neutral- black to slightly warm-black, depending on the developer. When processed with neutral working developers it shows a neutral-black print tone, and with warm working developers a more warm-black print tone.

Make sure to keep your developing times exactly on the spot when using warmtone developers because any change in developing time can result in a visible change in image 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 makes the tone warmer).

Toning after processing

MCC responds very well to any kind of toning after processing (r.g. selenium-toning, sulfur-toning, blue-toning). Toning ususally affects the contrast of the print. Adjust the contrast of your basic image acordingly.

Exposing and filtering MCP

Grade and grade numbers as for graded papers	ES 0		S 1		S* 2		N 3		H 4		EH 5
Real speed of MCP (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 MCP (ISO 6846) **with filter**	ISO P 160								ISO P 80		

* Basic grade ("Special") of MCP 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
Filtering 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
Filtering 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.

Darkroom safelights

Since MCP is an orthochromatically sensitized black-and-white photo paper (sensitive to blue and green light), special care must be taken in chosing 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.

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 prevent 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.

Storage

Black and white photo papers should be kept cool, dry and protected from harmful fumes (e.g. sulfur toner vapours). 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.

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.