

**ILFORD** PHOTO**HARMAN** technology Limited

## TECHNICAL INFORMATION

**MULTIGRADE RC  
PAPERS**

PREMIUM QUALITY, VARIABLE CONTRAST, BLACK AND WHITE PAPERS ON A RESIN COATED BASE

**ILFORD MULTIGRADE RC** Papers are available in a range of surface finishes, tones and base weight. The table below summarises the available range. Note MULTIGRADE IV RC DELUXE is currently being replaced by MULTIGRADE RC DELUXE. Both are referenced in this document for comparative purposes.

Product	Base gsm*	Base Tone	Image Tone	Glossy	Pearl	Satin
MULTIGRADE RC DELUXE - NEW	190 (M)	Neutral	Neutral/Warm			
MULTIGRADE IV RC DELUXE	190 (M)	Cool/Neutral	Cool/Neutral	Y	Y	Y
MULTIGRADE RC WARM TONE	190 (M)	Warm	Warm	Y	Y	-
MULTIGRADE RC COOL TONE	190 (M)	Cool	Cool	Y	Y	-
MULTIGRADE IV RC PORTFOLIO	250 (K)	Cool/Neutral	Cool/Neutral	Y	Y	-

**Base weight and Surface Codes**

190gsm, mid weight base is coded "M", 250 gsm, double weight base is coded K.

Glossy surface is coded "1", Satin "25" and Pearl "44"

**NB** Base weights are quoted excluding the polythene coating. For total weight add approx. 70gsm per sqm.

All ILFORD MULTIGRADE papers are part of the ILFORD MULTIGRADE system and are fully compatible with all current MULTIGRADE filters and equipment\* and are equally suitable for printing from conventional black and white or XP2 SUPER negatives.

\*Filters originally designed for older Multigrade II / III paper are not suitable and should be replaced.

**EXPOSURE**

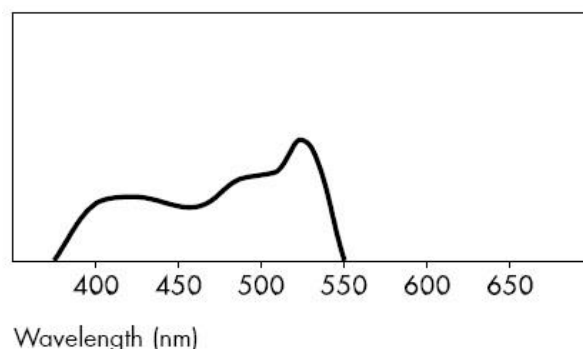
ILFORD MULTIGRADE papers are designed for use with all enlargers.

**Safelight recommendations**

ILFORD MULTIGRADE papers can be used with most common safelights for black and white papers. The ILFORD safelights are especially recommended as they generally allow darkrooms to be brighter, but completely safe. For direct lighting, do not expose the paper to the safelight for more than 4 minutes, and the distance between the paper and the safelight should be a minimum of 1.2 metres/4ft.

**Spectral Sensitivity**

ILFORD MULTIGRADE papers all have similar spectral sensitivity as shown in the chart opposite.



## MULTIGRADE RC PAPERS Technical Information

### Contrast range

Seven full grades of contrast, in half grade steps, are available on MULTIGRADE RC papers when used with the current ILFORD MULTIGRADE speed-matched filters.

### ISO Range (R)

The chart below gives the ISO range figures (ISO standard 6846 – 1992) for MULTIGRADE RC papers. These figures give a guide to selecting the appropriate grade of paper for a given effective negative density range.

PRODUCT	FILTER							
	00	0	1	2	3	4	5	None
MULTIGRADE RC DELUXE - NEW	160	130	110	90	70	60	50	90
MULTIGRADE IV RC DELUXE	180	160	130	110	90	60	40	110
MULTIGRADE RC WARMTONE	190	160	130	110	90	70	50	110
MULTIGRADE RC COOLTONE	180	160	120	100	80	60	50	100
MULTIGRADE IV RC PORTFOLIO	180	160	130	110	90	60	40	110

The above values are representative of those obtained when dish/tray processing the paper to ILFORD Photo recommendations.

ISO range figures may be helpful to printers who have some means of measuring the effective density range of the image as projected on the enlarger baseboard – such as with a photometer.

As an example, for a negative with an effective density range of 1.32 log exposure units, multiply this figure by 100 and choose the nearest ISO range figure from the table – in this case 130. Try printing this negative with the corresponding MULTIGRADE filter for your paper type.

### ISO Speed (P)

**NB** ISO Paper speeds are not the same as Film ISO speeds, MULTIGRADE RC papers have approximately an equivalent Film ISO of 3-6.

The speed of MULTIGRADE papers depends on the filtration used during exposure. (see table below)

PRODUCT	FILTER							
	00	0	1	2	3	4	5	None
MULTIGRADE RC DELUXE - NEW	240	240	240	240	240	220	220	500
MULTIGRADE IV RC DELUXE	200	200	200	200	200	100	100	500
MULTIGRADE RC WARMTONE	100	100	100	100	100	50	50	200
MULTIGRADE RC COOLTONE	200	200	200	200	200	100	100	500
MULTIGRADE IV RC PORTFOLIO	200	200	200	200	200	100	100	500

### Exposing light sources

MULTIGRADE RC papers are designed for use with most enlargers and printers, that is, those fitted with either a tungsten or tungsten-halogen light source. It is also suitable for use with cold cathode (cold light) light sources and LED exposing heads designed for variable contrast papers. Other cold cathode (cold light) and pulsed xenon light sources may give a reduced contrast range.

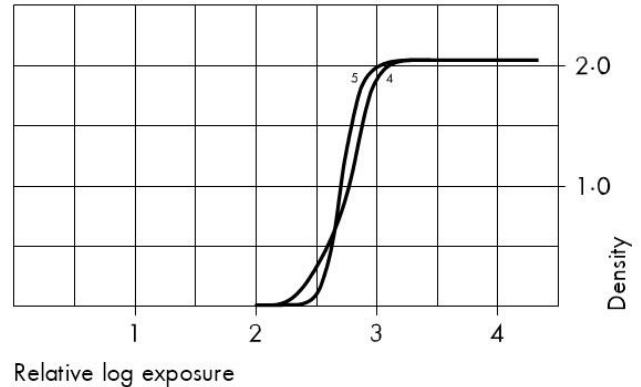
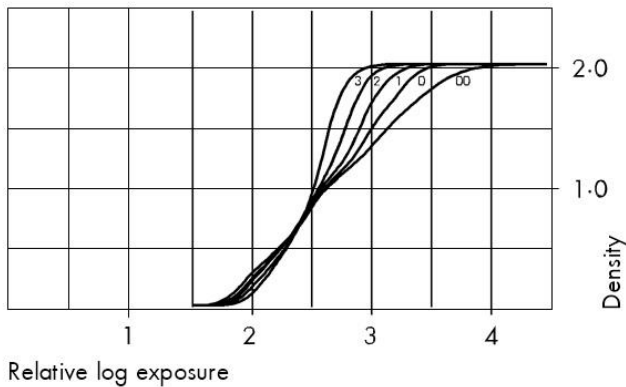
### Latent Image Stability

No significant change in picture quality will be seen when MULTIGRADE RC papers are left for a period of 24 hours after exposure and before processing.

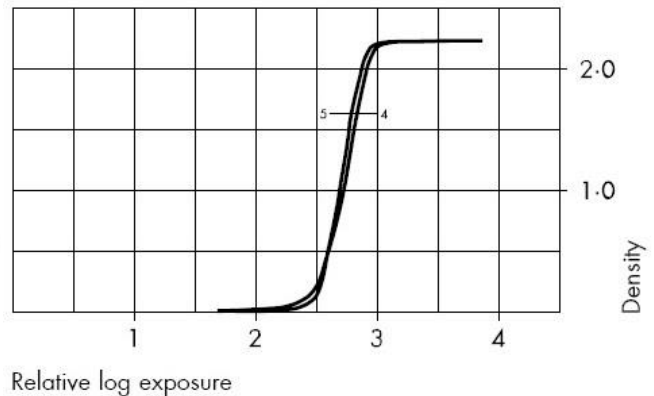
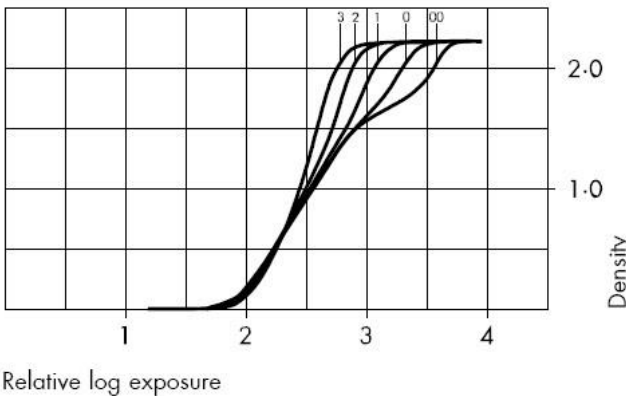
## MULTIGRADE RC PAPERS Technical Information

**Characteristic Curves:** The diagrams below illustrate typical characteristic curves for the four emulsions.

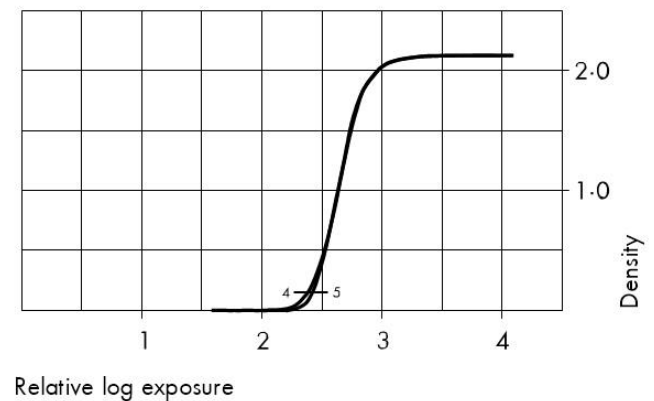
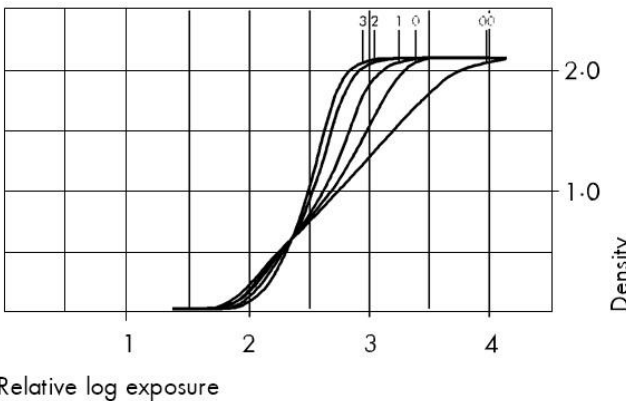
### MULTIGRADE IV RC DELUXE & PORTFOLIO



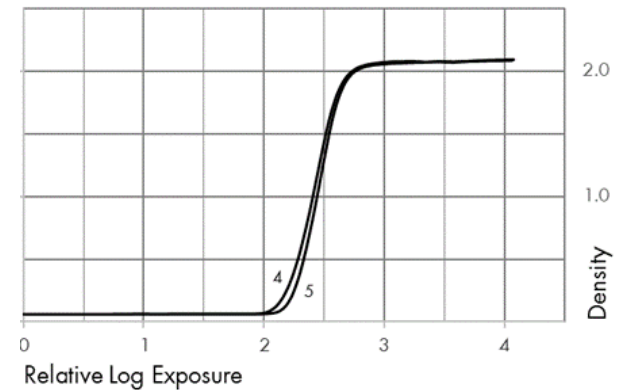
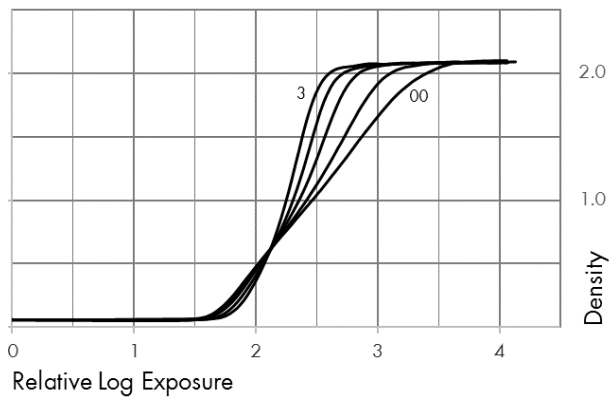
### MULTIGRADE RC WARMTONE



### MULTIGRADE RC COOLTONE



### NEW - MULTIGRADE RC DELUXE



MULTIGRADE RC papers exposed through filters 00,0,1,2,3,4,5. Development MULTIGRADE Dev @1+9. 1 minute at 20°C/68°F.

## MULTIGRADE RC PAPERS Technical Information

### Contrast control

Contrast is controlled by using MULTIGRADE hand filters, legacy MULTIGRADE 500/600 equipment, other variable contrast enlarger heads, such as those made by Heiland Electronics GmbH or colour enlarger heads. The twelve MULTIGRADE filters are numbered 00–5 in  $\frac{1}{2}$  steps, with the lowest filter number corresponding to the softest contrast.

**NB:** The exposure time for filters 00–3½ is typically the same and for filters 4–5 will require an increased exposure time.

### PROCESSING

#### DISH/TRAY PROCESSING

MULTIGRADE RC papers are all processed in the same way.

**Note** Photographic chemicals are not hazardous when used correctly. Always follow the health and safety recommendations on the packaging. Photochemical material safety data sheets containing full details for the safe handling, disposal and transportation of ILFORD chemicals are available from [www.ilfordphoto.com](http://www.ilfordphoto.com)

#### Processing summary (intermittent agitation)

Chemical Options	Dilution	°C/°F	Time (min:sec)
<b>Developers</b>			
ILFORD MULTIGRADE	1+9	20 / 68	1:00
ILFORD MULTIGRADE	1+14	20 / 68	1:30
ILFORD PQ UNIVERSAL	1+9	20 / 68	2:00
ILFORD BROMOPHEN	1+3	20 / 68	2:00
<b>Stop Bath</b>			
ILFOSTOP	1+19	18-24 / 64-75	0:10
<b>Fixer</b>			
ILFORD Rapid Fixer	1+4	18-24 / 64-75	0:30
ILFORD Hypam	1+4	18-24 / 64-75	0:30
<b>Washing</b>			
Fresh, Running Water	-	Above 5 / 41	2:00

**Development** - See the 'Processing summary' for development recommendations.

On correctly exposed prints with MULTIGRADE developer 1+9, the image will begin to appear after approx. 10 seconds. The minimum recommended development time for high quality prints is 45 seconds; after this time there is a more gradual image build-up. Over-exposed prints developed for a minimum of 35 seconds are acceptable for those applications where the highest quality is not required.

To give greater control during development, and for economy, the 1+14 dilution of MULTIGRADE developer can be used.

MULTIGRADE RC papers can also be processed in other high-quality dish/tray developers.

**Stop Bath** - See 'processing summary'

The use of a stop bath is strongly recommended. A stop bath stops development immediately, reduces the risk of staining and extends the life of the fixer bath.

**Fixing** - See the 'Processing summary' for fixer recommendations.

The use of a hardening fixer is not recommended as it reduces washing efficiency. ILFORD RAPID FIXER and ILFORD HYPAM are non-hardening fixers.

There is no benefit in extending fixation beyond the recommended time; some loss of print quality might be seen when long fixing times are given due to image etching. Also, long fixing times will affect the image colour of the paper.

## MULTIGRADE RC PAPERS Technical Information

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**Washing** - See the 'Processing summary' for washing recommendations.

When it is important to obtain a print in the shortest possible time, vigorously wash MULTIGRADE RC papers for 30 seconds in running water.

Prolonged immersion in water can cause edge penetration and print curl with resin coated papers; for this reason, avoid wet times longer than 15 minutes.

### Drying

A final rinse in ILFORD ILFOTOL, diluted 1+200 with water, will aid even and rapid drying.

Optimum quality results will be obtained using a machine dryer suitable for RC photographic papers such as the ILFOLAB 1250RC.

When a dryer for RC papers is not available, remove surplus water from the prints and leave to dry. At room temperature, prints will dry in 10-20 minutes.

**NOTE** MULTIGRADE RC papers, as with other resin coated papers, should not be glazed/ferrotyped or dried on a drum or flatbed glazer – as this can cause the polyethylene in the paper to stick to the glazing surface.

### MACHINE PROCESSING

MULTIGRADE RC papers can be processed in all conventional machines for black and white resin coated papers. It is not suitable however, for activation type processing.

### ILFOLAB 2150RC

For the ILFOLAB 2150RC table-top processor, ILFORD 2150XL developer and fixer kits are recommended.

### Other processors

This section is a guide to setting up processors for ILFORD resin coated papers using ILFORD 2000RT developer/replenisher and fixer/replenisher. Both the developer and fixer are diluted 1+4 to make tank or replenisher solution. These suggestions are only a guide, and the processing cycle should be checked in the processor.

### Suggested development times for ILFORD 2000RT Developer

The preferred temperature range is 20-30C/ 64-75 °F

Temperature (°C/°F)	Development time (sec) including transfer time to next tank	These times are for non-replenished systems, with a maximum solution life of 7 days. They are also for replenished systems with a solution life of up to 3 months. The suggested developer replenishment rate is 150-250ml/m <sup>2</sup> (14-23ml/ft <sup>2</sup> ) paper processed.
20/68	46	
25/77	32	
30/86	22	
35/95	15	
40/104	12	

### Suggested fixing times for ILFORD 2000RT Developer

The same times and temperatures as for development, can be used for fixing. The actual fixing time, however, is shorter, and 20 seconds is ample above 20C/68°F.

These recommendations are suitable for both replenished and non-replenished systems. In non-replenished systems, the maximum paper throughput is 4m<sup>2</sup>/L (44ft<sup>2</sup>/US quart) of working strength solution.

The suggested fixer replenishment rate for replenished systems is 300-450ml/m<sup>2</sup> (28-41 ml/ft<sup>2</sup>) of paper processed. The maximum silver concentration in the fixer bath is 4-6g/L.

**Note:** If fixing is not complete, then adequate washing is impossible.

## **MULTIGRADE RC PAPERS** Technical Information

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### **Washing times**

Wash for at least 15 seconds at temperatures above 5°C/41°F. Set the water flow to fill the wash tank in 4 minutes or less.

### **Hot air drying**

Use temperatures up to 85°C/185°F

### **FINISHING**

MULTIGRADE RC papers respond in the same way as other resin coated papers to the usual techniques of toning, chemical reduction and retouching. Prints can be mounted using the standard techniques for resin coated papers.

### **STORAGE**

Store unused MULTIGRADE RC papers in a cool, dry place in its original packaging. Avoid conditions of high temperatures and/or high humidity.

MULTIGRADE RC papers will keep in excellent condition for up to 2 years when stored as recommended.

### **Prints**

MULTIGRADE RC papers which have been processed as recommended in this document, will have a more than adequate storage life for most purposes. Print life will be shortened, however, in adverse storage conditions, or if the print is exposed to oxidising gases.

It is recommended that prints made for displays are toned to protect them from the oxidising gases that are found in many environments.

Selenium toner is recommended, there may be some change in image colour depending on the dilution and amount of toning applied. Other protection methods can be used including sulphide toning, silver image stabilisers and laminating.

A wide range of information sheets are available which describe and give guidance on using ILFORD PHOTO products. Some product information sheets might not be available in your country.

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