MULTIGRADE FB WARMTONE Variable Contrast Fiber Base Black & White Paper

1 DESCRIPTION AND USE

ILFORD MULTIGRADE FB WARMTONE is a premium quality, variable contrast black and white paper which has a warm black image tone on a warm white base.It is especially suitable for toning. MULTIGRADE FB WARMTONE has a double weight (255g/m^2) fiber base.

MULTIGRADE FB WARMTONE is part of the ILFORD MULTIGRADE system and is fully compatible with all existing MULTIGRADE filters and equipment. It is equally suitable for printing from conventional black and white and XP2 negatives.

MULTIGRADE WARMTONE FB is available in a double weight (1K) glossy surface.

2 EXPOSURE

2.1 SAFELIGHT RECOMMENDATIONS

MULTIGRADE FB WARMTONE can be used with most common safelights for black and white papers. The ILFORD safelight filters are especially recommended, however, as they generally allow darkrooms to be brighter, but completely safe, for MULTIGRADE FB WARMTONE and many black and white papers.

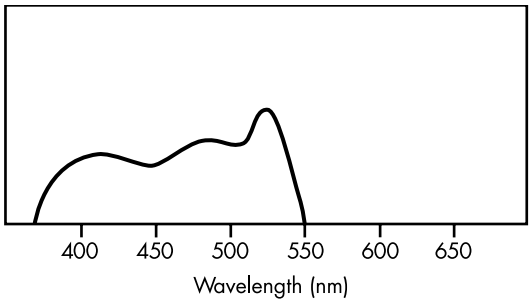
The ILFORD 902 (light brown) safelight filter fitted in a darkroom lamp with a 15W bulb is recommended.

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 3 feet.

Other safelight filters, for example, the Kodak OC, can be used.

2.2 SPECTRAL SENSITIVITY

Wedge spectrogram of MULTIGRADE FB WARMTONE (unfiltered) to tungsten light (2850K)



2.3 CONTRAST RANGE

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

2.4 ENLARGER LIGHT SOURCES

MULTIGRADE FB WARMTONE is 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 designed for variable contrast papers. Other cold cathode (cold light) and pulsed xenon light sources may give a reduced contrast range.

2.5 MULTIGRADE FILTERS

MULTIGRADE filters are suitable for use with MULTIGRADE FB WARMTONE. The twelve MULTIGRADE filters are numbered 00–5 in $^{1}1/_{2}$ steps. They have been specifically designed for use with ILFORD variable contrast paper. With MULTIGRADE FB WARMTONE fiber paper, they give a wide contrast range equivalent to grades 0–4 on graded paper: The lowest filter number corresponds to the softest grade of paper.

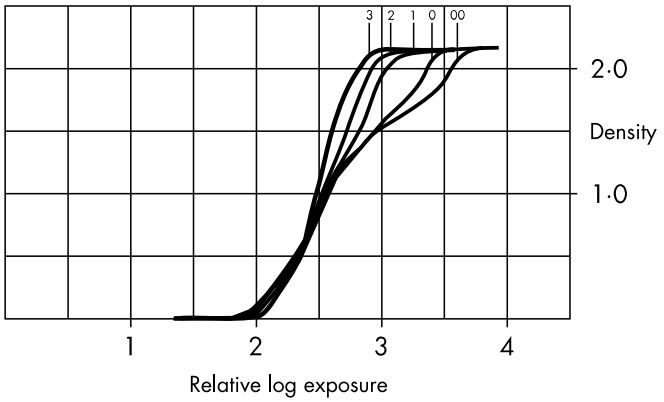
The sets comprise twelve filters, solvent coated on a polyester base. They are available in sets of $3^{1}1/_{2}$x$3^{1}1/_{2}$ inches and 6x6 inches, and individually in 12x12 inches. They may be used above or below the lens and may be cut to fit the filter drawer of a particular enlarger.

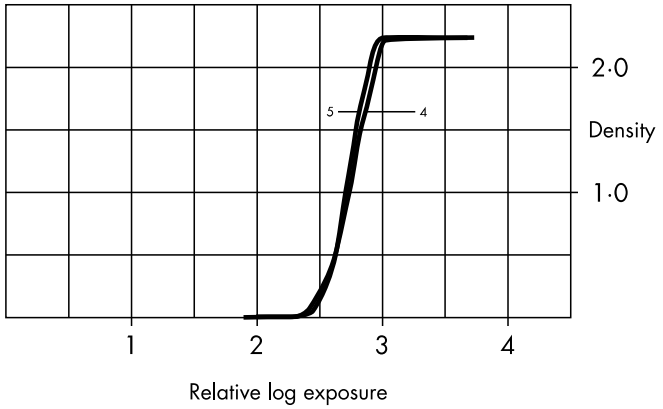
Filters are also available mounted, and supplied as a kit with a filter holder and a filter holder adaptor. The filter holder may be fitted to the enlarger in two ways. If the enlarger has a non-recessed lens and the filter holder can be attached without obscuring the aperture ring, mount it on the lens barrel. Alternatively, if the enlarger lens is either recessed or has too large an outside diameter, the filter holder may be fitted to the post supporting the red filter on the enlarger. A suitable adaptor is supplied with the kit.

MULTIGRADE filters are very easy to use: No complicated calculations are needed when changing from one filter to another. The exposure time for filters 00–$3^{1}1/_{2}$ is the same; that for filters 4–5 is double.

For example, if a print made with filter 3 requires an exposure of 10 seconds at f5.6, a print of similar overall density made from the same negative with filter 4 would require 20 seconds at f5.6.The effective speed of a variable contrast paper is dependent on the transmission characteristics of any filter through which it is exposed. The International Organization for Standardization (ISO) measures photographic paper speed at a density of 0.6 above base and fog, and expresses it using an arithmetic scale (in the same way as ASA film speed). For example, paper with a speed of ISO P200 is one having twice the speed of one with ISO P100. The American National Standards Institute (ANSI) has an identical system of speed rating.

2.6 CHARACTERISTIC CURVES





MULTIGRADE FB WARMTONE glossy paper
exposed through filters 00, 0, 1, 2, 3, 4 and 5.
Developer: MULTIGRADE, diluted 1+9.
Development: 2 minutes at 68°F.

2.7 ILFORD XP2 400 NEGATIVES

Equal contrast spacing and the same wide contrast range can be achieved when printing ILFORD XP2 400 negatives on MULTIGRADE FB WARMTONE fiber paper. In some cases of extreme over exposure (plus 3–4 stops) of XP2 400, the equal speeds between the highest contrast steps may not apply. Longer printing times may then be needed. For this reason, exposure must be reassessed by practical trial when changing filters.

2.8 MULTIGRADE 500 EQUIPMENT

MULTIGRADE FB WARMTONE fiber paper is fully compatible with the ILFORD MULTIGRADE 500 enlarger head and control system. Full details on this equipment are available separately from ILFORD PHOTO.

2.9 USE OF COLOR HEADS

By adjusting the yellow and magenta filtration, it is possible to obtain a wide contrast range with MULTIGRADE FB WARMTONE fiber paper. There are differences, however, between the characteristics of the filters used in different manufacturers' color heads. Also, as the yellow and magenta filters have not been arranged to equalize exposures, new exposure times will have to be calculated when the contrast is changed. For these reasons, it is not possible to accurately predict the settings that will be required to produce specific print contrasts. The following table may be used as a rough starting point.

The majority of enlarger manufacturers use Durst or Kodak filtration values. The tables are a guide to making prints with MULTIGRADE FB WARMTONE fiber paper when using a color enlarger.

From the table below, select the type of filtration needed according to the enlarger type.

Durst	Kodak
Dunco	Beseler
Durst	Chromega
Kaiser	De Vere
Kienzle	Fujimoto
Leitz	IFF
Lupo	Jobo
	LPL
	Omega
	Paterson
	Simmard
	Vivitar

From the tables below, read off the approximate filtration needed for each contrast step. Dual filtration values usually need longer exposure times than single filtration values, but may need less adjustment to exposure times when changing contrast.

Filter Settings **SINGLE FILTER METHOD**

ILFORD MULTIGRADE Filters	Durst (Max. 130M)	Durst (Max. 170M)	Kodak	Exposure Factor For Heads
00	120Y	150Y	199Y	2.5
0	70Y	90Y	90Y	2.3
1½	50Y	70Y	70Y	2.1
1	40Y	55Y	50Y	1.7
1½	25Y	30Y	30Y	1.4
2	0	0	0	0
2½	10M	20M	5M	1.2
3	30M	45M	25M	1.3
3½	50M	65M	50M	1.6
4	75M	100M	80M	2.0
4½	120M	140M	140M	2.4
5	130M	170M*	199M	2.6

*Some enlargers in this group have a maximum magenta setting higher or lower than 170M. For these enlargers, set the highest possible magenta value as an approximate equivalent to filter 5.

Filter Settings **DUAL FILTER METHOD**

MULTIGRADE Filters	Durst (Max. 130M)		Durst (Max. 170M)		Kodak	
00	120Y	0M	115Y	0M	162Y	0M
0	88Y	6M	100Y	5M	90Y	0M
1½	78Y	8M	88Y	7M	78Y	5M
1	64Y	12M	75Y	10M	68Y	10M
1½	53Y	17M	65Y	15M	49Y	23M
2	45Y	24M	52Y	20M	41Y	32M
2½	35Y	31M	42Y	28M	32Y	42M
3	24Y	42M	34Y	45M	23Y	56M
3½	17Y	53M	27Y	60M	15Y	75M
4	10Y	69M	17Y	76M	6Y	102M
4½	6Y	89M	10Y	105M	0Y	150M
5	0Y	130M	0Y	170M*	—	—

3PROCESSING

3.1 DEVELOPING

MULTIGRADE FB WARMTONE is processed in the same way as other fiber base papers.

Note: Photographic chemicals are not hazardous when used correctly. Always follow the health and safety recommendations on the packaging. Material Safety Data Sheets containing full details for the safe handling, disposal and transportation of ILFORD chemicals are available from ILFORD.

The image color of MULTIGRADE FB WARMTONE can be varied with the choice of developer and processing technique used.

PROCESSING SUMMARY (intermittent agitation)

ILFORD Chemical	Dilution	°F	Time (min.)
Development			
MULTIGRADE developer	1+9	68	1 1½ – 3
or			
MULTIGRADE developer	1+14	68	2 – 5
or			
BROMOPHEN developer	1+3	68	1 1½ – 3
Stop bath			
IN-1	1+31	65–75	5–10 sec.
Fixing			
MULTIGRADE fixer	1+4	65–75	1
Washing			
Fresh, running water	—	above 41	60

3.2 DEVELOPMENT

See the Processing Summary chart for development recommendations.

On correctly exposed prints with MULTIGRADE developer 1+9, the image will begin to appear after 35 seconds. Development can be extended up to 6 minutes without any noticeable change in contrast or fog.

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

The choice of developer affects the image color of MULTIGRADE FB WARMTONE paper. From the ILFORD range of developers, warmest results are achieved with MULTIGRADE and BROMOPHEN developers.

MULTIGRADE FB WARMTONE paper can also be processed in other high quality tray developers such as ILFORD UNIVERSAL Paper Developer.

3.3 STOP BATH

See the Processing Summary chart for stop bath recommendations.

A stop bath stops development immediately, reduces the risk of staining (which might not show until after toning) and extends the life of the fixer bath. The use of a stop bath is especially recommended with MULTIGRADE FB WARMTONE, as this paper carries over more developer to the next bath than other ILFORD fiber base papers.

A water rinse can be used instead of a stop bath, but it must be changed frequently to avoid processing marks (which might not show until after toning).

3.4 FIXING

See the Processing Summary chart for fixing recommendations.

Two bath fixing can also be used. Fix prints for half the recommended fixing time in the first bath, then transfer them to the second bath for the remainder of the time. When the capacity of the first bath is reached, discard it and replace it with the second bath

Make up a fresh second bath. This cycle can be repeated four times. If two bath fixing is not used, then the fixing and washing sequence using ILFORD UNIVERSAL Wash Aid described in section 4 is recommended.

There is no benefit in extending fixing 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 color of the paper.

The use of a hardening fixer is not recommended as it impairs the efficiency of the wash. A hardener CAN NOT be used with ILFORD MULTIGRADE Fixer. For optimum permanence, see section 4.

Checking Paper For Adequate Fix

It is easy to test for residual silver salts in the paper and thus check whether the paper is adequately fixed.

Make up a stock testing solution by dissolving 2g of sodium sulfide in 125ml of water. Dilute this stock solution 1+9 with water for use. Place a drop of the solution on a white area of a print that is known to be well fixed and washed. Blot any excess solution. The barely visible cream tint that remains is the reference color for a well fixed and washed print.

Soak any prints that show a yellowing of the test spot in fresh water for five minutes, then repeat the recommended fixing and washing sequence using fresh fixer.

A full, tightly capped bottle of stock testing solution will keep in good condition for three months. Once diluted to make working strength solution, it should be used within a week.

3.5 WASHING

See the Processing Summary chart for washing recommendations.

Short washing times, for example, when using a washing aid, will give a cooler image color than longer washing times. For warmest results, always wash prints for at least 30 minutes.

3.6 DRYING

A final rinse in ILFORD ILFOTOL, diluted 1+199 with water, will aid even and rapid drying.

After washing, squeegee prints on both sides to remove surplus water. Prints can then be air-dried at room temperature, glazed or heat-dried. However, the use of belt print dryers and photographic blotters is not recommended as there is a risk that prints will stick to them. If a belt print dryer must be used, fix the prints using a hardening fixer; however, this will have the drawbacks explained under section 3.4 Fixing.

3.7 TONING

Toning prints creates an aesthetic effect and, in some cases, can help to protect the print from external contaminants — see section 4, Optimum Permanence. MULTIGRADE FB WARMTONE is receptive to a wide range of toners and can be toned to give subtle color changes or dramatic effects. Especially recommended are polysulfide toners, such as Kodak Brown Toner or Agfa Viradon, and selenium toners. Other toners can be used to create different effects. Follow the instructions supplied with the toner.

4 OPTIMUM PERMANENCE

The biggest cause of premature deterioration of black and white photographs is undoubtedly poor processing technique, notably inadequate fixing and/or washing. In the case of fixing, this can mean times that are too long as well as too short.

Before the fixing and washing method using UNIVERSAL Wash Aid was introduced by ILFORD, it was probably true to say that there had not been a significant change in the way conventional black and white papers had been fixed and washed since the turn of the century. There had been, and still is, a resistance to using shorter fixing and washing times than those established by tradition. Where image quality and permanence are concerned this is understandable.

The traditional fixing and washing method described in section 3 will give excellent print permanence for all commercial needs (up to 10 years). When optimum permanence is needed (up to 100 years), perhaps for archival storage of prints, the ILFORD Archival Processing sequence at 68°F (20°C) is recommended using UNIVERSAL Wash Aid. Be careful not to exceed the capacity of the fixer or to extend the fixing time. Extra time in the fixer increases the absorption of the fixer by the paper base, and reduces the efficiency of the washing stage.

Optimum Permanence Sequence		
Fixing	ILFORD MULTIGRADE Fixer (1+4), intermittent agitation	1 minute
First Wash	Good supply of fresh, running water	5 minutes
Wash Aid	ILFORD UNIVERSAL Wash Aid (1+4), intermittent agitation	10 minutes
Final Wash	Good supply of fresh, running water	5 minutes*

*Extend to 30 minutes if the warmest image color is needed.

Optimum Permanence Sequence with Selenium Toner		
Fixing	ILFORD MULTIGRADE Fixer (1+4), intermittent agitation	1 minute
Toning	Selenium toner diluted (1+20) with working strength ILFORD UNIVERSAL Wash Aid instead of water, intermittent agitation	* minutes
Rinse	ILFORD UNIVERSAL Wash Aid (1+4), intermittent agitation	10 minutes
Final Wash	Good supply of fresh, running water	30 minutes

*Tone the print for the appropriate time to achieve the depth of color needed.

For optimum permanence with other toners that give a protective effect, for example, sulfide (sepia), polysulfide and some metal replacement toners (gold and platinum), use the optimum permanence sequence above and then tone the print as desired.

Note: Other metal replacement toners such as blue (iron) and red (copper) may not give extra protection as the image might fade. Dye toners do not give extra protection.

Fixer Solution Capacity

The recommended capacity of MULTIGRADE Fixer when following the Archival Process sequence is about 40 sheets of 8x10 inch paper, or equivalent, per liter of working strength solution.

4.1 UNIVERSAL WASH AID

ILFORD UNIVERSAL Wash Aid is specifically formulated to aid the efficient removal of the by-products of fixing. It is supplied as a liquid concentrate and should be diluted 1+4 with water to make a working strength solution. UNIVERSAL Wash Aid has a capacity of 40 sheets of 8x10 inch paper per liter of working strength solution

5 FINISHING

The fiber base of MULTIGRADE FB WARMTONE fiber ensures that it responds to the majority of established methods of reduction, toning, drying, mounting and retouching.

5.1 CHEMICAL REDUCTION

MULTIGRADE FB WARMTONE fiber can be reduced overall to brighten the highlights or locally with a brush or small cotton pad, using the standard formula.

5.2 MOUNTING

Prints made on MULTIGRADE FB WARMTONE fiber can be dry or wet mounted.

Dry Mounting

This technique is very convenient, fast, clean to work with and provides a permanent, perfect bond between print and mount.

Wet Mounting

This is generally applied to the mounting of very large prints for display purposes and is not recommended where the highest level of image permanence is required.

5.3 RETOUCHING

MULTIGRADE FB WARMTONE is an ideal paper for all types of retouching (i.e., spotting, knifing and air brushing).

6 STORAGE

6.1 UNPROCESSED PAPER

Store unused MULTIGRADE FB WARMTONE paper in a cool, dry place in its original packaging. Avoid conditions of high temperature and/or high humidity. MULTIGRADE FB WARMTONE will keep in excellent condition for up to two years when stored as recommended.

6.2 PRINTS

MULTIGRADE FB WARMTONE prints which have been processed as recommended in this brochure will have a more then adequate storage life for most purposes. Print life will be shortened, however, in adverse storage conditions, or if the print is exposed to oxidizing gases.

It is recommended that prints made for display are toned to protect them from the oxidizing gases that are found in many environments. However, not all toners protect the image. Toners with a protective effect include selenium, sulfide and polysulfide toners. Other protection methods can be used including silver image stabilizers and laminating.

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