

# TECHNICAL INFORMATION

## HARMAN DIRECT POSITIVE PAPER – RC GLOSSY/LUSTER

**HARMAN DIRECT POSITIVE RC IS A HIGH QUALITY, TRADITIONAL SILVER GELATINE BLACK AND WHITE, HIGH CONTRAST PAPER ON A 190g/m<sup>2</sup> RESIN COATED BASE WHICH PRODUCES DIRECT POSITIVE PRINTS (MIRROR, INVERTED IMAGES) WITHOUT A FILM NEGATIVE.**

HARMAN DIRECT POSITIVE RC paper is primarily suited for use in pinhole cameras where exposure and processing in conventional black and white photo chemistry achieves a unique positive print - without the need for a film negative or inter-negative.

HARMAN DIRECT POSITIVE RC paper can also be successfully used in other applications such as direct exposure in large format cameras (sheet sizes 4x5in up to 11x14in) or by cutting small sheets for exposure in LOMO type cameras. Creative and unusual effects can be achieved with direct positive paper when used to make photograms or perhaps substituted for standard photo paper when printing from negatives in an enlarger. Whatever the application, this paper can achieve unique photo images as well as fun effects.

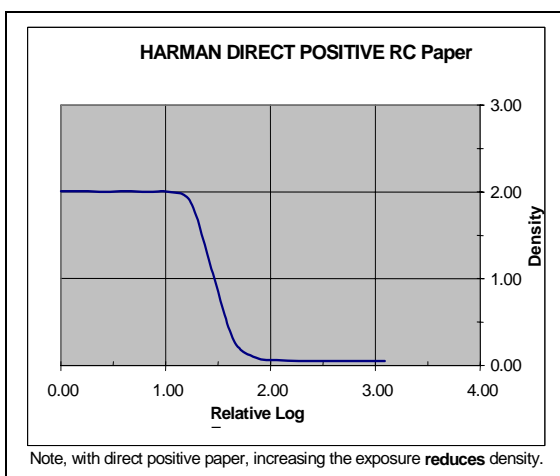
### 1. KEY FEATURES

- Genuine silver gelatine photo paper, coated on resin-coated base.
- 'Positive' paper enables prints to be generated without the need for a negative.
- Fixed grade, high contrast paper (similar to ILFORD MULTIGRADE grade 3½ - 4), but still capable of generating good tonal gradations when 'pre-flashed' during exposure stages (Section 5, method 2 below).
- Fully compatible with conventional black and white paper processing chemistry.
- Available in a Glossy surface (comparable to ILFORD MULTIGRADE IV RC Glossy) and a Luster surface (comparable to ILFORD MULTIGRADE IV RC Pearl).
- Slow ISO speed (around ISO 4-6) enabling a good latitude of control.
- Compatible with Ortho (deep red) safelights.

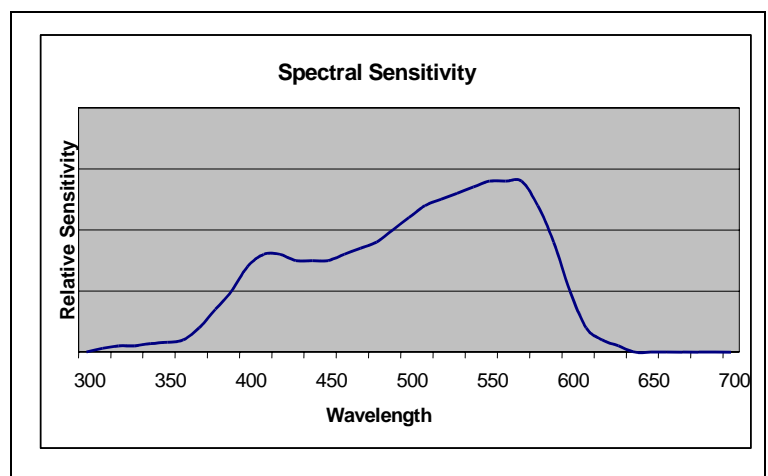
### 2. SAFELIGHT RECOMMENDATIONS

Unexposed paper must only be used with Ortho (deep red) safelight such as ILFORD 906 containing a 15W bulb or equivalent. As a precaution against fogging, it is advised that the light be a minimum of 1.2m/4ft from the paper at all times. Safelight exposure should be kept to a minimum and unused paper returned to its original packaging for storage.

### 3. CHARACTERISTIC CURVE



### 4. SPECTRAL SENSITIVITY



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## 5. EXPOSURE FOR PINHOLE CAMERA APPLICATIONS

There are 2 methods that can be applied when using this paper in pinhole cameras.

Method 1 refers to simple camera exposure and processing which can give perfectly acceptable results.

Method 2 allows greater control over tonal range and involves 'pre-flashing' paper prior to camera exposure.

Both methods are detailed below. It is advisable to start with method 1 before advancing to method 2.

### Method 1 – Camera exposure only

This paper is suitable for use in all pin-hole cameras, from the simple home-made varieties (usually cardboard or tin-can type) to the more sophisticated wooden models with integral sheet film holders. Image results from camera exposure only are normally dramatic and high contrast.

It may be necessary to cut the paper to an appropriate size to fit the camera being used. This must be carried out under Ortho (deep red) safelight conditions. Once cut to size, the paper should be loaded into the camera - in readiness for exposure.

If a light meter is not being used, exposure times will need to be determined by trial and error however the guide times given below are a useful starting point for test exposures.

These typical exposure times, based on using a pinhole camera with an aperture made from a pin in the lighting conditions described, resulted in good end prints.

- Bright sunshine (summer) 1-2 minutes
- Bright - but not direct sunshine 2-3 minutes
- Overcast (mixed sun/cloud) 4-5 minutes
- Dull / Cloudy 6-10 minutes
- Interior lit 1 hour

Paper should be processed as soon as possible after exposure to minimise any risk of latent image regression. See section 7 for processing instructions.

### Method 2 – Pre-flash prior to camera exposure

Pre-flashing the paper to light, prior to camera exposure will allow significantly more control over the tonal range and is therefore useful where softer images are required as an alternative to the dramatic, high contrast images associated with method 1.

The images below, exposed through a pinhole camera demonstrate the differences that can be achieved.

**Image 1.** – No 'pre-flash', camera exposure only  
Image has few mid grey tones, and is dramatic/high contrast



**Image 2.** – 'Pre-flashed', then camera exposed  
Image appears overall softer, and with more grey tones



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## 'Pre-flash' technique

A test strip should be produced in a similar manner to that which could be carried out when using standard photo paper such as ILFORD MULTIGRADE IV RC. This will indicate the tonal steps which correspond to different exposure times - starting from white and ending in black.

Given that this is Direct Positive paper, the aim is to select the tonal step that 'just' shows the slightest indication of shadow detail in the black density. The corresponding time for this step is then the 'pre-flash' time.

*(Note this is the opposite to how 'pre-flashing' works with conventional photo paper – where one would select the white which is just showing the slightest indication of highlight detail).*

The test strip would ideally be generated using an enlarger, however alternative pre-flash exposure methods are referred to at the end of this section.

The images below show test strips produced from enlarger exposures.

### Image 1

The enlarger aperture for this test strip set was set at f11 and the steps were based on 4 second exposures. Although there are many white/mid grey/dark grey tones visible, the jump from mid tones to black/slightly off black is too rapid. There are not enough 'black' steps showing detail to choose as an appropriate 'pre-flash' position indicating that too much overall exposure was given. Reducing the exposure should result in a test strip with more dark steps.

To achieve this, either close down the enlarger aperture to f16 or even f22, reduce the exposure time, eg. use 3 second exposure steps, or use a combination of both.

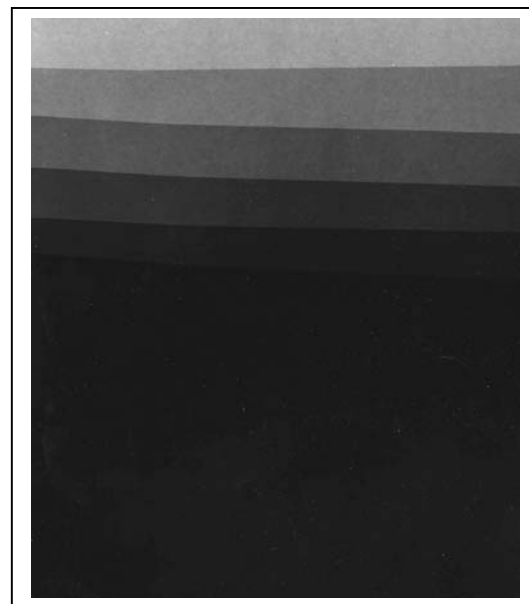
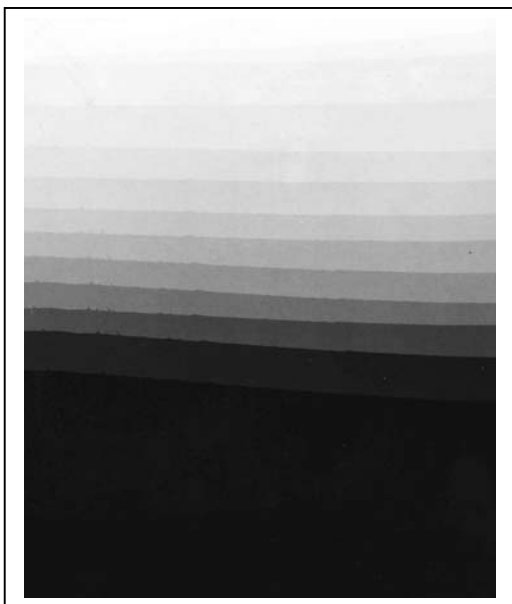
*Remember, with Direct Positive paper, less exposure is needed to make the image darker - (unlike conventional photo papers where more exposure is needed to darken the end print).*

### Image 2

The enlarger aperture for this test strip set was set as f16 and the steps were based on 3 second exposures. Sufficient tones are now visible in order to select a best guess for the 'pre-flash' time. Recommended selection from this test strip would be step 5. (Step 5 is not easily visible on the image below when viewed on screen, but can be seen on the actual print and is more apparent when this information sheet is printed out).

**Image 1** insufficient gradation between dark steps

**Image 2** sufficient steps present at black tone stages



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## **Pre-flash using selected exposure time**

Having determined the exposure time from the selected step on the test strip, the sheet of paper to be used in the camera requires an overall 'pre-flash' exposure of this exact time.

Once exposed/'pre-flashed' place the paper in the camera ready for its standard camera exposure. Typical camera exposure times are given in Section 5, method 1 if a light meter is not being used.

Although not always the case, 'pre-flashing' can slightly shorten the required camera exposure time. For example, where a 2 minute camera exposure may be required for non 'pre-flashed' paper in order to achieve the desired result, 'pre-flashed' paper may only need camera exposure of 1 ¾ minutes.

## **Alternative exposure methods to achieve 'pre-flashing'**

Using an enlarger with defined aperture settings and a precise timer is the optimum method for determining a 'pre-flash' time however it is also possible to 'pre-flash' using a light source such as an angle-poise (desk) lamp where the time is likely to be only 1 or 2 seconds.

This method will involve more trial and error testing as producing a test strip will be extremely difficult. Determining the correct 'pre-flash' time will involve pre-exposing a small sheet in its entirety and the time being modified dependant on those results.

Note, the paper/lamp must be used under the appropriate safelight conditions or the paper will become completely fogged by exposure to ambient light.

## **6. ALTERNATIVE APPLICATIONS**

Although this paper is primarily suited to use in pinhole cameras, it works well in a number of other applications some of which are described below. For any of the following applications, 'pre-flashing' or 'non pre-flashing' may be considered – depending on the creative or dramatic effects required. Following exposure, processing will be required as described in section 7.

### **i. Large format cameras**

The paper is ideal for use in large format cameras from 4x5" up to 11x14". (Camera types such as SINAR, LINHOF etc).

#### **Example of large format camera images**



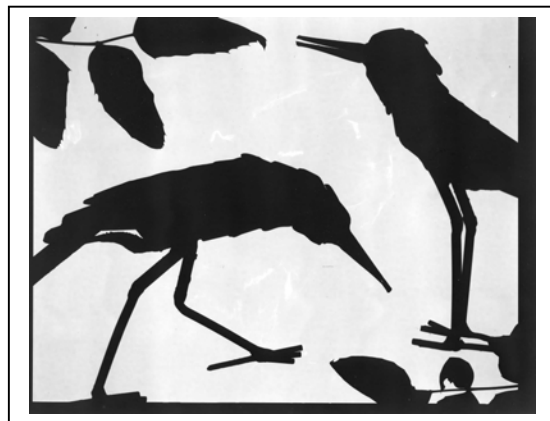
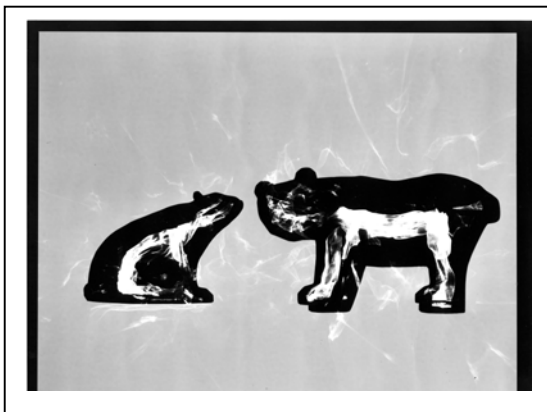
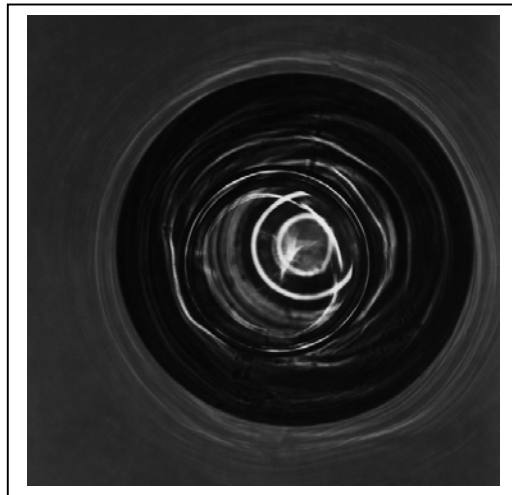
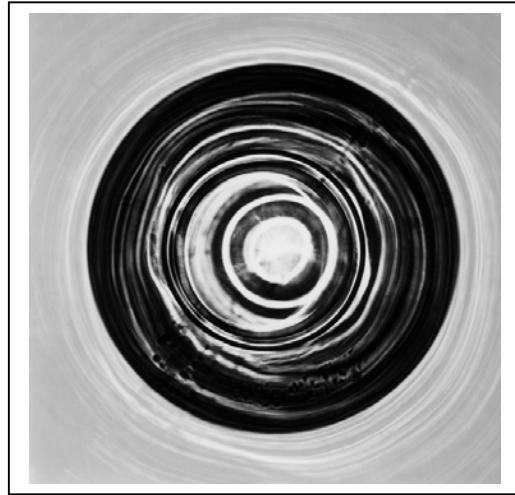
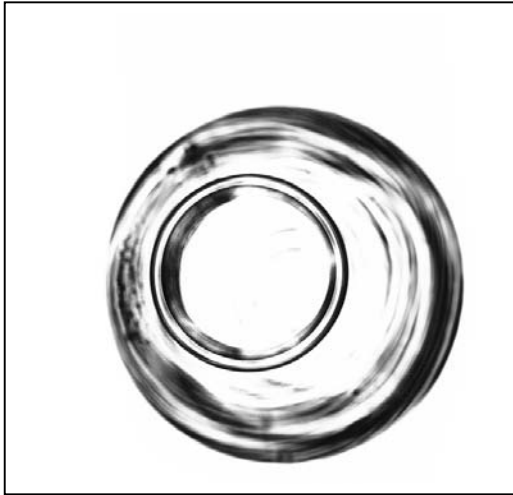
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## ii. Photograms

Photograms can be made with a similar technique to that used with standard black and white photo paper. This entails simply placing various objects directly onto the paper and exposing them whilst still on the sheet. It is likely that experimentation will be required in order to determine the correct exposure time as producing a test strip will be extremely difficult.

### Examples of Photograms:



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## iii. Exposing the paper using standard film negatives in an enlarger

As this is a positive paper, it is possible to produce unusual and striking prints.

Image below shows a film negative printed in the conventional manner onto standard photo paper.



Same negative printed onto DIRECT POSITIVE RC paper without the use of MULTIGRADE filter.



Same film negative printed onto DIRECT POSITIVE RC paper using MULTIGRADE filter grade 3 1/2



## iv. Exposing the paper in LOMO cameras

Using the method described below, it is possible to expose this paper inside certain models of LOMO camera such as the DIANA F+ and achieve unique positive prints without the need for film negatives.

Firstly, prior to loading any paper into the camera, it is important to ensure that any viewing windows on the camera back are covered securely with black tape otherwise the paper will be fogged. For example, the LOMO DIANA has two red filtered viewing windows on the rear of the camera which must be covered.

It will be necessary to cut the paper to approx 9.5cm x 6cm before laying it inside the camera (emulsion side facing the lens). After closing the camera back, the paper can be exposed in the camera and then processed using standard black and white paper chemistry. (See page 7 for processing information).

**NOTE:** Any paper cutting/handling/processing MUST be carried out in Ortho (deep red) safelight conditions.

Determining the optimum exposure is likely to require some trial and error as the image results will be dependent on lens used and the lighting conditions, however as a guide, the two relatively 'normal/fairly bright lit' indoor shots shown below, taken with a 75mm lens were given exposure times of between 3 and 5 seconds.

Where the pinhole lens is used in similar camera types, the exposure requirement for these lighting conditions is likely to be 1-2 minutes

Examples images taken with a LOMO DIANA F+ camera using its 75mm lens



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## 7. PROCESSING

HARMAN DIRECT POSITIVE RC paper can be processed in the same way as other black and white RC photographic papers, either in dishes/trays or in conventional processing machines designed for B&W papers. This product does however need to be fully/well developed in order to attain the optimum results.

### PROCESSING SEQUENCE – FOR DISH/TRAY PROCESSING

ILFORD Product	Dilution	Temperature (°C/°F)	Time (minutes : seconds).
<b>Developer</b>			
MULTIGRADE	1+9	20/68	1:00
or			
MULTIGRADE	1+14	20/68	1:30
or			
MULTIGRADE WARM TONE	1+9	20/68	1:30–3:00
or			
PQ UNIVERSAL	1+9	20/68	2:00
<b>Stop bath</b>			
ILFOSTOP	1+19	20/68	0:10
<b>Fixation</b>			
HYPAM	1+4	20/68	0:30
or			
RAPID FIXER	1+4	20/68	0:30
<b>Washing</b>			
Fresh running water	–	above 5/41	2:00

The above guide times will require intermittent agitation when processing paper in dishes / trays.

### PROCESSING STAGES IN DISHES/TRAYS

#### Development

Based on the conditions set out in the table above, images are expected to appear from around 30 seconds. Although guide times are given in the above table, it may be that certain images will require considerably longer development times (possibly between 2 – 6 minutes depending on the chosen developer) in order to achieve the desired direct positive end print. This will not lead to any noticeable change in contrast or fog, but may result in improved blacks.

#### Stop bath

Guide times are given in the table above.

The use of a stop bath is strongly recommended as it will halt the development stage immediately (reducing the risk of any staining to the print) and extend the life of the fixer bath.

#### Fixation

Guide times are given in the table above.

There is no benefit in extending the fixation period beyond the recommended times, on the contrary, it is possible to lose print quality with extended fixation due to image etching.

#### Washing

Guide times are given in the table above.

#### Drying

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

After washing, squeegee prints on both sides to remove surplus water, then leave them to dry on an appropriate surface (table top/shelf etc). At room temperatures, prints will dry in 10-20 minutes.

Note, RC paper is not suitable for glazing as this can cause the polyethylene in the paper to stick to the glazing surface.

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## **PROCESSING IN CONVENTIONAL B&W PROCESSING MACHINES**

This paper is suitable for processing in machines such as an ILFORD 2150 processor, using manufacturer's recommended chemistry such as ILFORD 2150XL (or as instructed in the processor manual).

Use dilutions/development times as advised in the processor manual .

### **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 our website [www.ilfordphoto.com](http://www.ilfordphoto.com) ('Health & Safety').

ILFORD equipment manuals are also available for download from our website.

## **8. STORAGE**

### **Unprocessed paper**

Store unused HARMAN DIRECT POSITIVE RC paper in a cool, dry place in its original packaging.

Avoid conditions of high temperature and/or high humidity.

HARMAN DIRECT POSITIVE RC paper will remain in good condition for up to 2 years when stored as advised.

### **Processed prints**

Prints which have been processed in accordance with the above recommendations will have a more than adequate storage life for most purposes.



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Examples of images produced in pinhole cameras and large format cameras, using HARMAN DIRECT POSITIVE RC paper and HARMAN DIRECT POSITIVE FB paper



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Note the 'mirror' effect of text that will arise with the paper.