

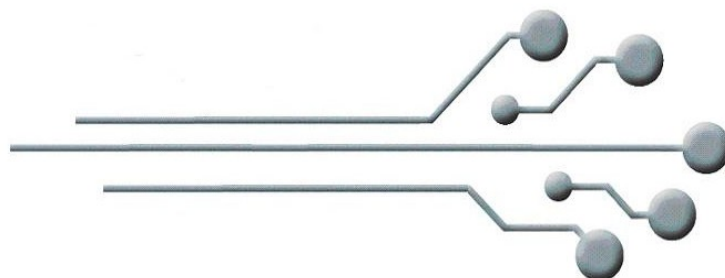


**Agfa Materials**  
**Printed Circuit Boards**

**High Resolution Film**

**HRR & HRO**  
**Technical Information**

April 2007



# HRR AND HRO

## Technical Information

HRR is a red-sensitive line film. It is especially designed for ultra-short exposure times (microseconds) in photoplotters with red neon lasers (633nm) or laser diodes (650 – 670 nm).

HRO is a violet-blue-green-sensitive line film. It is especially designed for ultra-short exposure times (microseconds) in photoplotters with violet leds (405 nm) or blue argon lasers (488 nm) or green laser diodes (500 – 553 nm).

Thickness of the polyester base: 0.18 mm (.007”).

### ■ Applications

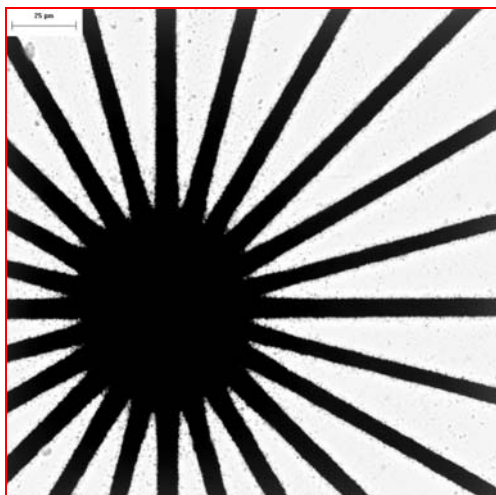
The films are used for high quality work in the PCB industry, chemical milling and for the production of FPD's with high demands for fine line capabilities, image quality, scratch resistance and dimensional stability.

In certain applications the films can be used to replace glass masks.

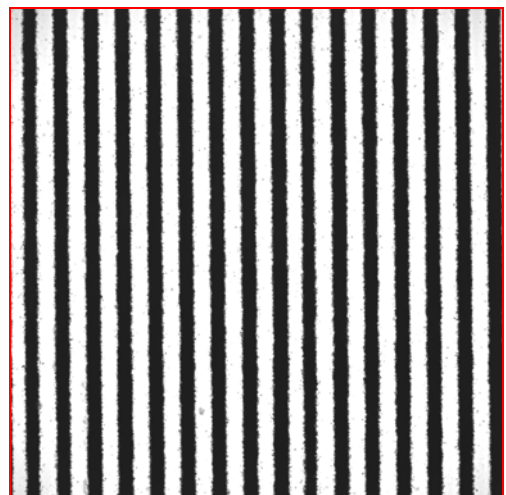
### ■ Characteristics

- Sub-mil lines and spaces capabilities. Lines and spaces of 5  $\mu\text{m}$  with excellent image quality can be generated.
- Consistent quality and controllable line width
- Very good dimensional stability
- Excellent line sharpness and line edge straightness
- Wide exposure and development latitude with accurate line width control
- Stable chemistry and low consumption
- High scratch resistance
- Optimal film transport and vacuum behavior

7 micron lines



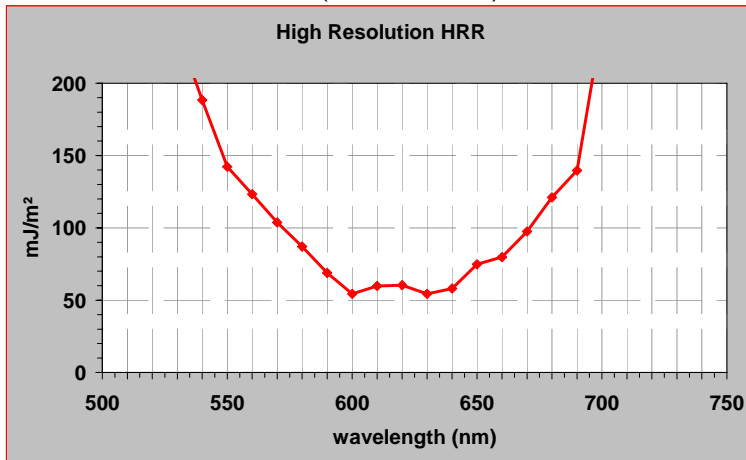
5 micron lines / spaces



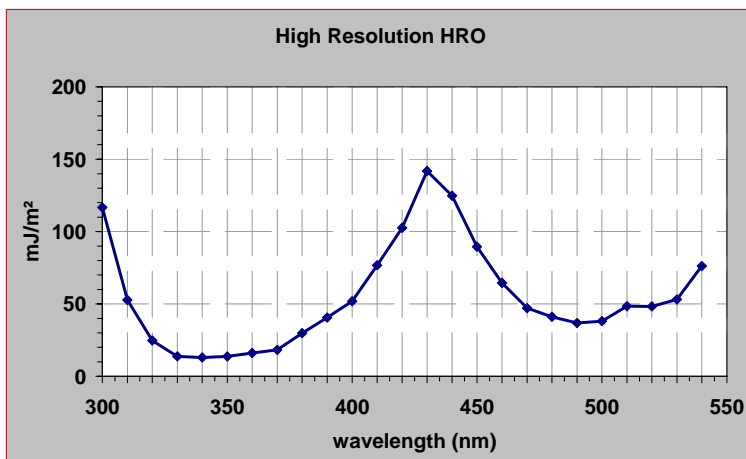
## ■ Photographic data

- Colour sensitivity:

HRR is red-sensitive (630 – 670 nm)

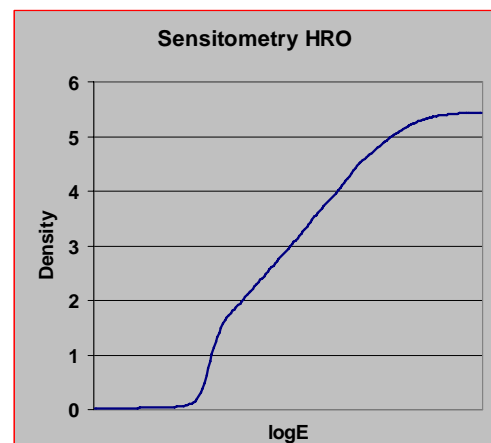
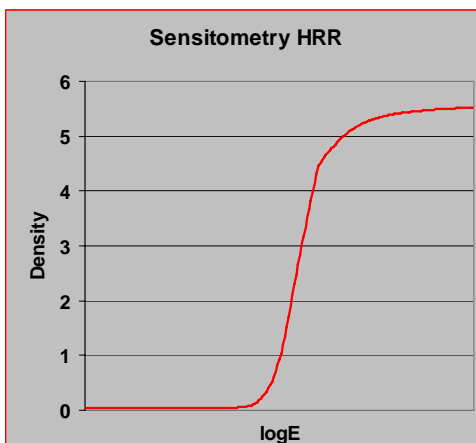


HRO is violet-blue-green sensitive (400 – 545 nm)



- **Characteristic curves**

(remark: High Res films are far less sensitive compared to Idealine films. The plotter settings are to be adjusted in order to get the correct imaging.)



## ■ Storage

Non-processed photographic film has a limited shelf life. Unopened boxes can be safely kept until the expiry date mentioned on the label. Film boxes are preferably kept flat, at a temperature of 21 °C and at 50% relative humidity. Temperature and relative humidity in the storage room must be kept within strict tolerances to avoid dimensional changes.

Remove the outer packaging and the shrink foil before taking the film into the plotter room, to avoid dust being dragged into the plotter area.

## ■ Production guidelines

### Workroom conditions

HRR: Cyan (blue-green) safelight, e.g. EncapSulite T20/ND.75 filter.

HRO: Red light, e.g. Agfa R6 or EncapSulite R20.

Temperature and relative humidity must be kept within strict tolerances to avoid dimensional changes.

If the conditions in the workroom are different from the storage room, the film should be allowed to acclimatise before use.

### Exposure

#### *Important*

Proceed carefully in order not to damage the film when loading the plotter. Take care that film sheets do not slide on top of each other. Do not apply strong local pressure on the film. Avoid dust contamination.

Closely follow the instructions for use provided by the plotter manufacturer. Avoid stray light during plotting.

**Make sure to load the film correctly. Under the correct dark room illumination the emulsion side of High Resolution film is darker compared to the back. This is opposite compared to Idealine films.**

The correct exposure will vary, depending on the type of plotter and the processor used. You can run a test to check the correct line width and the best line sharpness with the highest possible Dmax. Your Agfa representative will be pleased to give you more information.

### Processing

High Resolution films can be processed in rapid access machines.

#### *Recommended processing conditions*

Developers	Pdev
Developing time	In AgfaLine 86 HT: 35 s at 32 °C / 90 °F In Rapiline 72-3 HT: 30 s at 35 °C / 95 °F
Developer replenishment	250 ml/m <sup>2</sup> or 0.8 oz/ft <sup>2</sup> (50 % image blackness) + 2 l or 65 oz / 24hrs against oxidation
Fixer	Pfix
Fixer replenishment	500 ml/m <sup>2</sup> or 1.5 oz/ft <sup>2</sup> without fixer electrolysis 125 ml/m <sup>2</sup> or 0.4 oz/ft <sup>2</sup> with fixer electrolysis (50% image blackness)
Wash	At 20 °C for optimum dimensional stability

## ■ Packaging

All High Resolution films are supplied in special packaging for optimum protection during transportation and storage. The packaging is humidity tight for best dimensional stability results. A shrink foil protects the inner packaging against dust and scratches. With the selection of the packaging materials the possibility to recycle was taken in account. The amount of packaging material is reduced.



## ■ Dimensional stability

The combination of the polyester base with the High Resolution emulsions ensures maximum dimensional stability.

However the film will stretch with increasing temperature or relative humidity in the workroom. It will shrink with decreasing temperature or relative humidity conditions. An optimum adjustment of the dryer temperature in the processor will enable you to produce phototools with correct dimensions.

The film characteristics have some influence on the dimensional stability of phototools, but attention must be paid to the correct working conditions and the use of film and equipment. Your Agfa representative will be pleased to give you more information.

Thermal expansion coefficient	Relative humidity coefficient	
	Before processing	After processing
18 $\mu\text{m} / \text{m}^\circ\text{C}$ or 0.0018 % / $^\circ\text{C}$ 10 $\mu\text{m} / \text{m}^\circ\text{F}$ or 0.0010 % / $^\circ\text{F}$	11 $\mu\text{m} / \text{m} \% \text{RH}$ or 0.0011% %RH	10 $\mu\text{m} / \text{m} \% \text{RH}$ or 0.0010% %RH

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Subject to modifications without prior notice.