

# :AVIPHOT PAN 400S PE1/PE0

## Panchromatic negative film for aerial photography

:Aviphot Pan 400S PE1/PE0 is a panchromatic aerial negative film with medium resolution. The emulsion is coated onto a transparent polyester base providing excellent dimensional stability.

Thickness of the polyester base

- PE1: 0.10mm / 0.004".
- PE0: 0.06 mm / 0.0025".

### ■ Characteristics

- The spectral sensitivity of :Aviphot Pan 400S is expanded into the near infrared range of the energy spectrum. As a result, the film offers excellent penetration through haze, fog and other atmospheric conditions liable to affect the image quality. Due to the reduced scattering by the atmosphere, images are sharp and well edged.
- In the visual part of the spectral response of :Aviphot Pan 400S, the enhanced red response results in sharper images; the film speed sustains, even under reddish daylight. The enhanced red sensitivity is also beneficial for imaging the red fiducial marks.
- Although featuring high speed, the graininess of the emulsion is low thanks to the 2-layer emulsion architecture. The low granularity makes the film very scanner-friendly and the scans deliver noise-free images in the image highlights.
- The low fog level at standard processing temperature and at high temperature processing makes the film even more suitable for scanning and military reconnaissance applications.
- The image contrast can be controlled by the processing parameters. :Aviphot Pan 400S can be processed as a low contrast film for large-scale photography and as a medium contrast film for survey and map making applications.
- Processing can take place in a continuous automatic processor or manually (rewind development).
- Although high speed and near-IR sensitised, :Aviphot Pan 400S shows excellent storage stability before use and low latent image drift after exposure.
- Thanks to the use of modern film technology, the film has excellent drying abilities and is resistant to scratching.
- :Aviphot Pan 400S has a gelatine back coating to prevent scratches on the back of the film which could be picked-up by image scanners.
- Base substrate layers provide permanent anti-static properties to the film, at exposure and after processing..

### ■ Applications

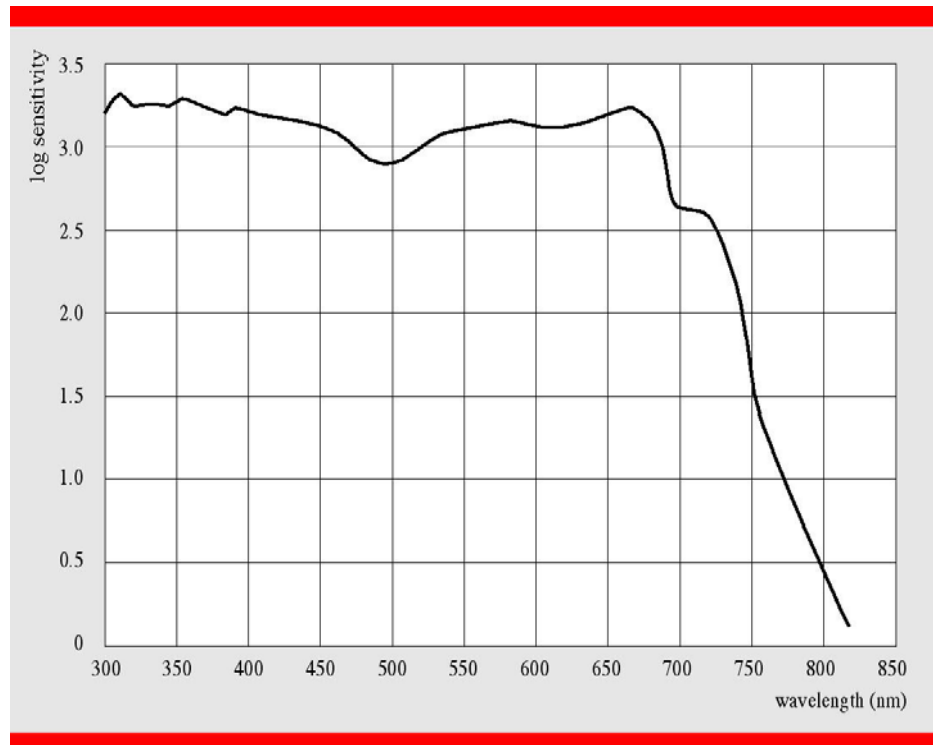
- The very fine graininess and the high speed make this an ideal for use in military low to medium altitude reconnaissance and for flights under low light conditions or at low altitude.
- The low fog level at high temperature processing makes the film suitable for fast military reconnaissance purposes.
- Due to its sensitivity to red light, :Aviphot Pan 400S is the optimum film for dawn, dusk and winter photography.
- Its speed and sensitometric characteristics make the film extremely suitable for low light and small sun angle photography (long shadow areas) and for wide latitude photographic exposure (high contrast objects or uncritical exposure procedures).

## ■ Photographic data

**Colour sensitivity:** panchromatic up to 750 nm.

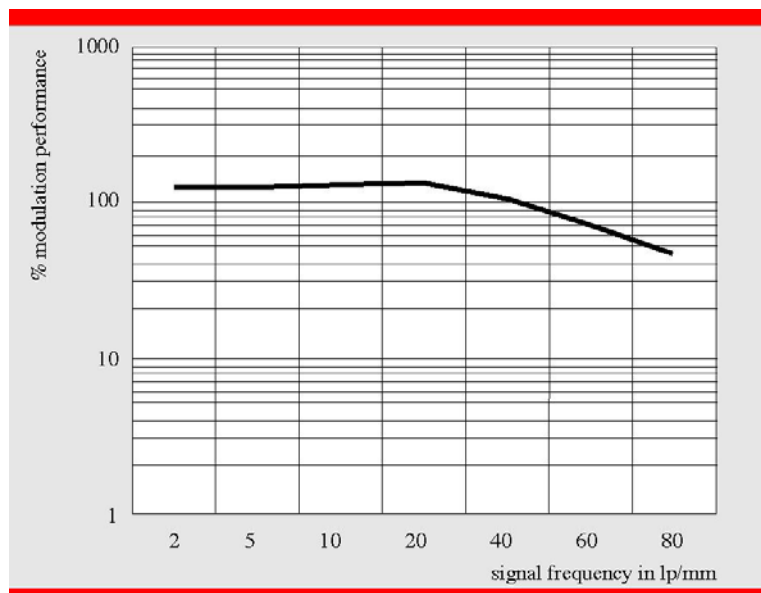
### Absolute spectral sensitivity

Sensitivity is reciprocal of the exposure ( $\text{mJ}/\text{m}^2$ ) required to produce a diffuse density of 1.0 above fog. Processed in :Gevatone 66, in G 74 c developer at 30 °C for 42 seconds.



### Photographic Modulation Transfer Function

The MTF curve expresses the ability of rendering sharpness (% of light signal modulation rendered) at increasing detail (detail frequency in lp/mm). MTF measured at 42 seconds developing time in :Gevatone 66 processor, G 74 c at 30 °C. Processing in G 74 c + AD 74 will shorten the developing time and improve the MTF results.



## Resolving Power

The resolving power is the resulting effect of granularity and sharpness of a film. Evaluation of resolution of the contact target results is heavily influenced by the local gradient of the sensitometric curve used when imaging the target on the film.

The resolving power measurement is a scientific result of a lab test which neither shows the impact of the atmosphere, nor the ability of a film to generate higher resolving power in practical circumstances due to near IR or IR abilities.

The resolving power is measured on USAF 1951 resolution test patterns.

Processed in :Gevatone 66, in G 74 c developer at 30 °C for 42 s.

TOC (target object contrast) 1000:1 = 161 line pairs or 322 dots/mm.

TOC 1,6:1 = 40.3 line pairs or 81 dots/mm.

## Granularity / Graininess

RMS granularity calculated from a micro-densitometric scan with 50 µm spot:

RMS = 14 at Density = 1

Processing in :Gevatone 66 processor, in G 74 c at 30 °C, developing time 42 seconds.

## ■ Production guidelines

### Darkroom lighting

The film should be handled in complete darkness.

### Exposure

The film sensitivity can vary with processing.

Aviphot Pan 400S can be exposed as a 200 EAFS to 500 EAFS film. So, it can be used with all classic aerial recording cameras and all reconnaissance cameras. The exposure depends on the required image contrast, the spectral quality and the intensity of the reflected light and the use of filters.

### Filter factors

If filters are used, the exposure time should be increased by a filter factor.

| With filter   | L 453<br>yellow | L 519<br>orange-yellow | L 599<br>red | L 622<br>deep red |
|---------------|-----------------|------------------------|--------------|-------------------|
| Filter factor | 1.5             | 1.8                    | 3.0          | 4.0               |

## Processing

### Automatic processing in a continuous-tone processor.

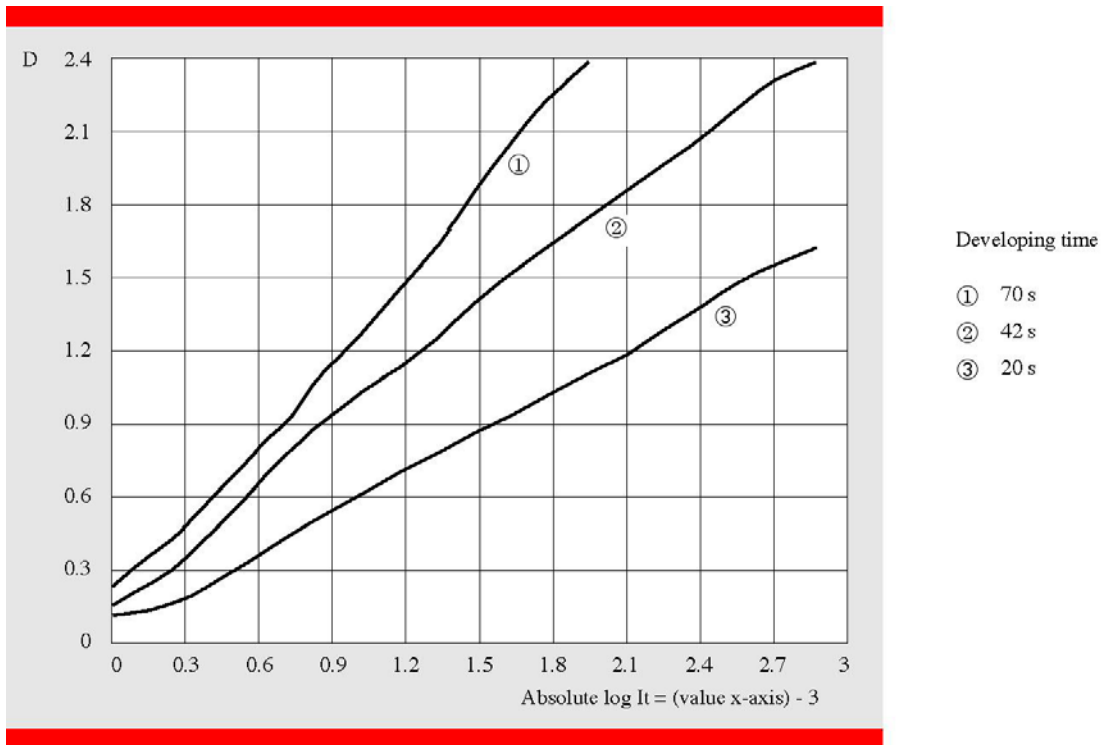
Recommended processing conditions: see datasheet on B+W processing

|                 |   |
|-----------------|---|
| Developer       | G 74 c or G 74 c + AD 74<br>Replenishment: 300 ml/m <sup>2</sup>            |
| Developing time | From 20 to 70 seconds, depending on the required image contrast and speed.  |
| Fixer           | G 333 c or :Vfix + :Aditan hardener<br>Replenishment: 500 ml/m <sup>2</sup> |
| Washing         | Minimum 6 l/min at 30 °C  |

## Sensitometry in :Gevatone 66, G 74 c developer

### Main sensitometric curves

- Characteristic curves (20, 42 and 70 seconds) in :Gevatone 66, G 74 c developer, 30 °C.



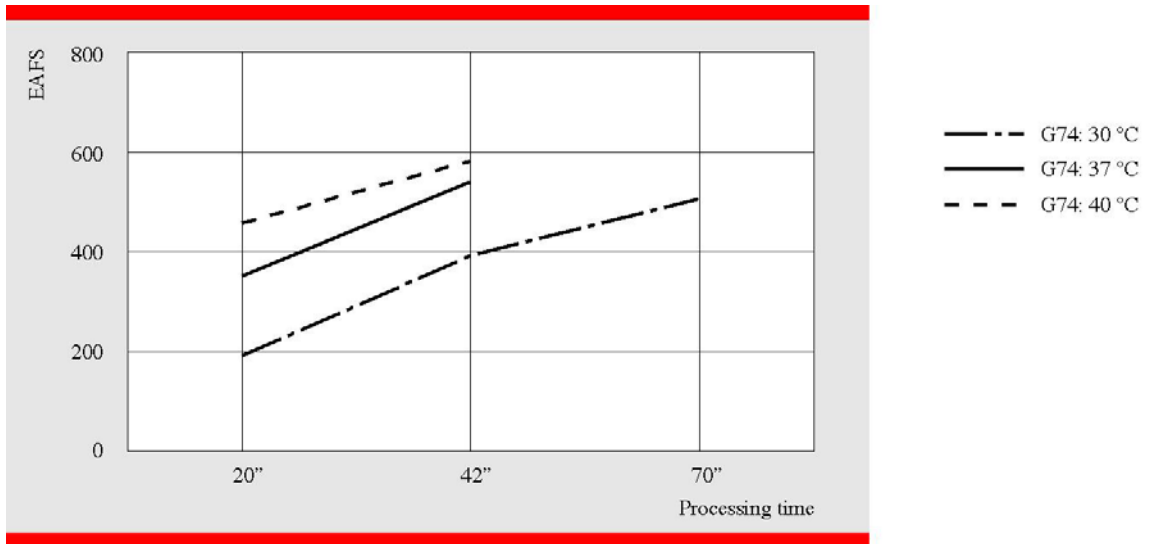
| <b>G74/30°C:Gevatone 66</b> | Processing 20 s | Processing 42 s | Processing 70 s |
|-----------------------------|-----------------|-----------------|-----------------|
| Speed in EAFS               | 200             | 400             | 500             |
| Average gradient            | 0.57            | 0.90            | 1.10            |
| Fog in D                    | 0.08            | 0.09            | 0.12            |

| <b>G74/37°C:Gevatone 66</b> | Processing 20 s | Processing 42 s | Processing 70 s |
|-----------------------------|-----------------|-----------------|-----------------|
| Speed in EAFS               | 370             | 550             | -               |
| Average gradient            | 0.73            | 1.07            | -               |
| Fog in D                    | 0.10            | 0.19            | -               |

| <b>G74/40°C:Gevatone 66</b> | Processing 20 s | Processing 42 s | Processing 70 s |
|-----------------------------|-----------------|-----------------|-----------------|
| Speed in EAFS               | 450             | 580             | -               |
| Average gradient            | 0.87            | 1.06            | -               |
| Fog in D                    | 0.12            | 0.30            | -               |

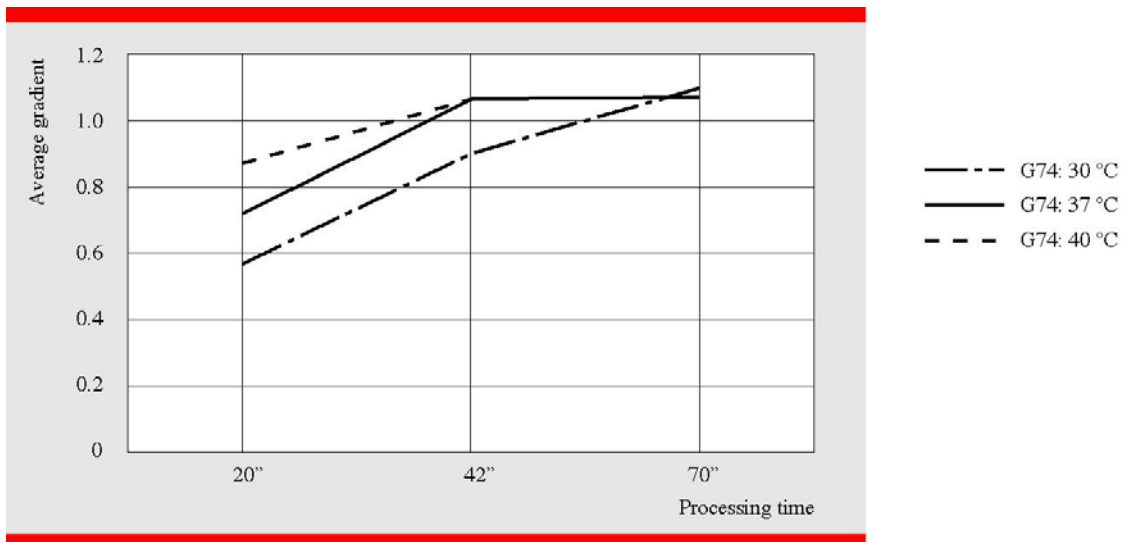
| <b>G74 + AD74 30°C:Gevatone 66</b> | Processing 20 s | Processing 42 s | Processing 70 s |
|------------------------------------|-----------------|-----------------|-----------------|
| Speed in EAFS                      | 355             | 515             | 630             |
| Average gradient                   | 0.90            | 1.19            | 1.16            |
| Fog in D                           | 0.10            | 0.15            | 0.24            |

- Exposure/time curves

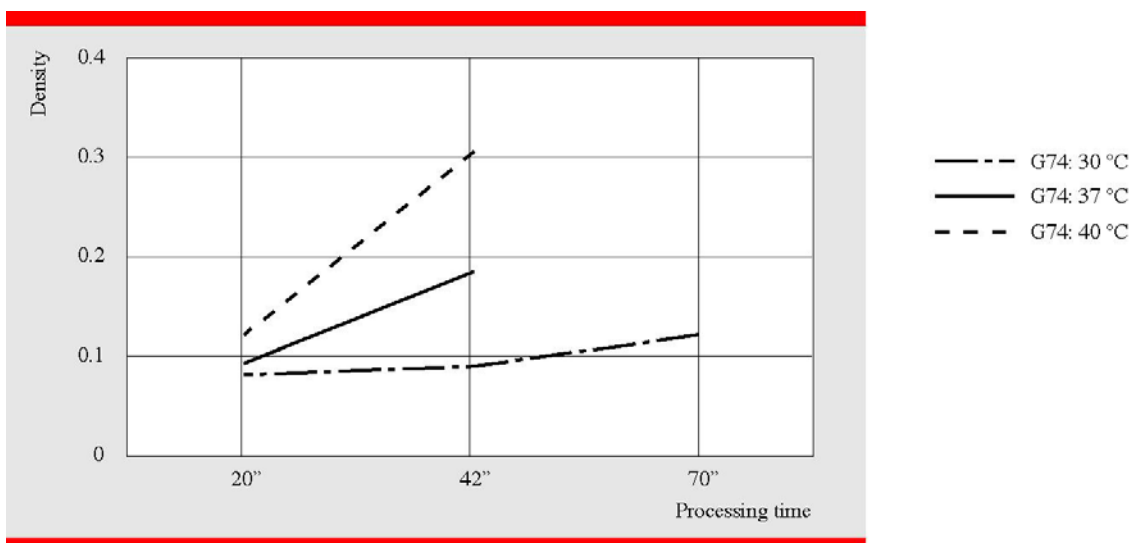


Processed in :Gevatone 66

- Average gradient/time curves



- Fog/time curves



## Rewind processing

Example: working method using a Zeiss FE rewind unit.

Wind the exposed film on the rewind frame. First manually rewind the film in water at 20 °C – preferably several cycles. After that, you can start film development.

Developer: G 74 c. The optimum developing time can be derived from the average gradient/time and exposure/time curves.

Rapid fixer: G 333 c or :Vfix, with 12 ml of :Aditan hardening agent added per litre of fixer. At least 6 passages are required (1 passage at 76 m and 38 m = 2.5 minutes).

Rinsing: 8 passages in running water.

Drying: Add 1 ml of :Agepon per litre of final wash water, to ensure spotless drying of the film

## ■ Latent Image Drift

Long-term and short-term exposed unprocessed images will show slightly altered sensitometric properties due to speed and average gradient drift. The storage temperature influences the drift.

Keep exposed films dry.

|         | Speed drift in log it                             |       |        |         |         |         |         |
|---------|---|-------|--------|---------|---------|---------|---------|
|         | Processed in :Gevatone 66, G74c developer at 30°C |       |        |         |         |         |         |
|         | No storage  | 1 day | 1 week | 2 weeks | 3 weeks | 4 weeks | 5 weeks |
| Shelf   | 0   | -0.12 | -0.16  | -0.16   | -0.16   | -0.16   | -0.16   |
| Fridge  | 0   | -0.08 | -0.09  | -0.10   | -0.12   | -0.13   | -0.13   |
| Freezer | 0   | -0.07 | -0.07  | -0.07   | -0.07   | -0.08   | -0.08   |

|         | Average gradient drift                            |       |        |         |         |         |         |
|---------|---|-------|--------|---------|---------|---------|---------|
|         | Processed in :Gevatone 66, G74c developer at 30°C |       |        |         |         |         |         |
|         | No storage  | 1 day | 1 week | 2 weeks | 3 weeks | 4 weeks | 5 weeks |
| Shelf   | 0   | -0.02 | 0      | 0.04    | 0.04    | 0.04    | 0.04    |
| Fridge  | 0   | -0.01 | 0      | 0.02    | 0.02    | 0.03    | 0.03    |
| Freezer | 0   | -0.03 | -0.03  | -0.01   | 0       | 0.01    | 0.01    |

## ■ Dimensional Stability

### Temporary dimensional changes

These reversible changes occur when film is kept at temperatures lower than 50°C and a RH between 30% and 60%.

Thermal coefficient of linear expansion: 18 µm/m per degree C of change.

Humidity coefficient of linear expansion: 22 µm/m per % RH (average).

### Permanent Dimensional changes

Handling the film outside the limits of the reversible changes will cause a permanent error due to image distortion. Dimensional changes due to processing and changes caused by mechanical tension cannot be avoided. To minimise these effects, it is recommended to dry film evenly over its entire surface, to avoid sudden temperature changes and to minimise the amount of hardening agent in the fixer. Vacuum plates and contact pressure systems may cause mechanical deformation of the image.

## ■ Shelf life and film storage conditions

Film expiry date on the film cans is 36 months after coating month. The expiry date is based on storage in the original packing and at an ambient temperature of 8°C. Colder storage expands the life time of the product. Ageing of the film is very limited when the film is stored in the freezer. Important: Never open the original packaging when the film is not adapted to ambient room temperature. Air humidity, which condenses on the cold film when loading, will produce water droplets, which will severely affect the final image quality.

## ■ Storage and handling of processed film

Avoid manipulation of the film shortly after processing as gelatine needs a few hours of hardening to be scratch resistant.

Processed aerial films are best stored in their original plastic boxes to shield films from light.

Ambient conditions are best between 10 and 20°C and a relative humidity between 30% and 50%. If sleeves are used to store cut film, make sure sleeves are inert to photographic materials.

Handle film with cotton gloves and only in dust free or dust poor areas.

## ■ Assortment

**:Aviphot Pan 400S PE1 – standard sizes\***

| Size           |                   | Spool/Winding/Perforation | Order code |
|----------------|-------------------|---------------------------|------------|
| 240 mm x 76 m  | 9 1/2 in x 250 ft | AH897 – EI – NP           | ELQXS      |
| 240 mm x 152 m | 9 1/2 in x 500 ft | AM897 – EI – NP           | ELQ33      |

\*Non-standard sizes are subject to a minimum order volume, standard sizes are not.

For all other sizes, please contact your local Agfa representative.

Sizes roll film: 16mm, 35mm, 70mm, 80mm, 126mm, 190mm, 240mm, 320mm.

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Subject to change without prior notice.

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