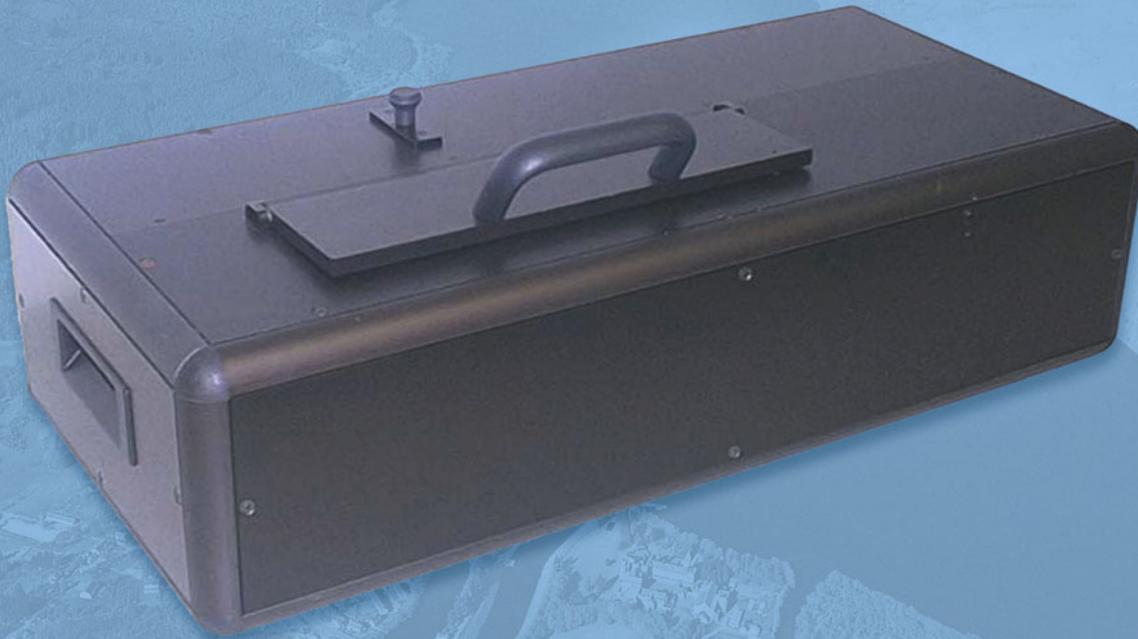


Sensitometer for Aerial Photography

:Avisense 2000



**Product Description
Installation
User Manual**

:Avisense 2000 Sensitometer

The :Avisense 2000 is a scientific instrument that produces daylight emission and incorporates a wedge as light modulator.

Use

On this sensitometer a film can be exposed

- to check the day-to-day condition of the chemistry. Here the drift of the sensitometric curves - compared to the standard curve - gives enough information. These kinds of checks can also be performed using pre-exposed wedges supplied by film manufacturers. Then, inaccuracies in latent image drift have to be taken into account. The use of a sensitometer eliminates the latent image drift, making the sensitometric curves more accurate. To improve the accuracy of the sensitometry it is recommended always to use the same reference film emulsions. Agfa can supply unexposed or pre-exposed strips in one and the same :Aviphot Pan 200 emulsion. Pre-exposed "lab-check" strips are available for AP64, AP70 and AP94 processes are available to check the colour films and chemicals.
- to determine film exposure and development parameters on the film that will be used during the photo flight;
- to perform general quality check on films;
- to perform absolute sensitometry: this application requires calibrated sensitometers and densitometers.

About the :Avisense 2000

The :Avisense 2000 sensitometer is a highly accurate exposure instrument for exposing a step wedge (21 steps) on film or film wedges. The film material or the wedges can either be panchromatic, panchromatic extending into the near infrared or infrared film.

Panchromatic film	400 nm to 650 nm
Panchromatic extended infrared film	400 nm to 780 nm
Infrared film	400 nm to 900 nm

The :Avisense 2000 simulates the exposure conditions during an aerial photo flight. The light emitted by the xenon tube approximates daylight according to the ISO 7829 specifications.

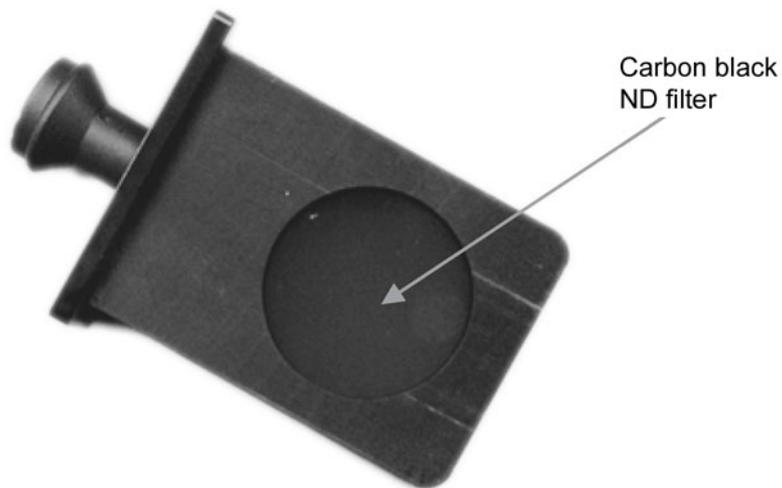
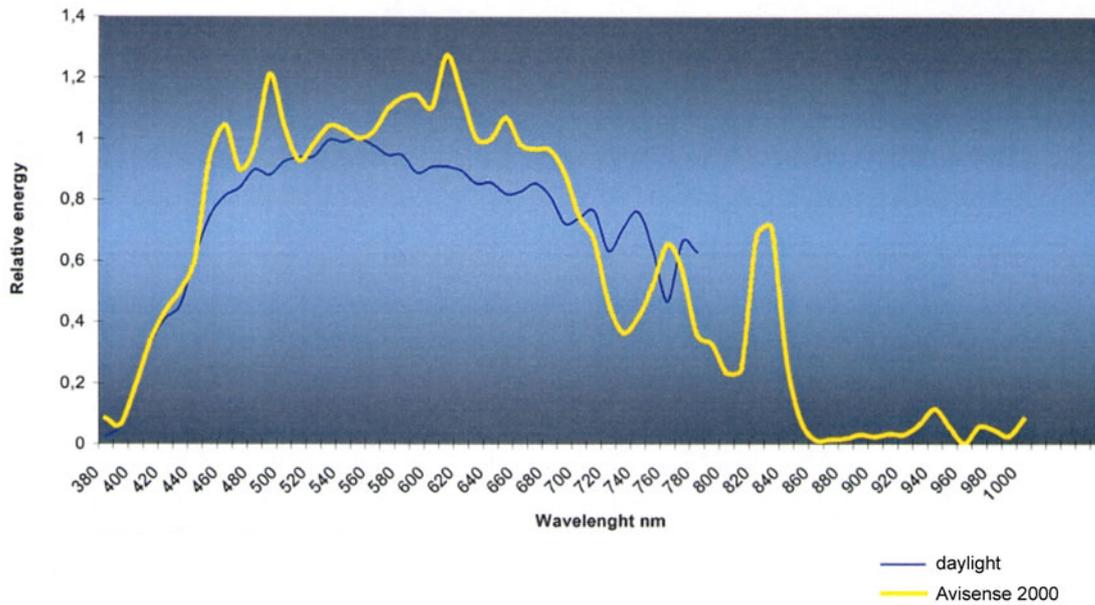
Any xenon light source emits light in a non-continuous radiation spectrum. In order to simulate daylight D60 at 6000°K the spectral radiation of the source is being corrected with built-in filters inside the :Avisense 2000 and also by using fibre optics as a light path. Fibre optics has the property of attenuating the blue emission and therefore contributes to the generation of daylight. Due to the filters and fibre optics the :Avisense 2000 produces a faithful daylight quality spectrum of 400 to 900 nm.

The :Avisense 2000 emulates fully diffuse daylight as per ISO 7829. The spectral component of the light emitted by the source is virtually non-existent. Absolute sensitometry calculations can only be performed if diffused light is used exclusively.

Neutral density filters, used to attenuate or to increase the light output, are made of carbon black material. The filters are very efficient light diffusers and attenuate all the frequencies of the emitted spectrum in an equivalent way, either from diffuse or specular light sources. Carbon black filters do not age and are extremely stable in all aspects. Also the wedge of 21 planes is produced out of carbon black material.

Any other filters used for filtering out part of the spectrum have to be mounted into a non-standard separate filter holder containing an ND filter and a spectral filter in a sandwich.

Relative power distribution of Air Photo Daylight (= ISO 7829)
and of the :Avisense 2000 sensitometer



Filter insert of :Avisense 2000

The fixed flash time is set at 2 ms to 3 ms, depending on the property of the flash bulb.

The xenon bulb, bulb voltage setting and flash time are individually selected for every :Avisense 2000 to produce a repetitive arc quality in any circumstance. Fine-tuning of the light output is performed by modulation of the coupling of the emitted light into the fibre optics. Hence it is understood that the :Avisense 2000 can only be repaired at Agfa HQ in Belgium, since replacing or moving any element of the optical chain will degrade the quality of the unit.

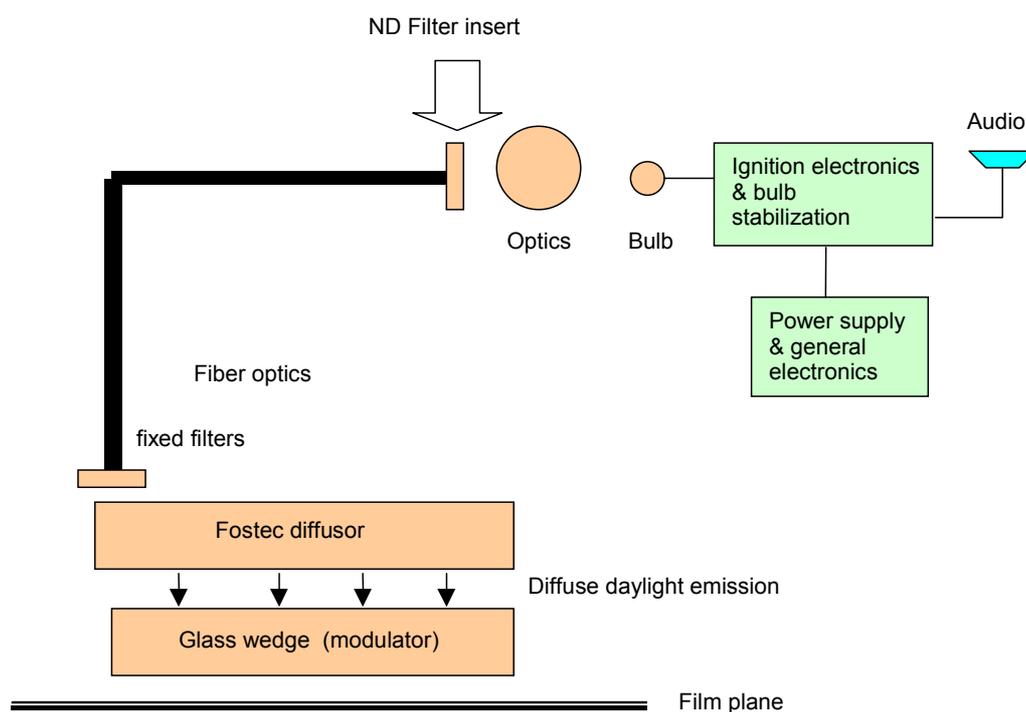
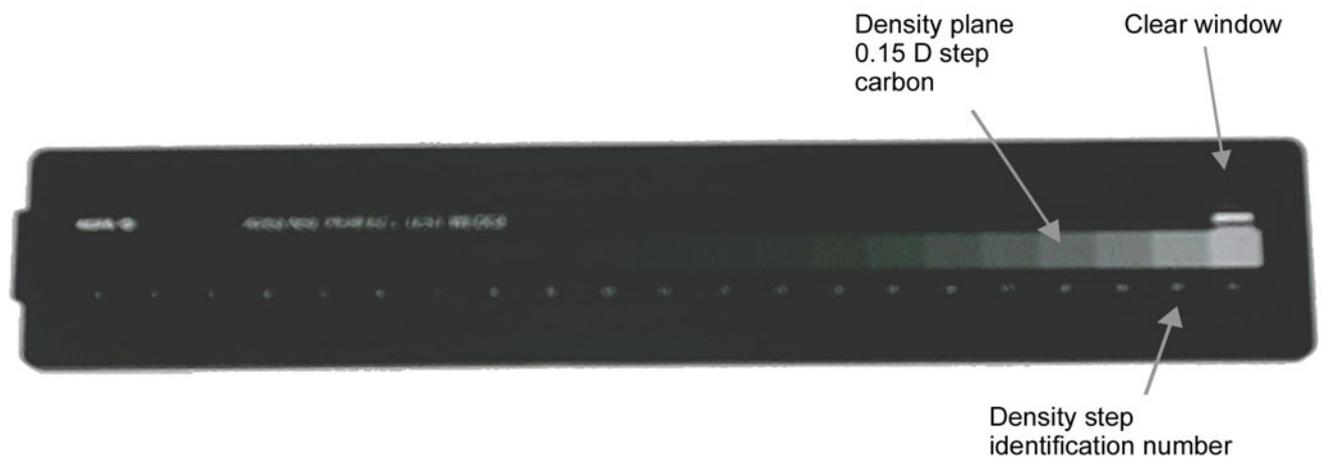
The glass wedge (light modulator)

This wedge is made of carbon coated glass, which guarantees long time stability and perfect diffusing properties. Carbon wedges and filters ensure a neutral response to all frequencies of the emitted light spectrum. The glass wedge, which can be ordered as a spare part, is exposed in contact. Each plane carries a number from 1 to 21 and all the planes have a relative diffuse density difference of approximately 0.15D. Due to the carbon coating a truly identical density difference among all planes cannot be guaranteed. Agfa aims at obtaining densities as close as possible to the ideal situation.

The glass wedge also features a small clear window, where only the thin upper glass is present. Through this window the film is exposed with maximum light and after processing the density of the window on the film indicates the highest density that can be achieved with the :Avisense 2000 on that film.

Important notice

Do not use this window for “zero-ing” the densitometer when measuring the wedge densities. Results will not be correct.



Exposing films

On the left and right hand side of the glass wedge two little screws are visible. They serve for positioning filmstrips in complete darkness. The screws position a filmstrip well if it is made according to the Agfa strip specifications. The two screws can be removed by unscrewing them, so that a wide film plane is available. Make sure that the suitable filter holder is in place. The orientation of the filter holder does not affect the quality or the quantity of the light output. The :Avisense 2000 has been optimised for easy use. An acoustic signal gives the user the following information:

- After switching the unit on, a long beep is heard during the automatic bulb warming up cycle.
- Signals “ready for use” by another long beep after a previous exposure (end of loading cycle).

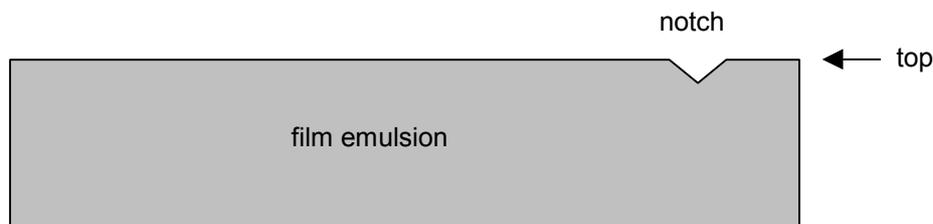
Exposure procedure

- Switch on the sensitometer.
- Wait until the alarm stops.
- Open the pressure plate using the handle.
- Place the film - emulsion side down - on the glass wedge.
- Close the pressure plate. Exposure follows automatically.
- Open the pressure plate and remove the film.
- Wait until cycle time alarm stops.
- Open the pressure plate for the next exposure and repeat the above cycle to produce more film wedges.
- Switch off the unit.

Remarks

Develop the film within reasonable delay, in order to avoid latent image drift.

Films cut in strips or formats have a notch for emulsion side identification. If the notch is at the top edge of the film in the right upper corner, you are facing the emulsion side of the film.



Installation

The unit is sturdy and can be transported without a risk of being damaged. Do not hold the unit by the handle of the pressure plate: use the side grips.

At installation the presence of a technician is not required. The :Avisense 2000 should be installed in a perfectly light-tight room. Any source of light interference must be excluded since no radiation sources between 400 nm and 1300 nm are allowed when exposing panchromatic films and panchromatic films with extended red sensitivity, such as :Aviphot Pan 80, Pan 200 and Pan 200S. Information on the spectral restrictions in dark room environment can be obtained from your film manufacturer.

Mains connection: the :Avisense 2000 has an internal power supply with power stabilisation. The power supply automatically adapts to the net frequency and mains voltage.



Warranty

The :Avisense 2000 sensitometer has a 2 years' warranty against failures (after date of invoice). On filter holders, wedges and other glass components the warranty is limited to 1 year after date of invoice.

Maintenance

No maintenance is required.

Recommendations:

Clean the housing with a damp cloth and - if necessary - a non-aggressive cleaning agent.

Keep the wedge and the light table underneath free of dust. To reach the light table (Fostec) release the catch on the left hand side of the wedge holder. Remove the holder and clean the light table. Place everything back in reverse order, but take care to slide in first the recess on the right hand side of the wedge holder.

Repair

If the sensitometer breaks down, it cannot be repaired on-site without altering the calibration values. Even exchanging a broken bulb can generate entirely different output values.

Defective units should be sent to Agfa HQ in Belgium for repair. In case of an urgency a replacement unit can be supplied.

Calibration

Environment

Calibrating the sensitometer is only meaningful if all other measuring equipment - primarily the densitometer - is also calibrated.

For applications where absolute sensitometry is aimed at, the use of professional densitometers is strongly recommended.

Densitometers should provide accurate measurements within pre-agreed tolerances. For performing densitometry on aerial film, only panchromatic cells can be used on the densitometer. Agfa HQ in Belgium has a certified lab and is able to generate standardised wedges for densitometer calibration. This lab can also calibrate densitometers against payment. If more than one densitometer is used within the same system, it is strongly recommended to have all units calibrated in the same calibration lab.

Calibrating the :Avisense 2000

Every :Avisense 2000 is delivered with a calibration sheet, issued by Agfa's ISO 9001 certified calibration lab.

This means that:

- Any measuring instrument used for performing the calibration is also calibrated to absolute light standards;
- Measurement procedures are always identical and based on international standards;
- Measuring results can be reproduced on request.

The calibration certificate also documents the wedge density values. If the wedge is replaced, a new calibration certificate has to be issued.

If a third party can provide the same quality guarantees, they can also calibrate the sensitometer light output and glass wedge density.

The calibration certificate is valid for 1 year. That does not mean that the light emission drifts over time, but a regular check is better to avoid long time accumulating effects. Ageing of the bulb and deposit of dust or smoke on elements of the optical path can have an impact on the light output results. Sensitometers should preferably not be installed in rooms where smoking is allowed. IR deposits create an additional density of 0.05D and the light output is reduced by 12%!

Standard calibration procedure includes calibration for one shutter/filter combination. Additional combinations will be invoiced separately.

The glossary of the calibration certificate includes:

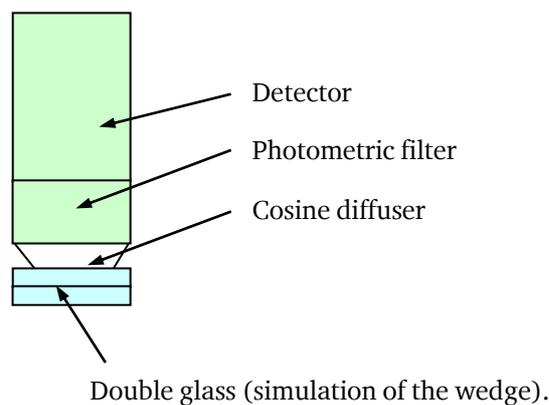
- Light output at the centre of the plane: average Lxs light output value over 30 measurements.
- Light divergence across the exposure plane: difference between centre and edges of the exposure plane. If this difference is too large, the shape of the sensitometric curve can be seriously influenced.
- Light output reliability: spreading in % of light output measurements at the centre of the plane over 30 measurements.
- Spectral emission quality: spectral energy spreading over the spectrum. Curve plotted against standard D60 daylight curve.
- Calibration accuracy: theoretical maximum measurement error due to tolerances on the measuring devices and calibration standards.

Important remark: Light output measurements

- Diffuse light is measured in radiometric units (mcs or lxs) by a photometer equipped with a probe. This probe has a diffuser cone and a visual filter. The light energy is measured on the film plane through clear glass replacing the wedge.
- Never measure light outputs of sources, which are not lying within the measuring range of the photometer. If a light source is too intense, the sensor head will get into saturation and the meter read-out will indicate wrong values. Check with an oscilloscope whether the measured pulse is in saturation.
- When measuring with a sensor head, the complete surface of the head should be exposed: the sensor may not be larger than the glass plate.

Alternative calibration labs

If you wish to have the :Avisense 2000 calibrated elsewhere, a “clear” glass in a wedge holder can be obtained at Agfa. This clear glass configuration has the same geometrical assembly as the wedge. It is a composition of a glass with the same thickness as the wedge and a glass with the same thickness as the covering glass. So, the light emitted via this “clear” glass can be used for light output measurement, providing the probe head is not wider than the clear glass area.



Measuring the density values of the wedge of the :Avisense 2000 can also be performed by zero-ing the densitometer on the clear glass wedge. The densitometer needs to be “nulled” on a clear glass base with the same optical geometry as the wedge itself. Otherwise wrong density measurements will occur.

Ordering additional filter inserts

The :Avisense 2000 comes with a filter insert which attenuates the light emission to approximately 1 lxs (or 1 mcs) at the film surface. Additional filters for other light attenuation values can be ordered. When ordering, always specify how much light (expressed in log it units or DIN/ASA values) less or more should reach the film plane. When ordering additional filters it is imperative that the original filter insert is sent to Agfa HQ to define the density values of the additional inserts.

Technical specifications

Dimensions	65 x 30 x 24 cm
Weight	17 kg
Exposure area	210 x 15 mm
Exposure time	2 to 3 ms (1/500 to 1/300 s) measured between -3dB points of the flash emission
Light output	Tuned to approx. 1 lxs
Reproducibility	Max. 2% difference between 2 flashes
Evenness	Max. 4% of light output difference
Cycle time	Audible signal when not ready
Mains voltage	Auro-ranging 98 - 132 V - 50/60 cycles 185 - 264 V - 50/60 cycles
Ambient temperature	Storage temperature between -20°C and +80°C Operating temperature between -10°C and +40°C
Safety label	CE label
Radio interference	Class A

Contact

For the calibration of your :Avisense 2000 please contact:

Agfa-Gevaert N.V.

Aerial Department, ext. 4295

Bulding 71, 4th floor.

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