OptoLeaf

Solar Radiation Film

OptoLeaf Solar Radiation Film provides a measure of the total photon dose received by a surface over intervals of days to weeks. The degree and rate of colour fading of the film are used to calculate the integrated amount of solar radiation or light quanta received. The small size and low cost of the film allows multiple measurements to be made simultaneously where the use of light sensors and meters would be prohibitive. A handheld meter is available for measurements in the field.

Features

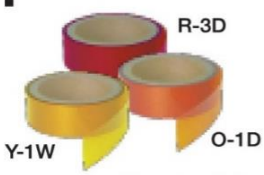
- The small and lightweight film that can be placed anywhere (terrestrial and aquatic environments)
- Convenient multipoint measurements can be made simultaneously
- The integrated photon dose and total amount of solar radiation can be measured
- The small size of film needed keeps the cost low

OptoLeaf can be placed on leaf surfaces of plants.

Examples of use of OptoLeaf

- Measurements of solar radiation at plant leaf surfaces within plantations, crops and forests
- Measurements of solar radiation inside greenhouses (a calibration curve in the greenhouse is required)
- Measurements of solar radiation reaching plants and algae in aquatic environments
- Measurements of water turbidity based on the amount of solar radiation penetrating the water column
- Solar radiation measurements on building surfaces variously exposed to sunlight or building shadow
- Measurement of solar radiation on the surface of human bodies

OptoLeaf 35mm x 10m (W x L/roll)



Product No.	Type	Measurement period as a guideline
R-3D (Red-3Days)	Standard type	3 to 7 days
Y-1W (Yellow-1Week)	Long-term measurement type	1 to 3 weeks
O-1D (Orange-1Day)	Short-term measurement type	1 to 3 days

【Cautions】To obtain the OptoLeaf color fade degree, an instrument to measure the absorbance of OptoLeaf is necessary.

OptoLeaf measuring instrument

As the OptoLeaf-dedicated compact absorbance measuring instrument, the absorbance (D) of OptoLeaf can be obtained anytime and anywhere with ease. This instrument is suitable for use in fieldwork because it is compact, light, and convenient to carry.
Simplified operations of the instrument are convenient for measurements in large quantities with OptoLeaf.

* The integrated amount of solar radiation is obtained with use of OptoLeaf color fade curves (calibration curves).

D-Meter RYO-470

- Absorbance (D) displayable
- Simple operation
- 2 AA batteries used
- Compact and light-weight (approx. 250 g: batteries included)

Dimensions: 90 x 35 x 135 (W x H x D) (mm)
Weight: Approx. 250g (2 AA batteries included)

大成ファインケミカル株式会社
Taisei Fine Chemical Co., Ltd.

How to Use OptoLeaf

1. Select the film type to be used based on the estimated length of exposure (see Table 1. below).
2. In a dimly lit room, write a code number on the lower edge of each 20mm strip before cutting strips from the roll. This marked side orients the strip and will be placed away from the sun, with the inner surface being exposed to the light. Prior to deployment, protect cut strips from light by placing in a lightproof container. Aluminium foil may be used.
3. Before starting the experiment, record the absorbance value for each coded strip by placing strips in the film holder and sliding the holder into the D-Meter.
4. Remove strip from holder and orient film so code number is on the underside and inner surface of the tape will be exposed to the light. (eg. No. I will appear as I .oИ when placed in the correct orientation for exposure). Place strip on surface to be measured and affix strip to surface.
5. After sufficient periods of exposure (based on times in Table 1 below), collect strips and measure absorbance. If exposure is not within the recommended times, absorbance readings will not be accurate.
6. Calculate the colour fade rate for the film type using the appropriate formula for the film type used as given in Table 2 below.
7. Use the calculated colour fade rate to calculate the integrated amount of solar radiation received by the sample.

If exposure period has not reached the maximum time, the strips can be used again.

Measurement period (period required for color fading) Table 1

Product No.	Summer/fair weather	Summer/cloudy weather Winter/fair weather	Winter/fair weather
R-3D (Red-3Days)	1 to 2 days	2 to 5 days	4 to 8 days
Y-1W (Yellow-1Week)	3 to 7 days	5 to 14 days	1 to 3 weeks
O-1D (Orange-1Day)	0.5 to 1 days	1 to 2 days	2 to 4 days

The periods described above are guidelines.
Adjustment is necessary depending on measurement conditions.

Fading rate formula Table 2

Product No.	Max absorbance wavelength	Fading rate formula Fading rate (%)
R-3D	521nm	$\log_{10}(D/D_0\times100)$
Y-1W	468nm	$D/D_0\times100$
O-1D	492nm	$D/D_0\times100$ Range 30-90%

D_0 = absorbance at the beginning (before exposure)
D = absorbance after exposure

Cautions
- OptoLeaf has front and back surfaces. The inner side of a roll is the exposure surface. Please use it by setting the exposure side to the solar radiation side. (If it is used with the reverse surface, correct measurements cannot be performed due to value errors.)
- Finish the OptoLeaf exposure so that the absorbance is not less than 0.6. If the absorbance is less than 0.6, correct measurements cannot be performed. (A standard initial value at the time of manufacturing: 2.0±0.2)

大成ファインケミカル株式会社
Taisei Fine Chemical Co., Ltd.
Function product Division
3-5-1, Nishi-shinkoiwa, Katsushika-ku,
Tokyo 124-8535, JAPAN
http://www.taisei-fc.co.jp

Distributed by:

Aquation
Water Quality • Plant Health • Environment Assessment
Aquation Pty Ltd
PO Box 3146, Umina Beach NSW 2257
Australia
ABN: 97 127 430 184
www.aquation.com.au, info@aquation.com.au
+61 4 0008 8662