Light Meter

(PK932)

Introduction

This light meter is a pocket-sized, portable, light-sensitive instrument capable of reading illumination up to 5000 foot-candles (lumens per square foot).

The logarithmic response of this light meter provides the operator with accurate meter deflection and easy reading at all light intensities.

A clear epoxy dome is affixed over the cell as a permanent protective feature to assure maximum durability.

The light meter incorporates a silicon photovoltaic cell that converts radiant light energy into electrical energy, eliminating the need for a battery. The photovoltaic cell exhibits a fast reading and has a stable, linear and reproducible output per light intensity. The cell displays no fatigue and has unlimited life expectancy. (The photovoltaic cell used is superior to light meters using selenium cells in efficiency, stability and lack of fatigue.)

The light requirements listed were compiled from materials supplied by the U.S. Department of Agriculture (USDA) and other authoritative sources. For specific recommended light intensities of plants not listed here, or for additional specific information on a particular plant, contact the USDA (www.usda.gov).

Light Intensity

Of all the limiting factors in photosynthesis, light intensity is the most important. The light of full sun on a clear day is approximately 10,000 foot-candles. *(A foot-candle is the amount of light cast by one candle at the distance of one foot.)*

The rate of photosynthesis is proportional to the light intensity received by the leaf to a maximum of 5000 foot-candles. At 5000 foot-candles, most plants are at 100% efficiency and light intensity levels above this measurement are of little benefit and can only cause heat exhaustion and undue drying of a plant. Therefore, the light meter has been calibrated to 5000 foot-candles.

High-Intensity Lighting

High intensity (also known as HID) systems utilize large bulbs that contain inner arc tubes that contain various gases and metal salts. When energized, these gases produce intense light that is sun-like and many times brighter than fluorescent or incandescent bulbs. High-intensity light is beneficial to plants because it occupies the region of the color spectrum that, like sunlight, fuels the process of photosynthesis. The two main types of HID lamps are halide and sodium. Standard halide lamps produce light in the white/blue region of the spectrum. This color of light encourages vegetative growth and root development. Sodium lamps produce light in the yellow/red/orange areas of the spectrum, the range that stimulates flowering and fruit production.

The output of HID bulbs diminishes gradually over time with use, but the human eye cannot discern this reduced output. Therefore, it is important that users have a way to measure the ongoing foot-candle readings from their lamp in order to know when its output has declined to the point where replacement is recommended. That is where the light meter comes in — it gives the indoor gardener an effective way of checking light output throughout the bulb's life.

Agrosun® Halides

Agrosun halides blend powerful halide light with light in the orange and red color range, resulting in a full-spectrum bulb that can be used for start-to-finish growing. There's plenty of blue light for growth in all halides, but until now, they lacked sufficient red light to maximize flowering and fruiting. Now that's all changed, because the spectrum-enhanced Agrosun bulbs provide more red than common halides.

Plants Grown under Grow Lights

If a grow light is purchased, be sure that it emits the full spectrum of light when compared to sunlight. With a grow light emitting the full spectrum, plants can be grown successfully. They reach proper maturity when exposed to a maximum light intensity for a specific period of time. (Intensity of about 1000-foot-candles is minimum.) The recommended minimum daily quantity of light is 10,000 foot-candle hours, which is the light intensity reading multiplied by the duration of exposure in hours.

The use of high-intensity lighting fixtures, such as halide and sodium (for indoor plants requiring higher intensities than can be supplied by fluorescent fixtures), has proven to be the best source of light that the serious gardener can utilize for optimum plant growth.

Photoperiodism

Photoperiodism is the length of time a plant is exposed to light. Plants of our temperate zone can be categorized into short-day, neutral and long-day plants. The dividing line between day lengths favorable to vegetative growth and those tending to cause seed and flower formation is called the critical light period. For most species the critical light period is between 14 and 16 hours. The intensity of the light and the duration of exposure combine to let us know the quantity of light received by the plant. Multiplying the number of foot-candles by the number of hours will give you foot-candle-hours, as shown in the lighting recommendations.

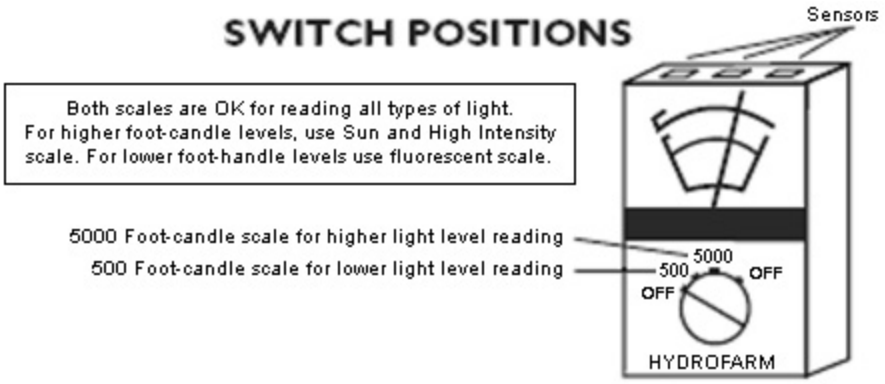
Light Meter Specifications

Power Source	Lifetime Photovoltaic Cells
Foot-Candle Scale	0 to 5000 for sun and HID
	0 to 500 for fluorescent
Multiplier	10X on both scales
Accuracy	±2%

Operating Instructions

To measure illumination:
To determine the level of illumination on the surface of a leaf, hold the light meter near leaf level.

Avoid positioning your hand or body in such a way that it blocks, inhibits or reflects light.



Lighting Recommendations

These recommendations are approximations. Most plants will grow under variable light intensities but may not perform as expected without optimum lighting.

Maximum Foot-Candle Hours per Day: 50,000
Minimum Foot-Candle Hours per Day: 20,000

This category of plants will thrive in full sunlight for medium to short time periods. Eastern and Southern exposures are preferred.

Bulbs	**Flowering Plants**	**Foliage Plants**
Amaryllis	Lilies	Aloe Vera
Caladium	Chrysanthemum	Anthurium
Daffodil	Begonia	Bottle Palm
Agapanthus	Gerbera	Coleus
Anemone	Geranium	Euphorbia
Calla Lily	Mini Roses	Fatsia
Freesia	Gloriosa	Herbs
Ixia	Bird-of-Paradise	Blood Leaf
Hyacinth	Poinsettia	Kalanchoe
Clover	Shrimp Plant	Cactus
Tulip	Annuals	Saxifraga
Ranunculus		Sedum
Society Garlic		Stone Plant
Crocosmia		Stachys
Blood Lily		Wax Plant

Maximum Foot-Candle Hours per Day: 37,500
Minimum Foot-Candle Hours per Day: 15,000

This category requires bright light, with Eastern and Western exposures preferred.

Bulbs	Flowering Plants	Foliage Plants
Caladium	Achimenes	Asparagus
Clivia	Anemone	Begonia
Daffodil	Zygocactus	Bromeliad
Hyacinth	Calceolaria	Coleus
Narcissus	Cineraria	False Aralia
Tulip	Crossandra	Dracaena
Freesia	Cyclamen	Hedera
	Orchids	Liriope
	Gloxinia	Yucca
	Impatiens	Palms
	Lipstick Vine	Philodendron
	African Violet	Pothos
		Spathiphyllum
		Pilea
		Prayer Plant
		Snake Plant
		Swedish Ivy
		Sedum Pearls
		Zebra Plant
		Zebrina

Maximum Foot-Candle Hours per Day: 27,500
Minimum Foot-Candle Hours per Day: 10,000

Plants grown within this category thrive on bright indirect light with no direct sunlight. Northern exposures are preferred. Subdued light by screening lightweight curtain will be adequate at Eastern, Southern to Western exposures.

Flowering Plants	Foliage Plants
Achimenes	Acorus
African Violet	Anthurium
Impatiens	Asparagus
Easter Cactus	Cissus
Primula	Dracaena
Peruvian Violets	Dieffenbachia
Kafir Lily	Palms
	Peperomia
	Prayer Plant
	Pothos
	Syngonium

Information provided by the manufacturer.