Rentokil Initial

Light measurement for interior landscapes

Introduction

This leaflet is all about measuring light. Measuring light properly means that you will make fewer mistakes when designing a plant display. This means that plants will live longer, displays will be more attractive and there will be fewer service and maintenance problems.

This leaflet does not explain the details of photosynthesis and the reasons that some plants have different light requirements than others. Also, this leaflet does not tell you the light levels required by different plants. That depends on where and how they are grown and acclimatized. Recommendations for the light requirements of individual indoor plant species are available from growers and from trade associations such as ALCA, eFIG and BALI. ***Such recommendations vary considerably from country to country and from grower to grower.***

What this leafelt DOES explain is how to measure light levels correctly so that you have the confidence to put the right plant in the right place.

Measuring light levels

Different types of measurement

Light can be measured in several different ways, including the energy of the light, the quantity of light or the brightness of the light. Light meters are available that measure light in all these forms, but for our purposes, you only need to consider brightness (illumination).

The brightness of light as experienced by the eye (illumination) is measured in **lux** (foot candles in the USA. 1 lux = 0.093 foot candles, which means that there are approximately 10 lux to 1 foot candle). ***This is the form of light measurement that most interior landscapers, including Rentokil Tropical Plants, and architects use.***

What do we use to measure light?

The only way to accurately measure light is to use a light meter. NEVER rely on your eyes and your judgement about the light levels in a room, because your eyes adapt very quickly. No matter how

much experience you have in specifying plants, you can never trust your eyes alone when making a decision about light levels.

The type of light meter you choose is important. The best type of light meter for our purpose is a digital light meter that measures in **lux** and has a range of **0 - 100,000 lux**. These are available from many good electronics suppliers and are relatively inexpensive. A good example of the recommended type of light meter is shown on the first page.

How to use your light meter

Light meters, like any other scientific instrument are totally objective. They can only tell you how much light there is at the centre of the sensor at the time of the measurement. They cannot make allowances for the time of day, the direction of the sun or the type of window blinds that might be in place. However, they are fairly simple to use, just as long as you follow some straightforward rules.

1. Always hold the sensor of the light meter horizontally. Make sure you are not holding the sensor in your own shadow.

2. Measure the light precisely where the plant is going to be, not just in the general area. A difference of a few centimetres might make be the difference between high light and medium light. **Remember**, natural light may fall by more than 50% for every metre that you move away from a window. This should also be considered before moving a plant to a new position. Also, many ceiling lights distribute their light unevenly. A plant directly underneath a light will receive considerably more light than one offset by as little as 20 cm.

3. The contribution made by artificial lighting should be assessed. You can do this by taking readings with the lights both on and off. In most office situations, artifical light is the main source of light (often more than 90% of the available light), in which case it is important that the building users understand the need to keep the lights on during the day. In atriums, however, daylight will make a far greater contribution to the overall amount of light the plants will receive.

4. In atriums, allowance must be made for the time of year that readings are taken. If the light level on a bright summer's day is just enough to support a particular species it will probably struggle to survive in the winter months. The tracking of the sun across the sky will ensure that at some point in time, almost every part of the building interior will experience direct illumination, although for most of the time, high levels of indirect illumination will occur.

5. With large plants, light levels in both the upper canopy and lower branches should be taken into account.

6. Dust and grime on the surface of leaves can greatly reduce their ability to absorb light. Regular cleaning is therefore very important, especially in low light levels.

Building effects

The light that reaches a plant in a building is made up of a lot of complex interacting components. The total illumination reaching individual plants in a building is the amount of artificial illumination inside the building (e.g. ceiling lights) added to the daylight that eventually reaches the plant from outside. In most office buildings, the contribution made by daylight is insignificant and can, in most cases, be ignored (see point 3 above). However, if the building has large areas of glass, e.g. an atrium, then the building effect should be considered.

The aspect of a building will also have an effect on the amount of daylight reaching the plants inside. For example, East facing aspects will be in shade for much of the afternoon, West facing aspects for much of the morning, so you must take this into account when taking your light readings. To be on the safe side, take your readings within an hour or two of midday as this is the average position of the sun during the day. Any shadow cast by the building can then be regarded as being part of the building for the purposes of light measurement.

Whilst the absolute quantity of daylight reaching a plant varies over time, experiments have shown that the proportion of daylight transmitted to the plant appears to be constant. This ratio is referred to as the 'Building Effect Coefficient' and is very helpful when making accurate light measurements inside a building where daylight is a significant source of light. Details of how to predict the amount of light inside such a building using the 'Building Effect Coefficient' can be obtained by contacting Rentokil Initial's Research and Development department at the address at the foot of this page, or by e-mailing info@plants-in-buildings.com .