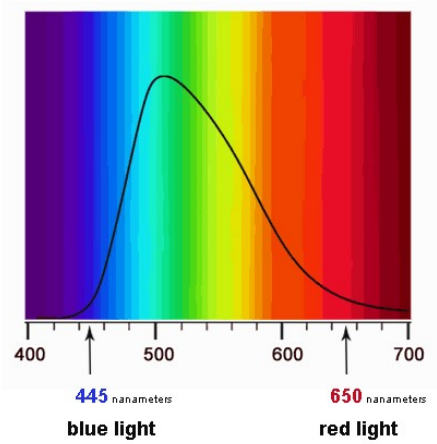
Cannabis Growing guide - Light

Plant growth involves the conversion of light energy into plant-building materials (photosynthesis). Two factors are important for optimal growth. In the first place, the light intensity. Light intensity is expressed in 'lumens'. At least 50,000 lumens are needed for growing indoors. It's not sufficient to add up the number of lumens listed by the manufacturer for each lamp. The total number of lumens given off is depends strongly upon good reflection, and proper connecting fixtures and starter ballasts for the lamps. The quality of the reflector used, and the connecting fixtures and ballasts determine the light yield for the greatest extent. For those reasons, self-built sets and home-designed illumination often deliver a lot less light yield than lamps being used in professional horticulture. We can improve the light yield in our grow room by applying reflective material. (We don't paint the walls of the room matt white, and used reflector caps for the lamps for nothing!) The second important factor is the wavelength of the light. For the production of chlorophyll, and an optimum photosynthetic reaction, light from the blue spectrum (445 nanometres), and light from the red spectrum (650 nanometres) is necessary. Blue light ensures optimal phototropism. Phototropism is the phenomenon which causes plants to grow towards the light, and to spread their leaves in such a way to receive the most light.



We prefer high-pressure sodium lamps, and Metal Halides for illumination. Ordinary light bulbs are not suited for cannabis-growing due to their considerably short life span, and principally due to their low light yield. Halogen lamps are not advisable for the same reasons. Fluorescent lamps are not appropriate for home growing. They do serve well, however, to stimulate seedlings and cuttings to set root. For actual growing, we stick to gas discharge lamps in the form of high-pressure- sodium, and metal halide lamps. There are lamps being sold which emit both the wavelengths needed (blue and red) or one can use separate lamps in a 1:3 proportion (1 lamp for blue light with 3 for red light). The combination lamps give off a lower amount of lumens, since they have to emit different wavelengths. This counts for growing: the more lumens, the greater the yield. This doesn't mean we can install an unlimited number of lamps. Other factors must be considered. Using many lamps means a higher temperature (the heat must be discharged of), a greater need for fresh air (containing CO2), and a greater need for water and feeding. Always remember the law of minimums. Depending on the size of

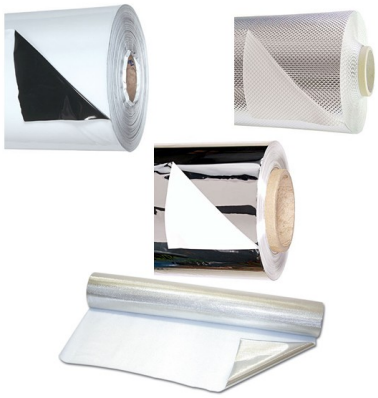
the garden, we use 400 Watt lamps or 600 Watt lamps. This choice is made in such a way that all the plants in the garden area can be illuminated as evenly as possible. By using 400 W lamps, you can put up one-and-a-half times as many lamps for the same electricity use as when using 600 watt lamps. Also 1000 watt lamps are being sold but proper reflectors for these types of lamps are not available. The result is a disproportionately large loss of yield. Moreover, 1000 Watt lamps give off more heat. Therefore they must be hung high above the plants, and this means more loss of light yield plays in the question. 1000 Watt lamps, with respect to 400 and 600 Watt lamps, mostly cause pain in your wallet, because the electricity bill gets higher. In practice, it is possible to reach a light yield of 70-90% of the lumens which are emitted. For that, (it can't be stressed enough), good reflection is necessary.Below is a chart with data for several reflective materials:

Examples of High-Pressure-Sodium and Metal halide bulbs

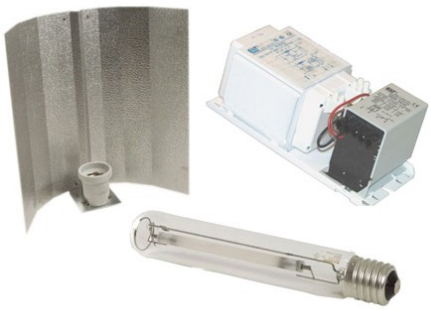
Reflectivity in %

* Reflective plastic sheet 90-95
* Matt white paint 85-90
* Semi-matt white paint 75-80
* Matt yellow paint 70-80
* Aluminium foil 70-75
* Black paint less than 10

Using proper reflective material, proper connecting fixtures ballast equipment, proper reflector caps with the lamps, and a distance from the lamps to the plants of 40 to 60 centimetres, 400 Watt lamps deliver, on average, between 35,000 and 47,500 lumens, and 600 Watt lamps between 60,000 and 80,000 lumens (at a distance of 50-70 centimetres). The distance between the plants and the lamps differs because 600 W lamps give off more heat. If the plants are to close to the lamps, they will dry out and burn. 600 Watt lamps are preferred, because you get the highest light yield for the lowest electricity cost. Though they do require more careful climate control.



The life span of a high-pressure sodium lamp is approximately 2 years when it's used 18 hours a day. The lamps are, however, subject to decay, which lessens the light yield, and we advise changing your bulbs once every year for optimum yields. In practice, it appears that high-pressure sodium lamps give optimal results for 4 to 5 harvests. After those, it's advisable to replace them. It seems that the installation of one 600 Watt sodium lamp per m2 is enough to achieve good results, however up to 900 Watts per m2 is currently being used by some advanced growers and record yields are continuously being broken. Principally one can say 'the more light, the better', but with more illumination, the control of other factors (namely, temperature control) becomes a problem. Indoor growers work with their light source close to the plants. Considering the light yield of the sun, (hundreds of thousands of lumens, but a little further away), fewer lumens are needed for growing indoors. The high pressure sodium lamps provide light from the red spectrum.This light is used mainly for flowering. A metal halide lamp emits a blue spectrum. This light is used principally during growth.



The advantage of growing cannabis indoors is the fact that you can give the plants the feeling that it's their flowering season all year round. You're not dependent on the weather or the season. We distinguish 2 separate phases in plant cultivation: the growth- or vegetative phase, and the flowering- or generative phase. A light period of 18 hours and a dark period of 6 hours are ideal for the vegetative phase. We only have to give the plants the idea that the days are getting shorter ('autumn'; for cannabis, the sign to flower). We do that by making the light and the dark periods the same length; - 12 hours. In principle, cannabis is an annual plant. The entire life cycle, from seed to death, takes place in one year in nature. When growing cannabis under artificial light, it is possible to force flowering earlier than in nature. After 4 or 5 days vegetative phase, flowering can be 'provoked'. We do that the moment the clones have visibly started to grow. Two or three weeks after the

light period is reduced to 12 hours, the plants begin to flower. It's very important not to interrupt the dark period. If the plants receive light during the 12-hour dark period, they 'get confused'; they want to continue growing, and the blooming phase is postponed. This is especially true for the first 3 to 4 weeks of flowering. The flowering phase lasts 60 days or longer, depending on the variety you're growing. When working with cuttings, it's possible to harvest 4 to 5 times a year.