



THE IMPORTANCE OF LIGHTING IN THE WORK PLACE

Introduction : Lighting represents one of the most important environmental factors needed to ensure the well-being in the work place.

The light produced by our halogen lamps is in the colour gradation of white (3.800 – 4.200°K). This is also called **cold light** and is considered to be the most suitable for work environments. This light guarantees a complete vision of colours and particulars/details. The balance maintained between wave lengths of various gradations in the solar spectrum results in an undisturbed and constant gaze of illuminated objects without putting strain on the eyes. To protect your vision, we recommend the use of light bulbs which yield the highest number of chromatics--- between 90 and 100 on the CIE scale if 100 represents the maximum yield of sampled sources. This is comparable to the chromatic yield of natural light that guarantees the true reading of colours.

Temperatures verified on our lampholders after constant use are very low due to the self-ventilation of the light bulb.

- they can be used in any position
- they can be used at temperatures between – 10° and + 45°

The luminous efficiency in technical Lumen/Watt terms optimizes the advanced technology of these lamps. This is due to the light they produce compared to their energy consumption. The efficiency is noteworthy due to the relationship between yielded power and absorbed power which is very low. In detail :

- luminous efficiency = 25/1 lm/W
- chromatic yield = 100 Ra
- light flow = 3.2+ -0.3 Klm

The variation in light brightness, in relation to the electrical current, changes in direct proportion to its use.

The life of a light bulb, in relation to the electrical voltage, varies in accordance with the exponential quadratic law.

Besides the energy aspect, we have evaluated the qualitative parameters and also the economical/financial aspects. In particular, we have focused on the three components which cost the most upon installation:

- A – financial responsibility due to the amortisation of the system
- B – energy/electrical costs
- C – maintenance costs



A)The lamp varies in cost from US \$31.50 to US \$80.00 on standard models and can reach up to US \$224.00 for special items such as fibre optic illumination, and depending upon the type of machine, the cost of the machine on which the lamp will subsequently be mounted, etc. Other considerations include:

- **Added Value** --- an inexpensive machine will most certainly be mounted with a less expensive lamp, costing the company more money in the future. New machines, especially if intended for constant/frequent use, will be mounted with high-quality lamps and light bulbs resulting in saved time, maximum chromatic and voltage yields and, above all, **REDUCTION IN AMORTISATION**. The more you are able to use your lamps, the shorter time it will take to recover the initial costs.
- **Lighting Requirements**---one must carefully consider the lighting needs if a work place is poorly or inadequately illuminated. Other lighting choices are necessary for work surfaces that move or where there are manipulations, rotations and vibrations. For these, we advise a filament light bulb, such as an incandescent bulb. Of all light bulbs, the ones which yield the best are those with iodine or halogen gas compared to the neon ones which can cause the so-called “stroboscopic effect.” These are very dangerous and are severely prohibited in technologically advanced countries.

B)The cost of a lamp mounted on a machine produces light equal to the length of time the machine is in operation. If we calculate the average number of work hours (8) per day with the average number of workdays (220) per year, the lamp is switched on for 1760 hours (in accordance with Italian law). If we also calculate the average voltage absorbed at 10W, the lamp consumes 17600W equal to 80KWh times the variable cost from zone to zone. The average lamp costs, then, between US \$7.00 and US \$15.50 per year. This is an insignificant cost if we consider all advantages the lamp can guarantee during its lifespan.

c) The lifespan of a light bulb is 2000hrs for the double plug ones, 3000hrs dichroic light bulbs, and 6000hrs for titanium light bulbs. The maintenance cost of our lamp holders is directly related to the bulb’s lifespan. Considering the average annual cost of US \$2.25 for a light bulb lasting an average of 2.000hrs, we can easily understand that the actual cost is less than US \$2.25 per year.



To understand the advantages of having the right light in the right place one must consider the following factors :

- **TIREDFNESS OF THE OPERATOR** ---It has been repeatedly and scientifically proven that **after four hours of work, there is an approximate 30% reduction in labour for each operator working in poorly or badly illuminated areas.** This results in an ECONOMIC LOSS TO THE COMPANY of APPROXIMATELY US \$10.75.- Lit PER OPERATOR PER WORKDAY. This amount can be halved if you have the right light in the right place.
- **MATERIAL WASTE**---Poorly finished or discarded end products are an obvious, economical damage to companies, varying upon the skill required from the operators. Especially in the apparel industry, and more specifically on those using sewing machines, industries require constant attention of their operators to ensure quality workmanship. This attention will suffer if the operator is working under a poorly illuminated work environment resulting up to 10% FINANCIAL DAILY LOSS on production. Material waste and discarded goods can be almost fully eliminated if the right lamps and light bulbs are used
- **ACCIDENTS IN THE WORKPLACE**--- POORLY ILLUMINATED WORKPLACES have been proven to be the main cause of the HIGH PERCENTAGE OF JOB ACCIDENTS. An INJURED EMPLOYEE CAUSES DAMAGE TO HIS COMPANY EQUAL TO 60% OF HIS GROSS DAILY WAGE DURING THE FIRST THREE DAYS FOLLOWING AN ACCIDENT. Responsible companies provide a safe work environment for their employees.

OTHER ADVANTAGES:

- easy maintenance*
- easy assembling*
- reduced costs for total work place illumination*

IT IS EASILY UNDERSTOOD THAT IF A LAMP IS USED FOR THE SPECIFIC ILLUMINATION OF A WORK PLACE FOR 8 HOURS PER DAY, IT WILL AMMORTISE ITSELF SHORTLY AS WELL AS IMPROVE THE QUALITY OF LABOUR, WORKMANSHIP, AND ENVIRONMENT.