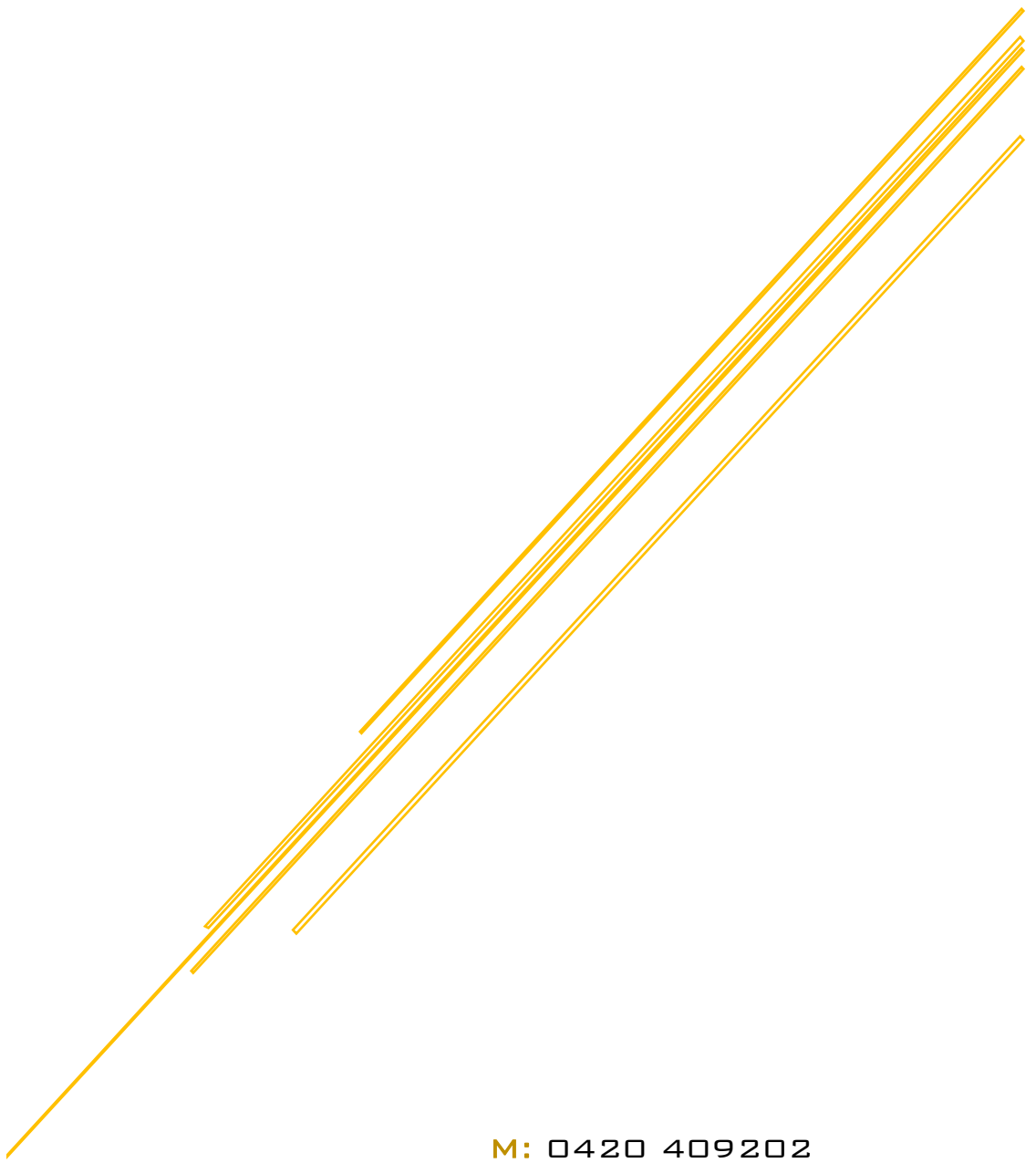




ILLUMINATION
SYSTEMS
A U S T R A L I A

COMPANY OVERVIEW



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REC: 30969



WHO WE ARE & WHAT WE DO

Illumination Systems Australia is a Registered Electrical Contractor (REC 30969) incorporating over 40 years' combined experience in the electrical industry with a dedicated focus of providing service and support to the Australian lighting industry.

In the ever-changing world of LED lighting which has seen it revolutionize the way we illuminate such important places in our lives, such as homes, work spaces, warehouses, retail outlets, hospitality venues, sporting fields and many more, it is becoming increasingly apparent there is a growing need for the servicing and repair of LED lighting and not just simply replacing old with new.

Whilst there are many lighting companies throughout Australia that manufacture LED light fittings of all shapes and sizes, there is a lack of knowledge and understanding of how these fittings operate and what their full potential is when applied correctly.

Illumination Systems Australia undertook extensive research and training to better understand the intricate nature regarding the fundamentals of LED lighting and it's ever changing technology with a particular focus on repairs and maintenance in this rapidly evolving market. The vast majority of LED light fittings that have been installed, particularly in commercial and industrial premises, are solid-state devices meaning that simply replacing a blown globe is not applicable anymore with nearly all businesses (and some households) not knowing what to do once an LED light fitting no longer works. Illumination Systems Australia is able to provide a truly unique service to any person or business out there who has invested in LED lighting and wants to reduce maintenance costs.

The cost savings in having LED lighting repaired vastly outweighs (in most cases), the need to simply replace it with a new one.

It's true, LED lighting offers longer life expectancy, reduced power consumption, positive environmental impacts and has become the lighting of choice for so many, and will continue to do so as older methods of lighting are phased out over time, however simply replacing a faulty fitting with a new one is costly to the consumer, un-necessary in many cases and can become (over time) harmful to the environment if not disposed of correctly.

Repairs and maintenance of LED lighting is something that is not recognised at present but will become ever so important in years to come with warranty periods expiring and the installation of poor-quality fittings which has seen our market flooded with in recent years.

Illuminations Systems Australia can also provide other electrical services if requested however this is not the main focus.

Whilst we are dedicated to the ever-changing world of lighting, we can provide general electrical services which include but are not limited to:

ISA SERVICES

• General Light & Power	• Data & Communications
• Commercial Construction	• Refurbishments & Alterations
• Maintenance & Service	• Thermal Imaging & Reporting
• Fault Finding & Repair	• Switchboard Upgrades
• Emergency Lighting Testing & Maintenance	• Testing and tagging of Equipment

ISA KEY SERVICES

• LED Lighting Repairs	• Lighting Audits
• Lighting Upgrades and Installation	• Lighting Control Systems & Automation
• Lighting Design, Calculations & Compliance	• Product Support
• Human Centric Lighting	• Sustainable Lighting

ASK YOURSELF

Do I have lighting concerns in my workplace or office...???

This question can incorporate many aspects of your current lighting environment and may include:

- Inadequate illumination – this may be caused by an insufficient number of light fittings, deterioration of lumen output or failed luminaires.
- Excessive illumination – in opposition to the above which results in excessive glare and reflection within the workspace.
- Lack of Uniformity – this results in dull or dark spots throughout the work area.
- Incorrect luminaire selection – this is a common problem as in many cases the fitting is chosen for aesthetics and not functionality or purpose.
- Incorrect CCT – this is known as “Correlated Colour Temperature” and is the colour of the light output. These colours are commonly known as Warm White, Day/Neutral White and Cool White and if installed without thought and consideration, can have adverse effects on the illumination of a given area.
- Lights being left on – this is a concern in large open spaces where a single switch (or group of switches) controls banks of lights and are not physically switched off. This results in energy wastage and excess power consumption resulting in costly electricity bills. More importantly, this has a negative environmental impact with increased carbon emissions. This is easily rectified through the use of lighting control with more information on this under our Lighting Control tab.
- Flicker - Flicker is problematic because it quickly causes eye strain and induces headaches. Flicker is especially dangerous around moving machinery. Flickering light may make the machine appear to be moving slower than it actually is, or may make it appear to have stopped when it hasn't.

A very important consideration to the above is Occupational Health and Safety. This cannot be ignored under current OHS laws and legislation and the effects of inadequate lighting may cause:

- Trip/slip hazards
- Difficulty in reading paperwork
- Poorly lit ingress/egress to work areas
- Health impact – headache, eye irritation, tiredness
- Unsafe evacuation in the event of emergency
- Incorrect operation of machinery



Illumination Systems Australia can carry out lux level assessments which includes measurement of current lighting levels and comparing them to the recommended levels as set out in Australian Standard AS/NZS 1680.1:2006. Upon completion of the site audit, a fully detailed report on the condition of your workplace lighting will be submitted along with recommendations on how to rectify any issues that may be found.

In the event that rectifications are required to be carried out, Illumination Systems Australia can provide solutions and pricing based on what needs to be done and effectively can be your one point of call. Alternatively, if you would like to seek pricing from another company or engage your usual service/contracting company then we would be more than happy to assist to ensure the desired result is carried out effectively.

LIGHTING CONTROL

Lighting control systems provide the right amount of light, at the right colour, in the required place, at the appropriate time. The result is a dynamic, flexible and multi-faceted space that complements a building's ambience and use. A lighting control system consists of a network of devices such as lamps, sensors, switches - that lets you set the lighting in a nominated workspace/area to your exact needs. Lighting control can be integrated into your building's electrical system or, thanks to new and ever evolving technology, operated wirelessly over frequencies similar to your broadband connection.

Lighting control systems offer businesses and workplaces many benefits:

- Ecological and Cost
- Low Maintenance
- Design
- Flexibility
- Better Lighting



These benefits are explained further below.....

ECOLOGICAL AND COST

It goes without saying a building that is more environmentally efficient doesn't just better the planet, it saves you money. Lighting can use up to 40% of energy in commercial premises, depending on the nature of the business and type of lighting used. Street and public lighting is the single largest source of carbon emissions for local governments. Having a better control of your lighting can reduce costs by 30-50% and significantly reduce carbon emissions at the same time, while new lighting technologies can reduce energy bills by as much as 80%. All this makes for a compelling argument for better-managed lighting output. Lighting control systems enable more efficient use of electrical energy and entire sections can be managed in accordance to use, while management of consumption and billing is made far easier. Faults can be automatically reported (with a monitored system) and rooms that are unoccupied no longer waste energy.

LOW MAINTENANCE

As technology and engineering has progressed significantly over the last few decades, many are surprised to find the kind of innovations lighting control systems now offer. Tablet and smartphone apps are a more frequent sight, but lesser known innovations, such as wireless switches, are equally as beneficial. Designed to control appliances and lights without the need for complex cabling systems, these signal-based controls are revolutionising how people light their homes and businesses. One of the many benefits of a wireless switch is of course the fact they can be installed with relatively low levels of disruption. This is particularly popular with heritage buildings that are bound by red tape, or for those for whom short maintenance periods are essential, such as hotels. Wireless switches and sensors are also ideal for establishments that have difficulty in the installation of new cabling. Mobile and tablet apps are also making managing one's lighting control systems all the more flexible and efficient.

DESIGN

The days of complex design and cumbersome hardware are over. Today, lighting control system panels are crafted to blend in as seamlessly as possible with the design schemes and layout of a building. These developments, paired with an ongoing commitment to design and flexibility, offer even greater options to users. From antique brass to sleek modern finishes and even transparent panels, lighting control systems can enhance the design of a room in more ways than light alone.

FLEXIBILITY

Innovation and development over recent years has seen lighting control become more flexible in functionality and design. Timers, sensors, switches and programmable systems can be used individually or in combination to optimise control effects. For example, occupants can switch lights on manually and then sensors and timers can automatically adjust the light level including switching lights off at night or when a space is no longer in use. Lighting control systems should be transparent and simple to operate. They can be integrated with other building systems, allow central management and include open protocols for multiple vendor choice. Lighting control assets should be reviewed, maintained and optimised periodically to adjust for changing building use and continuous performance improvement.

BETTER LIGHTING

One of the most popular benefits of lighting control systems is probably the most obvious – the improved use of light throughout a home, business or leisure establishment. Mood-appropriate lighting can be set depending on the time of day and the intended use of the space which may include, social occasions, group gatherings or simply, the requirements of the occupant. In domestic settings for example, systems can be set to turn on at certain times, ideal for somebody who may work late and who needs to move through certain sections of the house without waking fellow occupants. Similarly, homes or businesses looking to host an event or social occasion may like to plan accordingly, with lighting control systems also able to focus on specific areas, such as dining tables, lectern/key speaker location or even signal if certain areas are out of bounds.



LED LIGHTING REPAIR

It is commonly documented that LED technology has the potential to provide an operable service life in excess of 50,000 hours and in some cases, 100,000hrs. Whilst these statements are great and give the end user a lot of confidence in the product they purchase, LED light fittings can still prematurely fail at some stage throughout their working life.

Possible cause:

- Chip failure
- Poorly manufactured or incorrectly sized heat sink
- Thermal failure – heat stress
- Driver / power supply failure
- Loose cable connections
- Poor solder joins
- Electrical surge
- Physical damage



In nearly all cases of LED luminaire failure, they are replaced with a new fitting which can be both costly and un-necessary. Illumination Systems Australia can repair failed LED luminaires for a fraction of the price of having them replaced with new. What many don't know is that LED luminaires can in fact be repaired quite simply and Illumination Systems Australia can do this on site, having your light fittings back up and running in no time thus eliminating unwanted lead times on a new replacement.

We can replace failed LED drivers, PCB's (printed circuit boards) or LED chips (COB & SMD) and perform thermal testing to ensure early failure does not occur again. Illumination Systems Australia uses high quality replacement parts and offers a 24month written warranty for all replacements.

There are many different types of light fittings installed in Commercial premises that we can provide repairs on which include:

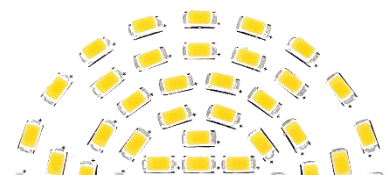
Downlights - Recessed Panels - Extruded Aluminium Linears - Wall Lights - Pendants – Carpark/street – Sports Field – LED strip and many more...

We can also offer lighting automation controls like dimming, occupancy sensing and programmable lighting control systems for more efficient use which inevitably prolongs the lifespan of the LED fitting, minimises environmental impacts and reduces consumption costs.

Call us today to discuss any LED lighting repairs or solutions for your workplace or home.

Phone: 0420 409 202

Email: matt@illumsystems.com.au



LIGHTING AUDITS & CONSULTATION

An important aspect when explaining the benefits of LED lighting has been from showing business owners how reducing their lighting costs can have a big impact on their bottom line. The first step to accomplishing this is a Lighting Audit to help identify the best lighting technology for each application that will yield maximum energy savings for the customer whilst delivering the required light output.

What is a lighting audit..??

A Lighting Audit is an onsite walkthrough of an existing facility to fully ascertain and document the current lighting conditions and determine where energy saving and illumination changes can be made. It can be conducted for both exterior and interior spaces, and involves collecting four main types of basic information: General, Lighting, Occupant and Financial.

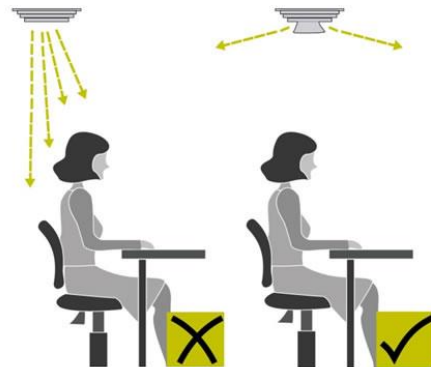
GENERAL INFORMATION

General information includes floor plans and ceiling plans that show current fixture locations. Room dimensions, as well as ceiling heights are also documented along with any future plans for renovation are also collected, if available.

LIGHTING INFORMATION

Lighting information for each area being considered is also collected. This includes information such as the:

- Number of lighting fixtures/luminaires
- Type and size of the lighting fixtures/luminaires
- Number of lamps per fixture/luminaire and ballast/driver
- Type of lamps
- Fixture/luminaire wattage
- Tasks performed in the allotted area (with light level targets)
- Hours of operation
- Height at which specific tasks are carried out
- Availability of natural daylight
- Current Lux level readings



OCCUPANT INFORMATION

It is also important to know how occupants feel about their current lighting system, as their insight can provide information to fill the gaps a physical inspection cannot determine. This step usually involves interviews or surveys, where the auditor asks the regular occupants of each space to reflect on how the lighting currently affects them. Questions can include whether occupants are experiencing glare on their computer screen, if they find the lighting too dim when they work at their stations or whether it is too bright (especially in areas where there is natural light) during the day.

FINANCIAL INFORMATION

With the physical space, luminaires installed and how users react now received and documented, the last step of a Lighting Audit is to collect financial information in the form of recent electricity bills. Knowing the average charges for electricity (kWh) and demand (kW) is important to calculating current operating costs and the eventual long-term savings gained from replacing everything with energy-saving LED fixtures.

So now we have the basic information, what happens next..??

The first item we need to determine is how many hours per annum the luminaires are in operation for. All the information we need to provide a detailed report of the current lighting conditions have been collected as per the previous page.

An example is shown below of how this is calculated.

Summary – we collected data for an existing warehouse and obtained the following information.

Room	Fitting	Wattage	Qty	Total Wattage	Daily Hrs	Days/week
Office.1	Fluorescent batten	72W (2x36W)	48	3456	16	6
Office.2	Fluorescent batten	72W (2x36W)	80	5760	16	6
Amenities	Downlight	50W	22	1100	16	6
Warehouse	Hi-bay	250W MH	80	20000	16	6
		Totals:	230	30316	64	

STEP.1

Calculate the approximate annual operation hours (the number of hours per year that the fittings are turned on)

Annual Operating Hours = Hours per Day x Days per Week x Weeks per Year

Therefor:

Annual Operating Hours = 64 x 6 x 52

Annual Operating Hours = 19968 hrs/year

STEP.2

Determine the power consumption (kW rating) that the total amount of luminaires will consume.

kW = total luminaire input wattage / 1000

Therefor:

kW = 30316 / 1000

kW = 30.31kW

STEP.3

Find the average Kilowatt per Hour (kWh) rate based on the customer's most recent electricity bills.

kWh rate = 0.262c / kWh

STEP.4

Determine the annual energy expense of the lighting data as collected.

Annual Cost = Annual Operating Hrs x kW x kWh rate

Therefor:

Annual Cost = 19968 x 30.31 x 0.262

Annual Cost = \$158,570.28 per annum (\$13,214.19/mth)

As you will clearly see, the costs associated with operating the existing lighting on a yearly basis is quite high.

However, this yearly cost can be significantly reduced by simply replacing the existing lighting with LED luminaires. Annual consumption costs can be even more reduced by the installation of motion sensors, timers or a lighting control system.

If we were to replace the existing fittings with LED luminaires, the results are quite astounding and are shown below.

Summary – we have simply opted to replace the existing fittings with a suitable LED luminaire which provides a similar light output.

Room	Fitting	Wattage	Qty	Total Wattage	Daily Hrs	Days/week
Office.1	LED Panel	30W	48	1440	16	6
Office.2	LED Panel	30W	80	2400	16	6
Amenities	LED Downlight	10W	22	220	16	6
Warehouse	LED Hi-bay	80W	100	8000	16	6
		Totals:	230	12060	64	

STEP.1

Calculate the approximate annual operation hours (the number of hours per year that the fittings are turned on)

Annual Operating Hours = Hours per Day x Days per Week x Weeks per Year

Therefore:

Annual Operating Hours = 64 x 6 x 52

Annual Operating Hours = 19968 hrs/year

STEP.2

Determine the power consumption (kW rating) that the total amount of luminaires will consume.

kW = total luminaire input wattage / 1000

Therefore:

kW = 12060 / 1000

kW = 12.06kW

STEP.3

Find the average Kilowatt per Hour (kWh) rate based on the customer's most recent electricity bills.

kWh rate = 0.262c / kWh

STEP.4

Determine the annual energy expense of the lighting data as collected.

Annual Cost = Annual Operating Hrs x kW x kWh rate

Therefore:

Annual Cost = 19968 x 12.06 x 0.262

Annual Cost = \$63,093.28 per annum (\$5,257.77/mth)

Having the existing lighting replaced with LED lighting reduces the annual costs by a staggering \$95,477.00

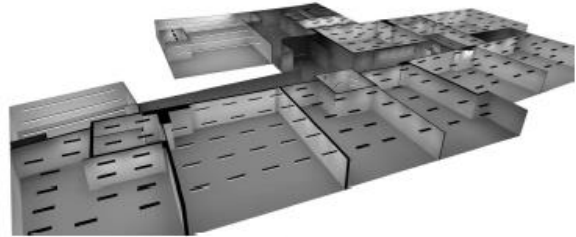
The above example has been based on a simple replacement scenario and there are other factors to consider.

1. The upfront costs of the LED fittings supply and installation will be significant. For example, an approximate cost to have the above example retrofitted with new LED fittings could cost approx. \$60,000 depending on quality of the fixtures used.
2. Having a lighting control system put in place would add to the cost as well.
3. The initial investment of having the fittings supplied and installed, along with the lighting control system can in many cases be "paid back" in the first 12 months of operation.
4. There are many other factors to consider in offering a suitable and effective solution to the scenario above and these are mentioned in the "Ask Yourself" section on Page.2 of this document.

LIGHTING DESIGN & COMPLIANCE

An Illumination Systems Australia Lighting Report lets you analyse your lighting plan output based upon your authoring file's lighting parameters. These parameters are generally in the form of an IES file which encapsulates the performance of an individual light source or fitting. Once this file is incorporated into the AGi32 software, the Lighting Report then outputs the results into an easy to read color-coded format which include lux level readings, uniformity and 3D design. Lighting adjustments can then be made on a single light or an entire family of lights, and these changes will be reflected in the generated reports.

Lighting reports are useful to understand your lighting intensity, distribution, efficiency, and how your lighting plan affects and is affected by the surroundings. Lighting reports help pinpoint hot spots, gaps in coverage and help to design for lighting emphasis and quality. Often, however, photometric analysis software is difficult to learn and can be high in price. The AGi32 Report provided by Illumination Systems Australia is simple to administer and offers an easy to understand report for the end user.



Our clients use our light reports to design for exacting coverage and ambiance to their specific needs and requirements. This addresses not only aesthetic concerns but health concerns as well. On the aesthetic spectrum, interior/exterior lighting plans can be adjusted based on the light report to add comfort lighting in dark areas or emphasize architectural elements or prominent objects. From the health aspect, the light reports identify gaps in lighting coverage that can pose health risks.

Enquire today for more information regarding our Lighting Design and Compliance service.

HUMAN CENTRIC LIGHTING

What is Human Centric Lighting (HCL)..??

Scientific research indicates that light is one of the main driving forces of the circadian system, whether it is natural sunlight or artificial light sources, they can trigger a series of physiological rhythm reactions. As we all know, outside light produced by the sun is the most natural form and source of light but with the advancements in LED technology, HCL has come as close to this natural light but in an artificial form. Lighting influences people's health in different ways through visual and non-visual effects, and "Human Centric Lighting" improves the quality of artificial light and provides comfort in stimulation of the human circadian rhythm.

What's more, with the develop of the scientific understanding, through HCL (Human Centric Lighting), we can also improve and enhance the conditions and quality of people's work, study and life, and promote mental and physical health, and adjust people's daily rhythms and improve their motivation, well-being, and productivity.

In the long history of human development, people have evolved under the sun. In the process, humans have adapted to sunlight and its highly diverse effects, just as they have adapted to natural circadian rhythms.

As recently as the year 2000, a new type of photoreceptor cell was discovered in the eye, which plays an important role in the biological and non-visual effects of light. The "new" receptor, a type of light-sensitive ganglion cell that is not involved in the actual visual process, responds specifically to the short-wave "blue" region of the spectrum, which are about 480 nm. Since its discovery, science and industry have devoted themselves to understand the effects of non-vision on humans, and the current state of knowledge is increasingly reflected in the use of light.

Therefore, the current people-orientated lighting applications have been extensively researched and developed. People-orientated lighting is based on human behaviour, visual effects and physiological and psychological research to develop more scientific, more efficient, more comfortable and more healthy lighting products and solutions. HCL lighting is about being able to personalise and control the light to suit your needs and increase your wellbeing. LED lighting technology makes them relatively easy to tune to settings that might support circadian needs.

Benefits of Human Centric Lighting.....

HCL – higher quality of light for better work An intelligent HCL lighting solution adapts illuminance and light colour precisely to the individual needs of the user – thereby improving personal work conditions.

Flexibility – custom-designed light for well-being, depending on age, mood and health with the “optimum” light meaning different lighting for different people. With an HCL lighting solution, central lighting parameters such as light colour and illuminance can be individually varied to provide exactly the right light for the particular user.

The Biological Rhythm – healthy light for internal spaces, with a circadian lighting solution, systematically alters the spectral composition of the lighting provided and can dynamically change the illuminated environment over the course of the day – this strengthens the biological rhythm and improves well-being.

Workplace - Based on Circadian Rhythms, light can be adjusted according to time. It can help stimulate employee's activity and create a comfortable, healthy and efficient working environment. In the morning, the office and industry lighting system simulate natural daylight to refresh employees. Over time, the intensity of the lighting will gradually weaken. After lunch, the lighting intensity is strengthened again to enhance the work vitality of employees. The light source is 5000K colour temperature and the illumination output is approx. 780lux. These subtle changes not only help to improve the level of energy saving, improve the comfort of employees, but also ensure the eye comfort of employees. Recently published studies in the office environment even show potential for productivity increases of 10 percent if HCL is implemented as part of a holistic approach together with other improvements in the working environment.

Schools - Schools utilize HCL to both calm students and to keep them alert depending on the time of day. In the early morning, the right light and better lighting environment can improve students' alertness and concentration in class and reduce drowsiness during the day. To provide higher light intensity and colour temperature at the appropriate times throughout the school day can help improve attention spans in students, along with prolonged concentration, which ultimately offers the students a more engaging learning environment.

Medical - There can be no substitute for good lighting. Good lighting can assist doctors in their treatment and paramedics in their work, help the elderly improve their vision, help patients in their care, help them recover, balance their circadian rhythms, and help balance their mindsets and hormones. Lighting in Nursing Homes, Aged Care facilities and Rehabilitation Centres can firstly consider safety and visibility. The emotional atmosphere created by the lighting is also important: the lighting needs to make the nursing home more comfortable. In Rehabilitation Centres, lighting can consolidate therapy and promote rehabilitation. For the staff, bright lights aid diagnosis, and dim lights aid recovery. People-orientated lighting provides the best working lighting environment, which can help doctors and staff work, improve efficiency and bring happiness to employees.

Conclusion

Today, when LED products have become the mainstream in the lighting industry, although the harm of blue light, the glare and flicker are still in existence, people's concern about LED lighting has also shifted from "energy saving" to "health and comfort".

The non-visual effect of LED is more closely related to human health. Its influence on human physiological rhythm and biological effect and led people to rethink the definition of lighting quality.

