

Creating a responsible and productive workplace

Office Lighting





See what's possible with better lighting

What are the most challenging visual tasks in the office? Reading material on computer screens? Reading the fine print of photocopied documents? Or perhaps evaluating the facial expressions of people in sensitive discussions or sales situations? Whatever tasks are the most critical in your office, lighting plays a crucial role in achieving a productive and appealing visual environment.



Philips Lighting, B.V. is the worldwide leader in lighting with an impressive record of innovation.

Leadership in Technology

In fluorescent lighting, which dominates office spaces, Philips sets the standard in cost-effective, energy saving, long life performance. Philips innovative tri-phosphor design gives modern fluorescent lamps both good color rendering and energy efficiency. Our ALTO® Technology is the pre-eminent low-mercury technology. And, our slim Silhouette T5 lamps have made indirect office lighting more efficient and more attractive.

Philips MasterColor[®] is a preferred metal halide lamp for energy-efficient accent lighting. And our QL Induction lamp can provide up to two decades of maintenance-free lighting. Philips UV germicidal lamps, installed in HVAC ducts, protect against airborne pathogens, purifying the air we breathe and improving indoor air quality.

Advance, another Philips affiliate, is the number one manufacturer of ballasts in North America. Their new wireless communication technology promises to improve the flexibility and cost effectiveness of lighting control installations. Lumileds, a joint venture of Agilent Technologies and Philips, is the world's leading manufacturer of high-power LEDs and a pioneer in the use of solid-state lighting solutions.





Lighting the Task

How much light you need depends on the visibility of the task (its size and contrast), the speed and accuracy required of the work, and the age of the people performing the work. The requirements vary widely. Reading fine print can require four times as much light as reading a computer screen, which is self luminous. Typically, people at age 55 require three times as much light as at age 25. The colors of walls, ceilings, and furniture also affect lighting since darker finishes can absorb significantly more light than more reflective ones. If your office needs more light, you can replace the lamps in the primary lighting system with ones that deliver more output and implement a group relamping program. These steps can raise light levels up to 25% at minimal cost. To achieve greater increases in illumination, you may have to upgrade the lamp and ballast system in the existing fixtures, add supplemental task lighting, or replace an obsolete lighting system altogether.

Lighting People

To read people's expressions, you need lighting that renders facial tones well. Lighting that reveals a healthy skin tone also makes people feel better, improving motivation and helping to retain employees. And most people feel that better color aids visual acuity and productivity. Older lighting systems are particularly poor with respect to color, but they can be easily upgraded with today's better color rendering lamps.

Beyond its effect on people's faces, good color rendering improves the office ambiance. It is essential to conveying the organization's image to customers, employees, suppliers, and the community at large. You can choose the color of your lighting system—warm or cool—to bring out the interior design scheme, integrate with daylight, or reinforce organizational culture.





Good lighting improves peoples' mood and office ambiance. The color qualities and placement of the light sources affect the way we feel in the space.



Lighting the Environment

Visual comfort affects the quality of the visual environment and employee productivity. Indirect lighting that reflects off the ceiling is considered the most comfortable and effective for viewing typical office tasks. Direct lighting should be controlled by high-quality louvers, lenses, or perforated shielding. Windows should be shaded to limit the glare from daylight. Well lighted walls and other vertical surfaces balance the brightness of the office space and prevent visual fatigue. Lighting systems that combine general lighting and individually-controlled task lighting will provide the highest level of visual comfort and worker satisfaction. Good color rendering, which affects how people feel about themselves and others, also contributes importantly to visual comfort.





The influence of color temperature on mood and lighting applications

Color Temperature	Incandescent	Warm	Midtone	Cool	Daylight	
Kelvin Range*	2700K	2700K 3000K		4100K	5000K	
Associated Effects Warm and Moods Cozy		Friendly Intimate	Friendly Inviting	Neat Efficient	Bright Alert	
Appropriate Applications	Reception Areas Lounges	Offices (warn tone finishes, wood) Reception areas Lobbies Cafeterias Auditoriums	Offices Classrooms Conference Rooms	Offices Medical and Pharmaceutical Companies	Printing Facilities Graphic Studios Atria Spaces with Extensive Daylight	

* The standard unit for color temperature measurement is expressed in Kelvin (K). A low color temperature implies warmer color (more yellow/red) light, while white high color temperature implies a cooler light (more blue).

Saving Energy

Electricity represents over 80% of total life cycle lighting costs and is a major cost of doing business for any organization. Annual savings of \$.10–.25 per square foot of office space are available by applying current technology—even to recently installed or upgraded lighting systems.

Today, saving energy not only makes sense in terms of the bottom line, it is increasingly mandated by law. Numerous states have adopted energy codes at least as stringent as ASHRAE-IES 90.1–1999. This standard generally limits the lighting power density in offices to less than 1.3 watts per square foot, including portable task lighting!





Retrofitting an Older Lighting System

Fortunately, you have many attractive options for reducing energy consumption. Older lighting systems using T12 lamps can be refitted with new high performance T8 lamps and electronic ballasts. Philips 25W T8 lamp system delivers the same light output as a typical 34W T12 system with substantial savings of up to 40% in energy costs. Offices designed before the 1980s often use more light than required for today's computer-oriented tasks. They can achieve greater savings by upgrading to newer lighting systems. Notwithstanding the added cost of replacing the ballast, payback generally takes less than two years. Local utilities may cover part of the cost through their Demand Side Management rebate programs.

Upgrading a Newer Lighting System

Even offices with modern T8 lighting systems can benefit from the more advanced technology in today's ALTO Energy Advantage T8 lamps without changing ballasts. Philips offers two Energy Advantage T8 options. The 30W T8 model delivers comparable light to standard 32WT8 lamps at a savings of 2 watts per lamp (6%). Although the 25WT8 model delivers slightly lower light output (10%) than standard 32WT8s, it saves 7 watts per lamp (22%). Both Energy Advantage models also achieve higher rated average life and provide higher color rendering than standard 32WT8 lamps.

Using Lighting Controls

Dimming and occupancy sensing controls also save energy and are viable options for most fluorescent lighting. For dimming or frequent switching, the Philips ALTO Advantage T8 offers superior energy efficiency and full controllability.

Advanced Lamp and Ballast Systems

Typical electronic ballasts are tuned to deliver about 87% of rated light output. You can take advantage of other ballasts that produce either higher or lower light levels with a corresponding increase or decrease in total system power. Combine these ballasts with high efficiency lamps, such as the Philips ALTO Advantage T8 to optimize the light level and energy consumption.

Additional Savings on HVAC

Lighting systems add heat to all spaces, which contributes to the air conditioning load. Depending on the climate, each watt saved on lighting can produce an additional savings on the energy used to cool the space.



Save 60 watts per fixture by replacing a 4-lamp T12 system with a 4-lamp ALTO Energy Advantage 25WT8 Instant Start System.

ALTO[®] Energy Advantage 25W T8 vs. F34T12/EW Systems

	3 LAMP	SYSTEM	4 LAMP SYSTEM			
	Standard F34T12/EW .87 BF*	ALTO® Eng Adv 25 Watt T8 .87 BF*	Standard F34T12/EVV .87 BF*	ALTO® Eng Adv 25 Watt T8 .87 BF*		
System Wattage						
Maintained Lumens	2650 × .87 BF* × .87 LM × 3 = 6017	2400 × .87 BF* × .95 LM × 3 = 595 I	2650 × .87 BF* × .87 LM × 4 = 8023	2400 × .87 BF* × .95 LM × 4 = 7934		
Energy Savings	51 Watt	60 Watts Saved				

Ballast Factor (BF) Measure of light output from lamp operated by commercial ballast, as compared to a laboratory standard reference ballast.

Saving on Maintenance

Lighting maintenance is a costly headache in most offices. Poor maintenance can result in lower light levels, "dark" fixtures, inconsistent lamping, poor color, and employee complaints. On the other hand, using the right long-life lamps extends the service cycle, which lowers labor and material costs and avoids work interruptions. It also simplifies the task of assuring that the lighting remains the way you intended it.





ALTO Universal T8 Lamps

The majority of electronic ballasts operate on instant start circuits, which significantly reduce the rated life of most standard fluorescent lamps. Philips ALTO Universal T8 lamps however, were the first T8 lamps to deliver full rated average life on any approved ballast, including instant start circuits and enjoy longer rated average life than standard T8 lamps. In typical office applications, this 25–33% longer life increases the time between relamping by an entire year.



ALTO PLUS Lamps

For even longer lamp life, Philips offers F32T8PLUS lamps. Operated on a 12-hour cycle, typical of open plan offices, PLUS lamps enjoy a rated average life of 36,000 hours, 50% longer than standard T8 lamps. This can save about \$0.10 per lamp per year in material and labor maintenance costs. That's nearly a dollar over the life of the lamp! Considered differently, when half of an installation of standard-life lamps have expired, virtually all of an installation of PLUS lamps would still be operating. The longer life of PLUS T8 lamps also favors the recommended practice of group relamping. Typically scheduled at 70% of rated lamp life (before lamps begin to expire in large numbers), group relamping saves substantially on labor costs and hassle. And, it greatly facilitates the cleaning of fixtures, which helps to maintain light levels. The maintenance benefits of PLUS lamps offer a further financial incentive to upgrade an old and inefficient T12 system to today's T8 technology.

ALTO Lamp Warranty

With more than a billion lamps installed, ALTO lamps offer proven reliability. As a result, ALTO Universal T8 lamps are warranted for 24 months, ALTO PLUS T8 for 30 months and Advantage T8 lamps for 36 months, based on a three-hour start, when operated on ANSI-compatible ballasts. We encourage you to contact Philips for the details of our warranty.

Compact Fluorescent Lamps

Energy-saving compact fluorescent lamps reduce maintenance cost sign significantly. These lamps range in rated average life from 6,000–20,000 hours, many times that of the incandescent lamps they would replace. Use PL-C, PL-L, PL-T or PL-H lamps in new compact fluorescent fixtures and Marathon lamps in existing incandescent fixtures. Where incandescent lighting is required, upgrade to Halogenà, which offers up to three times the rated average life of comparable general service lamps.



ALTO[®] Universal Lamp Rated Average Life



ALTO[®] PLUS Lamp Rated Average Life

Based on 3 Hours Per Start Philips ALTO[®] PLUS Instant Start Ballast 24,000 Philips ALTO[®] PLUS Rapid Start Ballast 30,000 Based on 12 Hours Per Start Philips ALTO[®] Universa 30,000 Instant Start Ballast Philips ALTO[®] PLUS Rapid Start Ballast 36.000 10,000 30,000 40,000 0 20,000 Rated Average Life in Hours

Energy Conservation and Emission Reduction



Conserving energy not only reduces electricity costs; it also decreases the emission of greenhouse gases produced in electricity generation. In addition to the energy saving strategies applicable to the primary fluorescent lighting systems in the office, you can reduce energy consumption in supplemental lighting by using compact fluorescent and metal halide lamps. They can save 60–70% of the energy consumed by incandescent lamps—with commensurate savings in electricity costs. So you can do well by doing good!



Reduce, Reuse, and Recycle

Philips ALTO® Lamp Technology is widely recognized as the leading low-mercury solution for fluorescent lighting. This technology uses capsule dosing to precisely control the amount of mercury in each ALTO lamp to the lowest level in the industry. Long-life ALTO lamps further reduce the need to replace lamps and, as a result, decrease the amount of mercury used over life of any lighting installation.

ALTO lamps can be recycled, which is safer for the environment. Moreover, Philips supports the recycling of spent mercury containing lamps at the end of life. Over one billion ALTO lamps have been successfully installed throughout the United States.

Saving the Environment

All fluorescent lamps contain a small amount of mercury, which is required to operate the lamp. Standard fluorescent lamps contain enough mercury to be classified as hazardous waste by the EPA. Minimizing that mercury (and recycling the lamps) is safer for the environment.

Sustainability

Increasingly, organizations are seeking sustainable design in their office facilities. Sustainability is

defined as meeting the needs of the present generation without compromising the ability of future generations to meet their needs. The Philips Sustainability Policy is a core element for the operations of the entire Philips organization and influences the design, manufacture and distribution of its products worldwide.

LEED®

The benchmark for sustainable design in buildings is the Leadership in Energy and Environmental Design (LEED) certification, created by The US Green Building Council. Different LEED criteria cover new and existing buildings, and commercial interiors. With respect to lighting, LEED encourages the use of daylighting and controllable electric lighting, aggressive limitations on lighting power density and minimizing mercury content in lighting.

2002 Mercury Content of Standard 4'-T8/T12 Lamp Comparison

Manufacturer	TCLP-Compliant	Non-TCLP-Compliant
	3.5 mg (ALTO®)	Not Manufactured
Philips	4.4 mg (ALTO®)	Not Manufactured
C have	6–8 mg (Ecologic®)	6–8 mg
Sylvania	9 mg (Ecologic [®])	9 mg
	6 mg (Ecolux®)	Not Manufactured
GE	9 mg (Ecolux®)	9–15 mg
T8 Comparison	T12 Comparison	n

* See fact sheet entitled Purchasing for Pollution Prevention: The Lowdown on Mercury in Fluorescent Lamps, by Inform, Inc, July 2003, as published on www.informinc.org



For more information on LEED and USGBC, please visit www.usgbc.org



Philips Lighting Company is proud to be the first lighting manufacturer to become a member of the USGBC.

The Bottom Line

Better lighting hits the bottom line in important ways: better costs for performance in the workspace and a more cost-effective facility itself. An investment in better lighting also increases the value of the property.

Lighting often addresses the "hidden" costs in office work: data input errors, absenteeism, and low motivation. The best way to assess the impact of better lighting is to install a sample and compare the improved output and color of the upgraded system against the existing condition.



The Total Cost of Ownership

Financial savings can be calculated using a Total Cost of Ownership tool, an "all-in" approach that considers energy, maintenance and product costs. The key variables include the density of lighting required, operating hours, electricity rates and demand charges, and maintenance costs. In many cases, there are no incremental one-time costs to upgrading your lighting. In others, there are additional costs for replacement hardware and installation labor.

Return on Investment

Lighting upgrades typically offer attractive rates of return and rapid payback of initial outlays. Importantly, the energy savings—the most significant component of the positive cash flow—are available as soon as you upgrade the system. The faster you act, the sooner the returns become available.

Improve the Bottom Line

Looking at your lighting system's cost of ownership



A Material Cost Avoidance is the annualized acquisition cost per lamp (average cost per lamp of \$2.00 for standard T8 product/ 3-3/4 years = \$.53 per year). By installing ALTO Universal T8 lamps, a material cost per lamp of \$.53 is avoided due to the extra one year of life expectancy. Note that the average cost per lamp may very.

B Labor Cost Avoidance is the annualized cost per lamp (Labor replacement cost per lamp of 4.45/3-3-1/4 years = 1.18 per year). By installing ALTO Universal T8 lamps, a labor replacement cost per lamp of 1.47 is avoided in the sixth year due to the extra one year of life expectancy. Note that the labor replacement cost per lamp may vary.

Source: National Lighting Guide to Office Lighting and Productivity.

The use of ALTO lamps instead of standard lamps can save additional handling cost, as required under the Universal Waste Rule.

General Overview

ALTO Universal 4 ft. T8 lamps provide up to 33% longer life than standard 4 ft. T8 lamps on Instant Start Ballasts. With no incremental cost, the benefits and financial impact can be significant.

Benefits

Replace standard T8 lamps, with a rated average life expectancy of 15,000 hours on Instant Start ballasts, with ALTO Universal T8 lamps and you may get an additional 5,000 hours life. Assuming your building operates 13 hours a day 7 days a week, 5,000 hours means you could get an additional year of lamp life. Subsequently, your lamp replacement and associated labor costs are delayed by over a year, just by making the switch to ALTO Universal T8.

Financial Impact

With the extended life expectancy of one year, combined with the benefits of Philips' exclusive ALTO TCLP-compliant, low mercury technology, the positive financial impact of installing ALTO Universal lamps will provide cost of ownership savings per lamp as follows:

Cost of Ownership Savings	\$1.71
Labor Cost Avoidance [®]	(\$. 8)
Material Cost Avoidance ^A	(\$.53)
Incremental Cost	(\$.00)

Product Selection Factors

Selecting the proper lighting solution involves numerous factors. Performance, comfort, cost-effectiveness and ambience must be prioritized based on the office area concerned.



Philips Lamps for Office Areas

Office Areas	Ranking of Key Needs		Light Levels ¹	CRI ²	Color Temp.	Uniformit Ratio ³	y Glare⁴	ALTO TR	Silhouettawa	Marathon 15	PL CF	Halogen DAG	MR-16	Halogena°	MasterColor [®]
Open-plan	Performance Cost Effectiveness Comfort	General Task	30–70 fc 50–70 fc	≥70 ≥70	3500–4100K 3500–4100K	$\begin{array}{l} U \geq 0.6 \\ U \geq 0.8 \end{array}$	$VCP \ge 80$ $VCP \ge 80$								
Open-plan/ Integrated	Performance Comfort Cost Effectiveness	General Task/Accent	30–50 fc ≥50 fc⁵	≥70 ≥70	3000-3500K 3000-3500K	$\begin{array}{l} U \geq 0.6 \\ U \geq 0.8 \end{array}$	$\begin{array}{l} VCP \geq 90 \\ VCP \geq 90 \end{array}$	•							
Private	Performance Comfort Ambiance	General Task	30–50 fc ≥50 fc⁵	≥70 ≥80	3000-3500K 3000-3500K	$\begin{array}{l} U \geq 0.6 \\ U \geq 0.8 \end{array}$	$VCP \ge 70$ $VCP \ge 70$	•							
Executive	Performance Comfort Ambiance	General Task/Accent	10–30 fc ≥50 fc⁵	≥80 ≥80	3000–3500K 3000–3500K	N/A $U \ge 0.8$	$VCP \ge 70$ $VCP \ge 70$				•				
Conference Areas	Comfort Performance Ambiance	General Task/Accent	10–70 fc 10–70 fc	≥80 ≥80	3000-4100K 3000-4100K	$\begin{array}{l} U \geq 0.8 \\ U \geq 0.8 \end{array}$	$\begin{array}{l} VCP \geq 90 \\ VCP \geq 90 \end{array}$				•				
Reception Areas	Ambiance Performance Comfort	General Task/Accent	20–50 fc ≥50 fc	≥80 ≥80	3000–5000K 3000–3500K	N/A $U \ge 0.8$	$\begin{array}{l} VCP \geq 90 \\ VCP \geq 90 \end{array}$	•			-				•
Circulation Areas	Cost Effectiveness Comfort Ambiance	General Accent	10–20 fc 10–20 fc	≥70 ≥70	3000–5000K 3000–3500K	$\begin{array}{c} U \geq 0.6 \\ U \geq 0.6 \end{array}$	$VCP \ge 70$ $VCP \ge 70$				•				•

(1) Footcandles (fc) stand for horizontal illuminances, (2) See glossary on last page. (3) Uniformity Ratio = E^{min} + E^{avg}, (4) VCP is Visual Comfort Probability, (5) Certain critical seeing tasks may require significantly different illuminance levels. Consult the Illuminating Engineering Society Lighting Handbook for these seeing needs.

Suggested Philips products for general lighting Suggested lighting



Premium Philips Lamps for Commercial Office Buildings

		Approximate	lumen	Rated Avera	ge Life Hours		Color	
Lamp Туре	Watts	Initial Lumens ¹	Maintenance	3 hrs/start ²	12 hrs/start ³	CRI ⁴	Temp. (°K)	
Universal T8 ALTO®	32	2950	95%	20,000	25,000	86	3000, 3500, 4100, 5000	
PLUS T8 ALTO®		2950	95%	30,000	36,000	86	3000, 3500, 4100, 5000	
Advantage™ T8 ALTO®	32	3100	95%	20,000	25,000	86	3000, 3500, 4100, 5000	
Energy Advantage 25W T8 ALTO®	25	2400	95%	24,000	30,000	85	3000, 3500, 4100, 5000	
Energy Advantage 30W T8 ALTO®	30	2900	95%	20,000	25,000	86	3000, 3500, 4100	
Silhouette™ T5/HO ALTO®	54	5000	95%	25,000	35,000	85	3000, 3500, 4100, 5000	
Silhouette™ T5 ALTO®	28	2900	95%	20,000	25,000	85	3000, 3500, 4100	

Fluorescent

(1) Approximate initial lumens. The lamp lumen output is based upon lamp performance after 100 hours of operating life, when the output is measured during operation on a reference ballast under standard laboratory conditions. (2) Average life under specified test conditions with lamps turned off and restarted no more frequently than once every 3 operating hours. Lamp life is appreciably longer if lamps are started less frequently. (3) Average life under engineering data with lamps turned off and restarted once every 12 operating hours. (4) See glossary on last page.

	Lamp Туре	Watts	Approximate Initial Lumens ¹	Lumen Maintenance	Rated Average Life Hours ²	CRI ³	Color Temp. (°K)
	Marathon [®] Universal ALTO [®] 20W	20	1200	85%	15,000	82	2700
Ę	PL-C ALTO® 13W/4P	3	900		12,000	82	2700, 3000, 3500, 4100
-	PL-T ALTO® 42W	42	3200		I 2,000	82	2700, 3000, 3500, 4100

(1) Approximate initial lumens. The lamp lumen output is based upon lamp performance after 100 hours of operating life, when the output is measured during operation on a reference ballast under standard laboratory conditions. (2) Average life under specified test conditions with lamps turned off and restarted no more frequently than once every 3 operating hours. Lamp life is appreciably longer if lamps are started less frequently. (3) See glossary on last page.

	Lamp Type	Watts	Lumens	Approximate Candlepower ¹	Rated Average Life Hours ²	CRI ³	Color Temp. (°K)
D	Energy Advantage IR PAR38 60W	60	1120	15,500-SP10, 5100-FL25, 1800-VVFL40	4200	100	2900
	Long Life MRC-16 50W	50	920-970	13,000-SP10, 8000-SP15, 4400-NFL24, 2200-FL36	6000	100	3100
	Halogena® Classic 100W	100	1670		3000	100	2900

(1) The intensity base unit for light. Intensity is the luminous flux emitted from a point per unit solid angle into a particular direction, regardless of distance. (2) Rated average life is the length of operation (in hours) at which point an average of 50% of the lamps will still be operational and 50% will not. (3) See glossary on last page.

	Lamp Type	Watts	Approximate Initial Lumens ¹	Approximate Candlepower ²	Lumen Maintenance	Rated Average Life Hours ³	CRI ⁴	Color Temp. (°K)
	MasterColor® PAR38 70W 3K	70	4100	42,000-SP, 18000-FL	70%	12,500	85	3000
E	MasterColor ED-17 100W 4K	100	9000		75%	20,000	92	4000
	QL Induction System 85W	85	6000		80%	100,000	80	3000,4000

(1) Approximate lumen values listed are for vertical operation of the lamp. (2) The intensity base unit for light. Intensity is the luminous flux emitted from a point per unit solid angle into a particular direction, regardless of distance. (3) Rated average life is the life obtained, on the average, from large representative groups of lamps in laboratory tests under controlled conditions at 10 or more operating hours per start. It is based on survival of at least 50% of the lamps and allows for individual lamps or groups of lamps to vary considerably from the average.
(4) See glossary on last page.

Haloge

Simple Tips for better lighting



I. Effective lighting for computer use

Use indirect or well shielded direct lighting to reduce reflections on computer screens. Provide blinds to prevent glare from windows. Balance the brightness of both vertical and horizontal surfaces throughout the workplace.







2. Effective lighting for paperwork

Provide local task lighting under shelves. Arrange overhead lighting parallel to viewing angles to prevent "Veiling reflections". Use high-contrast printed material.



3. Effective lighting for circulation spaces

Reduce the wattage in overhead lighting. Provide lighting for vertical surfaces. Add accent and decorative lighting selectively for visual interest.





4. Effective lighting for conference spaces

Provide lighting for display surfaces (walls, flipcharts, white board). Provide controls to create appropriate lighting for face-to-face discussions and AV presentations.



5. Maintenance

Develop a planned "group relamping and cleaning" strategy to replace lamps at 60-70% of rated life. Specify and require consistent lamp color per floor. Consolidate the lamping schedule to reduce the number of different lamps used.







6. Environmental leadership

ALTO lamps, easily recognized for their green endcaps, contain 70% less Hg than the 2001 industry average. Long life ALTO PLUS lamps allow you to gain I LEED-EB point by achieving less than 80 picograms/lumen/hour.

Glossary

ALTO Lamps

ALTO means that the lamps pass the US government's TCLP test (Toxic Characteristic Leaching Procedure). ALTO linear fluorescent lamps have the lowest mercury content of any linear lamps in the market.

Ballast

The ballast is an electrical device that performs two basic functions:I) provides the starting voltage and2) limits the current to sustain lamp operation.

Candela (Luminous Intensity)/Candlepower

The intensity base unit for light. Intensity is the luminous flux emitted from a point per unit solid angle into a particular direction, regardless of distance.

Color Rendering Index (CRI)

A method describing the effect of a light source on the color appearance of objects, compared to a reference source of the same color temperature (CCT). The highest CRI attainable is 100. Originally based on an eight standardized color comparisons, it was later extended to fourteen colors.

Color Temperature or Correlated Color Temperature (CCT)

The color temperature of a light emitter refers to the temperature to which one would have to heat a "blackbody" source (Planckian radiator) to produce light of similar overall appearance or chromaticity. A low color temperature implies warmer color (more yellow/red) light while higher high color temperature implies a cooler light (more blue). The standard unit for color temperature measurement is expressed in Kelvin (K).

Efficacy

The expression of efficiency in converting power (watts) into light (lumens). Expressed as a lumens per watt or I/w.

Footcandle

The unit of measure for the density of light on a surface unique to the USA. One footcandle is equal to one lumen per square foot (lm/ft2). One footcandle = 10.674 lux.

General Lighting (Ambient Lighting)

Lighting designed to deliver a predominantly uniform level of light throughout an area.

Rated Average Life

The length of operation (in hours) at which point an average of 50% of a large sample of lamps will still be operational and 50% will not.

Task Lighting

Lighting designed for a specific visible operation which requires higher levels; most often characterized by proximity to that task.





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