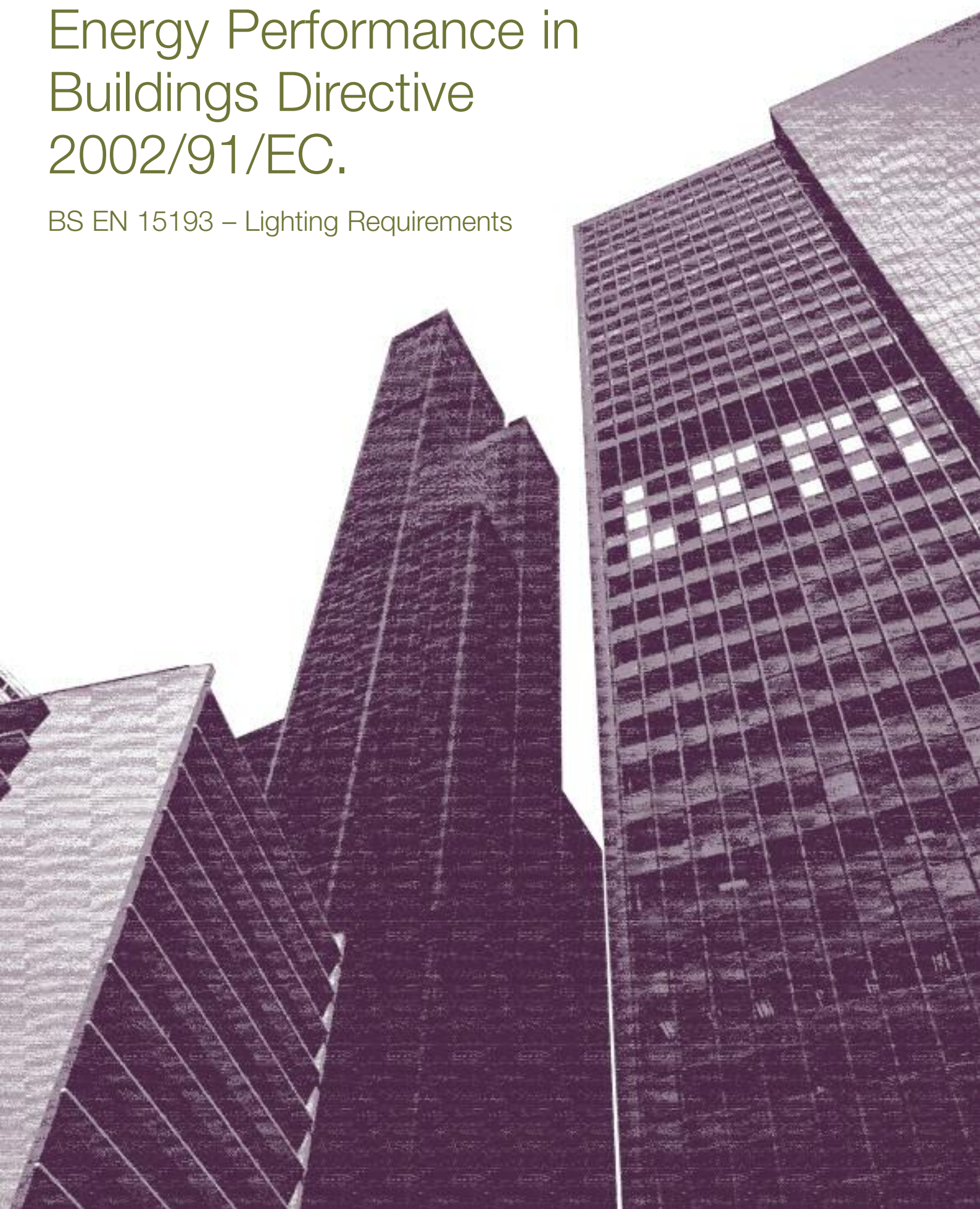
Whitecroft lighting

Lighting for Life

Energy Performance in Buildings Directive 2002/91/EC.

BS EN 15193 – Lighting Requirements



Global Efforts to Limit Climate Change

Throughout the history of the earth, our climate has varied between warmer and colder periods. In the last 100 years the climate has become warmer and researchers on the UN climate panel IPCC are in agreement that there is a human impact. The combustion of fossil fuels, oil, coal and gas which amplifies the natural greenhouse gas effect has been identified as the cause.

On 16th February 2005, the Kyoto agreement came into force to regulate and limit emissions of greenhouse gases with the objective of reducing the rate of climate change. The industrialised nations of the world have been instructed to take the lead.

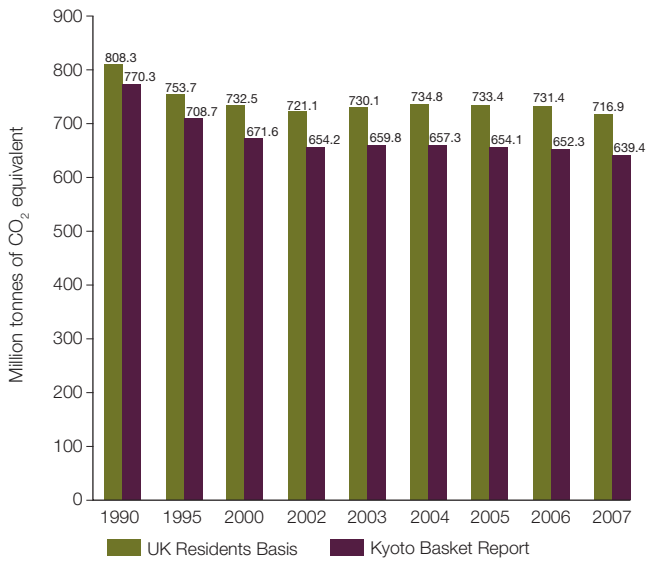
The latest EU targets challenge member states to cut carbon emissions by 20% by 2020. Only the UK and Sweden are on track to meet current targets of a 12% reduction by 2012.

Greenhouse gases

Greenhouse gases include carbon dioxide, methane, nitrous oxide and halocarbons. They all have different retention times in the atmosphere and show different degrees of “effectiveness” as greenhouse gases.

The greatest threat is said to come from carbon dioxide (CO_2), not because it is the most powerful, but because it is the most common. All forms of combustion, not only that of fossil fuels (oil, coal and gas), generate CO_2 emissions. However research carried out by the US Department of Agriculture's (USDA) Agriculture Research Service, based at the University of Nebraska suggest bio-fuels offset the CO_2 released in combustion as a consequence of CO_2 absorbed when the crops are being grown. However the report recognises the use of land for cultivating bio-fuels is contributing to food shortages and rising prices. Furthermore, with current technology. The potential contribution from clean energy sources (such as wind farms) is limited. This suggests the only viable solution at present is to limit total energy use.

Graph showing progress made by the UK toward meeting its Kyoto Protocol commitments.



Whitecroft and Energy Solutions

As a leading UK lighting supplier we take our responsibilities seriously; one of our main concerns is to help protect the environment for future generations by providing lighting systems that use less energy.

Around 90% of the environmental impact of a typical lighting installation is as a consequence of the energy it consumes. About 18.5% of the energy used in a UK office is for lighting (Department for Business, Enterprise and Regulatory Reform).

In a report commissioned by the Carbon Trust, the Whitecroft carbon footprint was assessed as 2563.3 tonnes of CO_2 in October 2005. Plans were made to reduce this value; and have been implemented with a more efficient paint plant, a factory lighting upgrade with absence and daylight sensing, and a redesign of transport vehicles allowing a 25% increase in capacity. However, based on our current sales level of £54m (2008) and assuming a 15-year service life for our luminaires, the population of Whitecroft luminaires in use in any one year would consume in the region of 0.92 million tonnes of CO_2, in the absense of lighting controls. This is more than 350 times the carbon footprint of the Whitecroft site, which explains why we have invested heavily in developing more efficient lighting systems, to the extent that a new Whitecroft installation can halve energy usage compared with older designs.

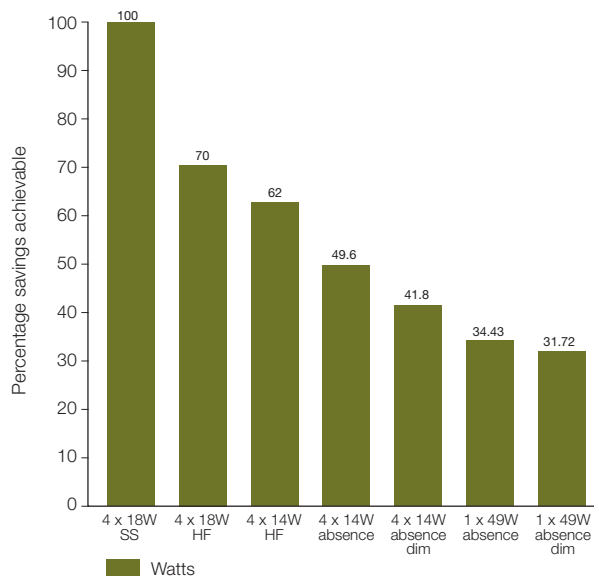
We have developed solutions with different types of lighting control, to reduce the energy consumption of our lighting systems. Further savings in resources also arise from the subsequent reduction in cooling load.

Modern lighting produces many environmental benefits beyond reduced energy consumption. For example, the new fluorescent lamps with HF-operation have a longer life, which means less relamping, and the T5 lamp contains less mercury. Increased use of the T5 lamp has also enabled us to develop more efficient optics.

Our knowledge and understanding of more efficient ways to deliver lighting solutions has improved greatly. DUO, our latest office luminaire, incorporates an Intermediate Brightness Zone, delivering diffuse light and making the optic visually more comfortable. DUO also provides excellent control of contrast, meaning spaces can feel bright even if reduced illuminances are employed at the lower end of CIBSE recommendations.

As part of the Fagerhult group, we are continuously taking steps to reduce energy consumption at our factory in Ashton. We conform fully to ISO 14001:2004, we monitor our own carbon footprint and that of our suppliers, and we are members of a registered Compliance Scheme (Electrolink) in accordance with the WEEE Directive.

Based on a typical office, this graph shows the savings achievable, based on a point for point replacement between 4x18W T8 and 4x14W T5 recessed solutions. It then shows additional savings based on a redesign around a 1x49W T5 suspended solution.



Energy Declaration of Buildings

> Nearly 50% of the UK's emissions are generated through the way we heat, light and use our buildings. The Government's Climate Change agenda recognises that comparatively minor changes to the ways in which we construct and use buildings can have a large cumulative effect.
>
> *Yvette Cooper, Minister for Housing and Planning.*

The Directive

The EC Directive on the energy performance of buildings (2002/91/EC) was drawn up as part of the EU's measures to satisfy the Kyoto Agreement. It seeks to promote improvements in energy performance while allowing for local conditions. For example, Southern Europe does not face the same problems as the North of Norway.

The Directive came into force on January 4, 2006, with an implementation time up to 2009, due to the need to train inspectors. It requires that all properties provide details of their energy consumption. These buildings are then rated on their energy performance after taking into account considerations such as types of energy, daylight, ventilation etc.

England and Wales have already started to implement the Directive with the amendment to Part L of the Building Regulations, which came into force on 6th April 2006. These changes implement Articles 3,4,5,and 6 of the Energy Performance of Buildings Directive (EPBD) in England and Wales. The Directive allows a 3-year transition period to fully apply the requirements for energy certificates and plant inspections. The UK government is working with stakeholders to ensure sufficient numbers of trained inspectors are in place to support a phased programme of implementation.

Energy Performance of Buildings

A requirement of the Directive is for building owners and Local Authorities to provide details of the building's energy consumption. This must be in the form of an Energy Performance Certificate in the Private Sector, and Display Energy Certificates in the Public Sector. These certificates rate the energy performance and carbon emissions of the building on a scale of A to G, with A being the most efficient. Also, the certificate shows the rating that could be achieved if certain recommendations were implemented.

The energy declaration is only part of the Directive. However, it is the part that has the greatest effect on property owners. In the annex to the Directive it cites the importance of exploiting positive factors wherever possible.

In terms of lighting installations, a key positive factor would be use of daylight. Accordingly, when calculating energy usage, consideration should be given to the outdoor climate, local conditions, demands on the indoor environment (e.g. the requirements of EN 12464-1 and other standards) and cost efficiency.

Property developers are likely to find that the energy ratings their buildings attain, will have a significant impact on the rental or resale values that they can achieve. A declaration that indicates that the premises are energy efficient will be more attractive to potential tenants, especially if their lease requires them to pay their own energy costs.

Exemption

Not all buildings need an energy declaration, as EU member states can decide to exempt buildings. For example, listed buildings can be exempted on account of their special architectural or historical value if the demands of the Directive would result in unacceptable changes to their distinctive features or appearance. Part L of the Building Regulations 2006 already excludes historic buildings and exemptions can also be given to places of worship.

BS EN 15193:2007 LENI: Lighting Energy Numerical

The EC Directive – Energy Performance of Buildings, 2002/91/EC, outlines energy requirements and the requirement for buildings within the EU to have energy certification.

Concerns of the Directive:

a) The basis of calculating the building's total energy performance.

b) Implementation of minimum requirements for the energy performance of new buildings and major refubishments

c) Energy certification of buildings.

Common standards are created to provide a consistent basis for calculation (see (a) above). Different methods are specified to calculate energy consumption for various building services.

Lighting is included as an important part of the energy use in buildings. It must be evaluated using an index (Lighting Energy Numeric Indicator, LENI) and is expressed in kWh/m^2 per year. The focus has shifted from installed load to total energy consumed over time.

The standard defining the method for calculating energy consumption is "BS EN 15193:2007 – Energy Performance of Buildings – Energy Requirements for Lighting". This was adopted as a British Standard BS EN 15193 in November 2007 and must be implemented by 2009.

The Relux and Dialux programs provide tools to facilitate these calculations and are available for download from the Whitecroft Lighting website.

BS EN 15193

There are various methods of measuring the energy performance of a lighting installation. In the past we used W/m^2/100 lux (CIBSE Code for Interior Lighting 1994), although this did not consider the positive contribution from controls, or the total energy used by an installation over its design life. Then we considered efficacy, which is still a requirement of the Building Regulations, and provides a meaningful representation of the practical light output compared to the energy input. A major limitation of Part L2:2006 is the fact that it is effectively a simple pass or fail system, which does not encourage a drive for best practice, or the use of lighting controls.

These methods of comparison were useful in terms of the parameters being considered, but the most up-to-date method of analysis is provided by a standardised measurement tool: the Lighting Energy Numeric Indicator (LENI). LENI encourages the use of lighting controls and best practice in minimising energy use.

BS EN 15193, Energy Performance of Buildings – Energy Requirements for Lighting, provides a harmonised method for determining energy use for lighting within different building types. The lighting's energy efficiency in the building must be rated by a LENI index expressed in kWh/m^2 per year. The LENI should apply to the whole building and can be used to compare the energy consumed for lighting.

Comparisons can be made between different buildings with the same function, but of a different size and design. The LENI is specific to the building under consideration. For example, the hours of occupancy for a school are shorter than those in an office, and also classrooms are generally lit to lower levels than offices. The LENI for a given building is likely to be higher if calculated for an office rather than for education, even if the same luminaire type is used.

BS EN 15193 gives example values of the LENI number for a number of common building types. These nominal values may be used as the basis for national recommendations, but at present they are useful as a comparison with the efficiency of a proposed lighting installation. These values are summarised in the table opposite:

Indicator

Benchmark LENI values given in BS EN 15193:2007

Application	LENI	
	Manual Control	Automatic Controls
Office	38.3 to 67.1	32.2 to 55.8
Education	31.9 to 54.9	24.8 to 41.8
Hospital	63.9 to 160.6	50.7 to 126.3
Hotel	34.6 to 108.1	34.6 to 108.1
Restaurant	27.1 to 92.1	n/a
Sport	39.7 to 123.7	37.9 to 117.7
Retail	70.6 to 178.1	n/a
Manufacturing	39.7 to 123.7	37.5 to 116.2

LENI has no minimum or maximum figure to achieve, but it is a very important measure of a scheme's energy consumption and cost-effectiveness. With the introduction of Energy Performance Certificates (EPCs) and Display Energy Certificates (DECs), building owners and occupiers will demand better and more energy-efficient buildings. This method of assessing a building raises the profile of energy issues within the overall design process.

LENI is factored in to the Energy Performance Asset Rating (graded from A to G, as shown on all EPCs and DECs).

Regulations 17A to 17E of Part L of the Building Regulations implement Articles 3 and 4 of the Energy Performance of Buildings Directive. The LENI rating has been written into the SBEM software by the Building Research Establishment (BRE), although it is not described as 'LENI' in either the software or the supporting documentation for SBEM.

The calculation method for SBEM relies on the use of a notional building. This is a building with the same geometry and activity data as the actual building but built with systems in accordance with Part L2 standards. The methodology then requires that two calculations are performed: one on the actual building and one on the notional equivalent. For Part L compliance, the actual building has to perform better than the notional building by a specified percentage.

SBEM carries out a calculation for the lighting energy use, based on the input data provided by the user. This calculation uses the LENI method to calculate the lighting electrical load, as part of the wider building calculation process.

LENI can be calculated for any complete lighting installation within a building, but it requires knowledge of many parameters for each individual scheme. We have created a simplified calculation method, to give an indicative LENI for your scheme.

Energy Performance Asset Rating

This value is an indicator of the potential energy performance of a building under standard conditions. It indicates the energy efficiency of the building fabric and the heating, ventilation, cooling and lighting systems. It appears on DECs and EPCs and is accompanied by a rating from A to G. The Asset Rating is a measure of the energy performance with all the building services factors taken into consideration; LENI is just one part of this.

The Comprehensive LENI Formula

The total energy consumed by lighting is calculated by:

$W_{total} = W_{light} + W_{parasitic}$ (kWh per year)

W_{light} is the estimated energy needed to power the lighting in the building during a given period of time.

$W_{parasitic}$ is the estimated energy used when the lighting is off. This is the energy used by ballasts and controls in standby mode or for charging emergency luminaires.

However, W_{light} and $W_{parasitic}$ are themselves made up of other factors. The complete LENI formula is:

$$\frac{\frac{1}{1000} \Sigma \{[P_N \times F_C] \times [(t_D \times F_O \times F_D) + (t_N \times F_O)]\} + \frac{1}{1000} \Sigma \{P_{pc} \times [t_y - (t_D + t_N)] + (P_{em} \times t_e)\}}{A}$$

given in kWh/m^2 per year.

P_N Total luminaire power for the room or zone, measured in Watts.

F_C Constant illuminance factor, a function of the lighting maintenance factor.

t_D Annual operating hours during daylight

F_O Occupancy dependency factor, relating the installation power usage to the occupancy period.

F_D Daylight dependency factor, relating the installation power usage to daylight availability.

t_N Annual operating hours during darkness.

P_{pc} Input power of all control systems in luminaires in the room or zone when the lamps are not operating, measured in Watts.

t_y Standard year time, 8760 hours

P_{em} Input charging power of all emergency lighting luminaires in the room or zone, measured in Watts.

t_e Operating hours during which the emergency lighting batteries are being charged.

A Total internal floor area, m^2

These items are themselves made up of other factors requiring calculation. The calculation we have devised considers some of the variables as constant values, and simplifies the process. We have made reasonable assumptions which ensure the retention of a good degree of accuracy, such as constant values for parasitic power, and assuming sensible values for occupancy times.

The following page summarises the method for carrying out the simplified calculation. The worksheet can give a result for one zone or many zones – you must adjust the total installed lighting power and floor area values to suit the extent of your design.

We have selected some constant values, regarding operating hours. These figures are sensible for most commercial buildings, but you may wish to change these values to suit your installation, if the actual hours are very different to those given here.

Simplified LENI Worksheet

Use this worksheet to calculate an estimated LENI for your lighting installation. The worksheet gives suggested sensible values for certain parameters, but you may wish to change these. All figures in bold refer to items calculated in a previous step of the worksheet.

	Calculation Steps	**Result**
1	Total internal floor area: (m^2)	
2	Annual daylight operating hours: (2250)	
3	Annual operating hours in darkness: (250)	
4	Total emergency charging power: (1000 x **Line 1**) / (**Line 2** + **Line 3**)	
5	Total lighting controls standby power: (5000 x **Line 1**) / (**Line 2** + **Line 3**)	
6	Total installed lighting power (Circuit-Watts for all luminaires)	
7	Emergency lighting charge time: (normally 15 hours for common ballast types)	
8	Absence Factor, F_a For offices — assume 0.2 For education — assume 0.2 For hospitals — assume 0 For factories — assume 0 For hotels / restaurants — assume 0 For retail — assume 0 For warehouses — assume 0.2	
9	Control System Function For manual switching only, — use 1 For presence detection with daylight dimming, — use 0.95 For Presence detection only, — use 0.9 For absence detection with daylight dimming, — use 0.9 For Absence detection only, — use 0.8	
10	Occupancy Dependency Factor If $F_a < 0.2$, — use 1 – [(1 – **Line 9**) × **Line 8**] / 0.2 If $0.2 \leq F_a \leq 0.9$, — use **Line 9** + 0.2 – **Line 8** If $F_a > 0.9$, — use [7 – (10 × **Line 9**)] × (**Line 8** – 1)	
11	Daylight supply factor If average daylight factor is greater than 3%, — use 0.83 if you want to achieve 300 lux, use 0.75 for 500 lux, and use 0.65 for 750 lux. If average daylight factor is between 2% and 3%, — use 0.75 if you want to achieve 300 lux, use 0.63 for 500 lux, and use 0.5 for 750 lux. If average daylight factor is between 1% and 2%, — use 0.63 if you want to achieve 300 lux, use 0.45 for 500 lux, and use 0.32 for 750 lux. If average daylight factor is less than 1, — use 0.	
12	Daylight control factor If average daylight factor is greater than 3%, — use 0.85 if daylight-linked controls are used, and 0.4 otherwise. If average daylight factor is between 2% and 3%, — use 0.77 if daylight-linked controls are used, and 0.3 otherwise. If average daylight factor is between 1% and 2%, — use 0.75 if daylight-linked controls are used, and 0.2 otherwise. If average daylight factor is less than 1%, — use 0.	
13	Daylight dependency factor: 1 – (**Line 11** × **Line 12**)	
14	Parasitic power of controls: **Line 5** x [8760 – (**Line 2** + **Line 3**)]	
15	Parasitic power of emergency charging circuits: **Line 4** × **Line 7**	
16	Total energy usage for lighting: {(0.9 x **Line 6** × **Line 10**) × [(**Line 2** × **Line 13**) + **Line 3**]} / 1000	
17	Total parasitic energy use: (**Line 14** + **Line 15**) / 1000	
18	LENI: (**Line 16** + **Line 17**) / **Line 1**	

Note: Daylight supply and control factors apply to UK locations. For other areas, more detailed calculations may be needed.

The results obtained using this table can be slightly higher than the expected value, but they do give a good indicator of an installation's performance. Using this calculation method, the expected error would be less than 10%.

Typical LENI Calculations

Displayed on the following pages are details of typical LENI results for generic areas using common luminaire types from the Whitecroft range.

These results aim to show that the LENI does not depend only on the type of lighting used in a space, but also on the shape of the room, the required maintained illuminance, the amount of glazing, and the hours for which the space is occupied. It can also depend on other factors such as building location, but no changes to factors such as this were made in the calculations. It is possible to improve the LENI by the use of a suitable lighting installation, which incorporates efficient luminaires and lamps, and appropriate energy-saving controls.

The more efficiently designed the lighting installation, the lower the energy usage, and the more saleable / lettable the completed building. Our lighting solutions are designed to improve energy efficiency and bring down the running cost of an installation. The result of this is being one step closer to creating an energy–efficient building which comfortably exceeds the requirements of Part L2 of the Building Regulations.

The introduction of LENI allows comparisons to be made, and helps us to demonstrate FM cost savings and the desirability of a proposed installation to clients. The ever more stringent requirements of Building Regulations, British and European Standards and local and national legislation can also be met by designing an installation with high efficiency in mind.

The calculations carried out for this report are based on generic room types, so that we can see the effects of different lighting solutions on the achievable LENI value.

We have considered 6 basic room types, which are representative of typical scenarios found in real-life buildings. These are:

- Classroom
- Factory
- Warehouse
- Office
- Circulation space
- Sports Hall

All sample rooms assume windows. A comparison is made between results for the area with and without absence and / or dimming control. In each calculation, the recommended running hours in BS EN 15193 have been used. A maintenance factor of 0.8 has been used.

General illuminance calculations were carried out for these spaces with suitable luminaire types, and the results are summarised as follows:

Room	Dimensions (m) L x W x H	Floor Area m^2	Luminaire type
Classroom	10 x 6 x 3	60	Foil 2 x 39W T5
		60	Cascade TSI 4 x 14W T5
Factory	30 x 40 x 8	120	Hibay 1 x 250W HQI
		120	Aerial 3 x 80W T5
Warehouse	50 x 40 x 10	2000	Harrier 1 x 250W HQI
		2000	Aerial 3 x 80W T5
Office	30 x 12 x 3	360	Cascade 4 x 14W
		360	Duo 4 x 14W
Circulation	2 x 30 x 2.4	60	Mirage 2 x 26W
		60	Laguna 1 x 38W
		60	Radial 1 x 35W
		60	Gibraltar 1 x 54W
Sports	18 x 33 x 9	594	Serve 6 x 55W TC-L

	Number of luminaires	Total Installation Watts	Power per area (W/m²)	Installation Efficacy for Part L2 Compliance	Average illuminance
	6	462	7.7	64.0 luminaire lumens per circuit-Watt	410
	12	744	12.4	45.8 luminaire lumens per circuit-Watt	407
	36	9900	8.25	74.0 luminaire lumens per circuit-Watt	328
	42	10920	9.10	62.1 luminaire lumens per circuit-Watt	330
	42	11550	5.78	62.1 luminaire lumens per circuit-Watt	203
	36	9360	4.88	62.1 luminaire lumens per circuit-Watt	221
	45	2790	7.75	56.2 luminaire lumens per circuit-Watt	374
	45	2790	7.75	51.8 luminaire lumens per circuit-Watt	336
	10	540	9.00	65.7 lamp lumens per circuit-Watt	165
	12	480	8.00	71.3 lamp lumens per circuit-Watt	144
	9	360	6.00	82.5 lamp lumens per circuit-Watt	154
	7	427	7.12	73.0 lamp lumens per circuit-Watt	175
	15	5220	8.79	56.7 luminaire lumens per circuit-Watt	306

The following results show the LENI number improves if sophisticated controls are used. The benefits of using controls are emphasised in the text of BS EN 15193, the Building Regulations Parts L2A and B, CIBSE documents, and publications by other bodies, like the Carbon Trust.

In most cases the LENI figures generated for these installations (using the comprehensive method) are well below the expected range (given in BS EN 15193). There can be a number of reasons for this.

The benchmark values in Annex F of BS EN 15193 are based on W/m² estimates of the lighting electrical load, which are not only approximations. But rather exaggerated estimates, which fail to take account of the latest luminaire and lamp technology available. The values in BS EN 15193 do, however, allow for flexibility in design and do not impose unnecessary restrictions on the types of luminaires and lamps available for use. As previously mentioned, BS EN 15193 is not looking to achieve a pass / fail result, but does rely on commercial pressures to encourage best practice.

LENI figures have here been calculated for single rooms. A more representative LENI can be found by carrying out a comprehensive calculation for all areas of a building. The actual result may be higher or lower than these estimates.

Whitecroft Lighting endeavours to employ best practice in all aspects of design, ranging from the design and specification of the most efficient luminaires and lamps, to the design of fully functional and intelligent lighting systems to suit individual applications.

We always consider the end user requirements of each lighting installation with the utmost care, and design to meet this goal in order to maximise functionality and aesthetics, and reduce FM costs, ensuring a better life-cycle cost performance. While we must not forget the primary concern of a lighting system is to best light the space to facilitate the end user activity; our solutions seek to combine this with good energy performance.

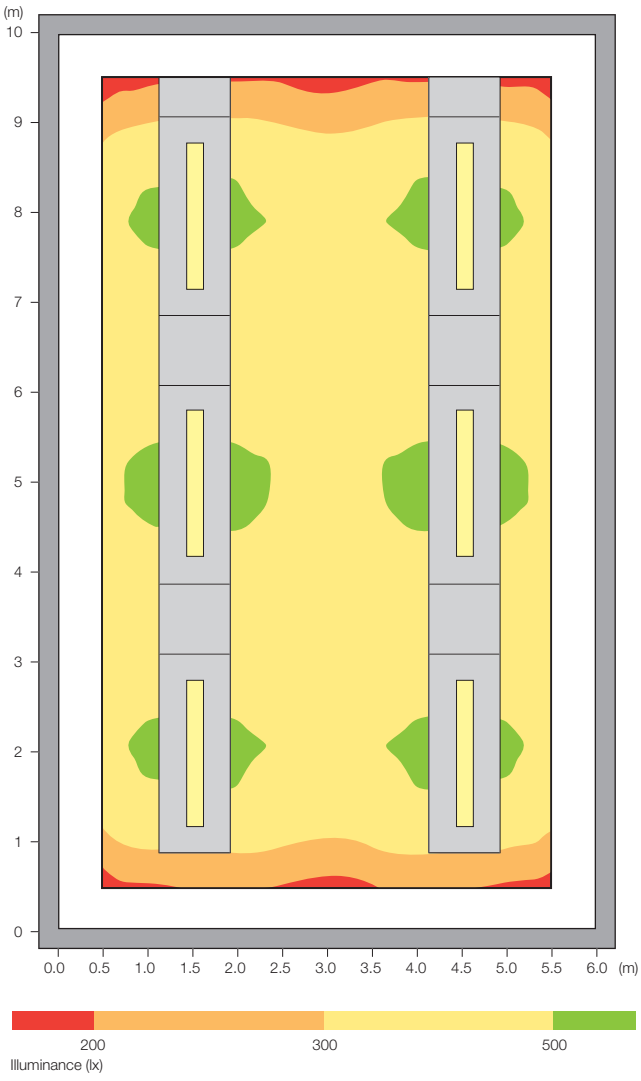
Classroom Examples

60m², 300 lux.
1800 hours per year during daylight, 200 hours per year during darkness.

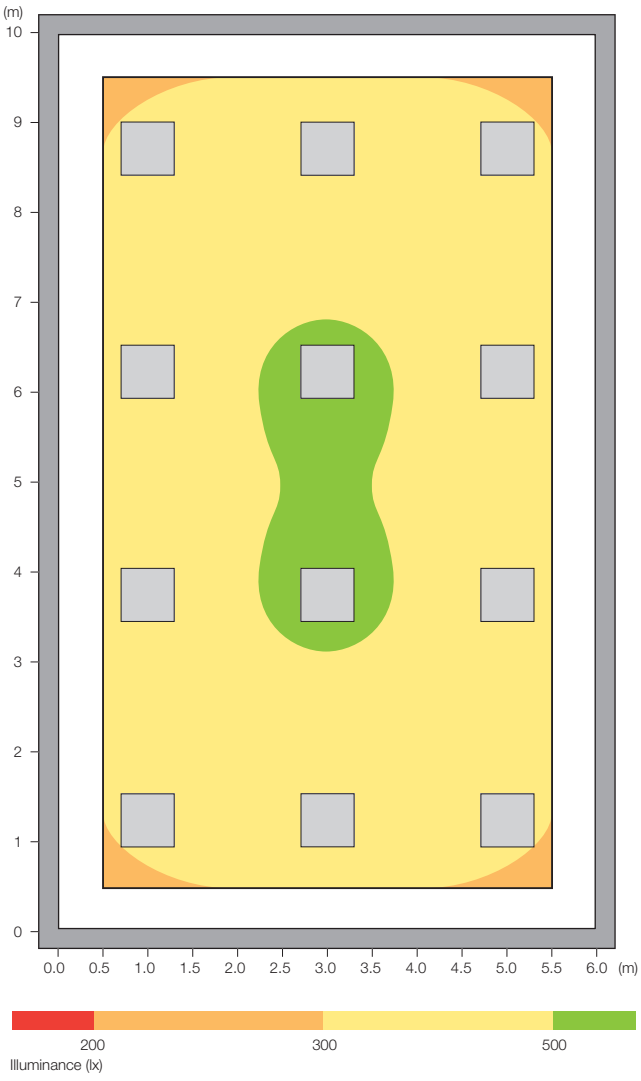
Foil 2x39W			
Number of luminaires	6		
Total installed lighting power (W)	498		
Lighting Control Method	Manual switching	Absence detection	Absence detection and daylight dimming
Parasitic power (W)	15	18	21.9
LENI (kWh/m² per year)	**10.48**	**8.72**	**5.14**

Cascade TSI 4x14W			
Number of luminaires	12		
Total installed lighting power (W)	744		
Lighting Control Method	Manual switching	Absence detection	Absence detection and daylight dimming
Parasitic power (W)	15	18	25.8
LENI (kWh/m² per year)	**15.67**	**12.86**	**7.74**

Foil 2x39W



Cascade TSI 4x14W



Factory Examples

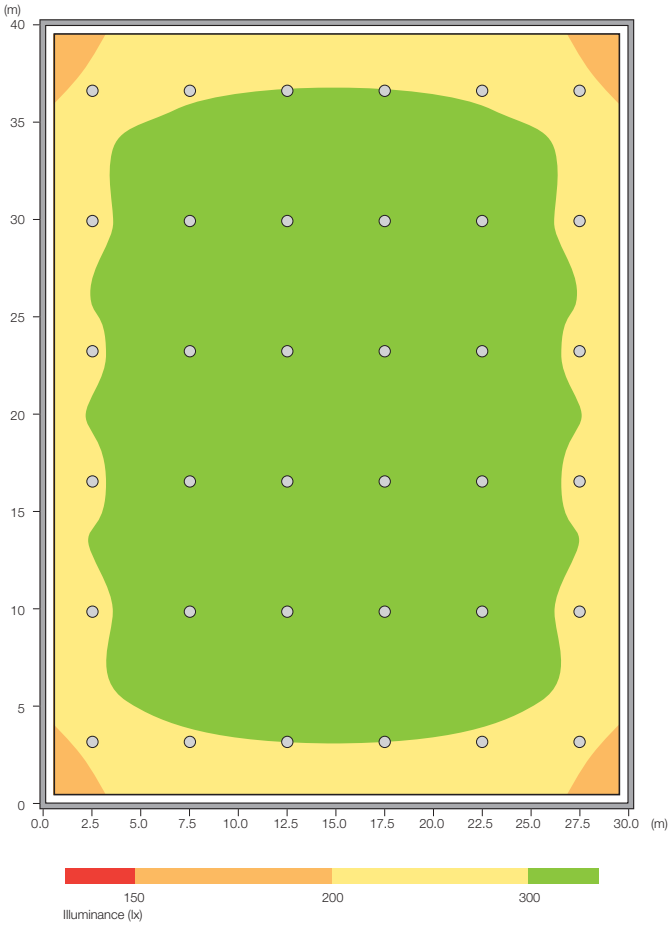
1200m^2, 300 lux.

2500 hours per year during daylight, 1500 hours per year during darkness.

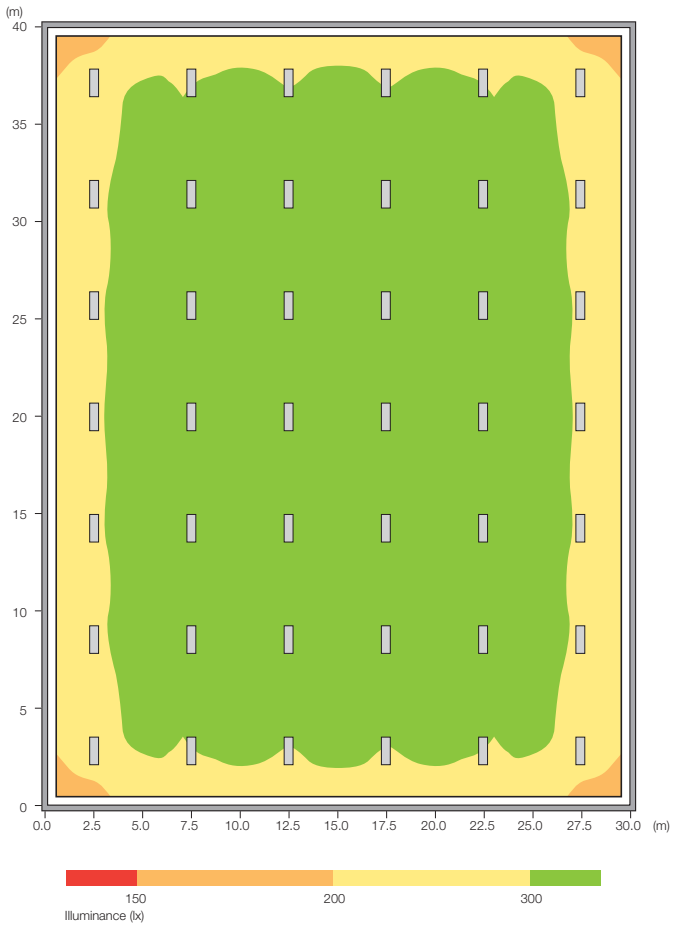
Hibay 1x250W	
Number of luminaires	36
Total installed lighting power (W)	9900
Lighting Control Method	Manual switching
Parasitic power (W)	0
LENI (kWh/m^2 per year)	**23.54**

Aerial 3x80W			
Number of luminaires	42		
Total installed lighting power (W)	10920		
Lighting Control Method	Manual switching	Absence detection	Absence detection and daylight dimming
Parasitic power (W)	90	142.5	146.4
LENI (kWh/m^2 per year)	**25.96**	**26.17**	**18.53**

Hibay 1x250W



Aerial 3x80W

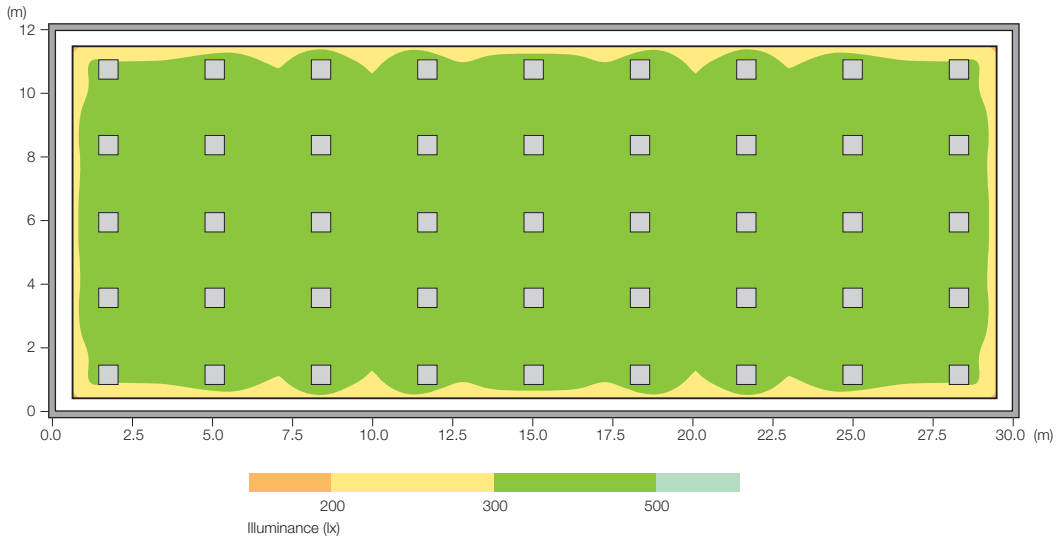


Office Examples

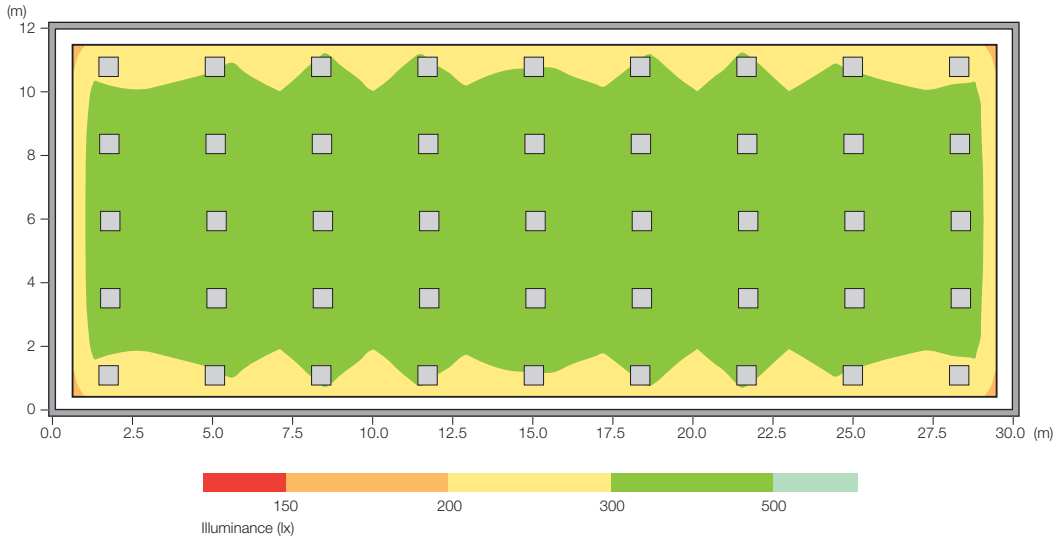
360m², 500 lux.

2250 hours per year during daylight, 250 hours per year during darkness.

Cascade 4x14W			
Number of luminaires	45		
Total installed lighting power (W)	2790		
Lighting Control Method	Manual switching	Absence detection	Absence detection and daylight dimming
Parasitic power (W)	75	97.5	101.4
LENI (kWh/m² per year)	**12.23**	**10.18**	**5.55**



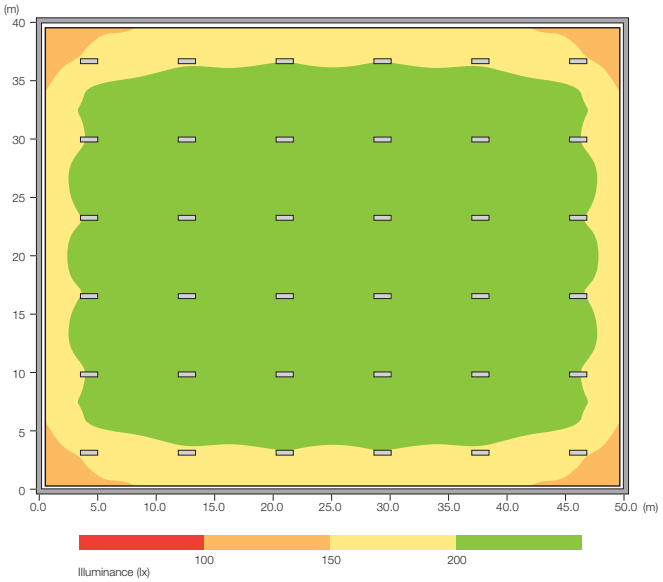
Duo 4x14W			
Number of luminaires	45		
Total installed lighting power (W)	2790		
Lighting Control Method	Manual switching	Absence detection	Absence detection and daylight dimming
Parasitic power (W)	75	97.5	101.4
LENI (kWh/m² per year)	**12.23**	**10.18**	**5.55**



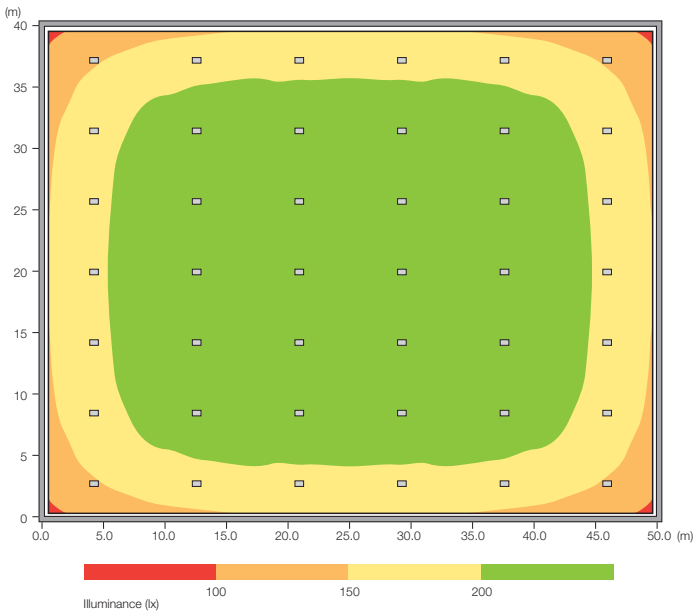
Warehouse Examples

2000m², 200 lux, 6 aisles.
2250 hours per year during daylight, 250 hours per year during darkness.

Aerial			
Number of luminaires	36		
Total installed lighting power (W)	9360		
Lighting Control Method	Manual switching	Absence detection	Absence detection and daylight dimming
Parasitic power (W)	90	184.5	188.4
LENI (kWh/m² per year)	**7.38**	**7.68**	**4.15**



Harrier 1x250W	
Number of luminaires	42
Total installed lighting power (W)	11550
Lighting Control Method	Manual switching
Parasitic power (W)	0
LENI (kWh/m² per year)	**8.24**

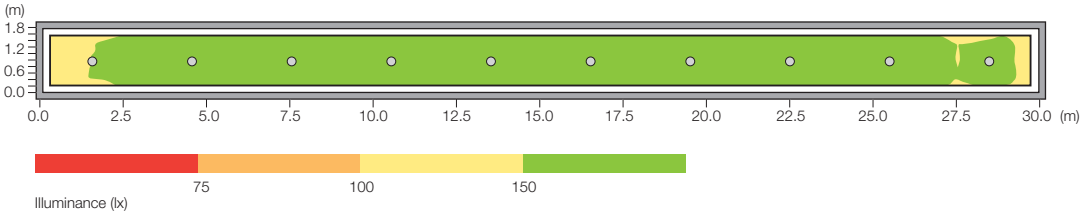


Circulation Examples

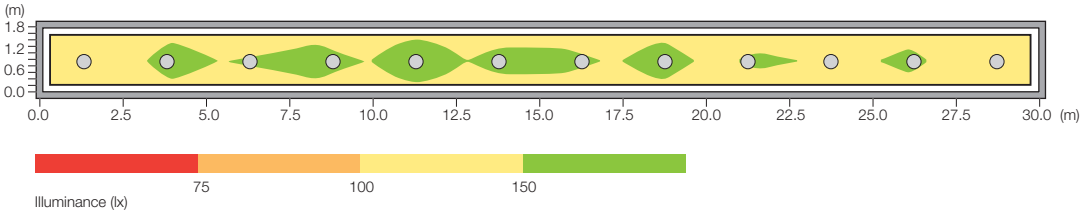
60m², 150 lux.

2250 hours per year during daylight, 250 hours per year during darkness.

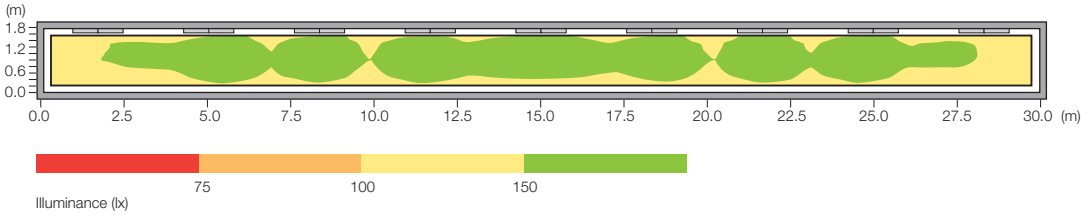
Mirage 2x26W			
Number of luminaires	10		
Total installed lighting power (W)	540		
Lighting Control Method	Manual switching	Absence detection	Absence detection and daylight dimming
Parasitic power (W)	25	31	37.5
LENI (kWh/m² per year)	**11.37**	**9.15**	**5.74**



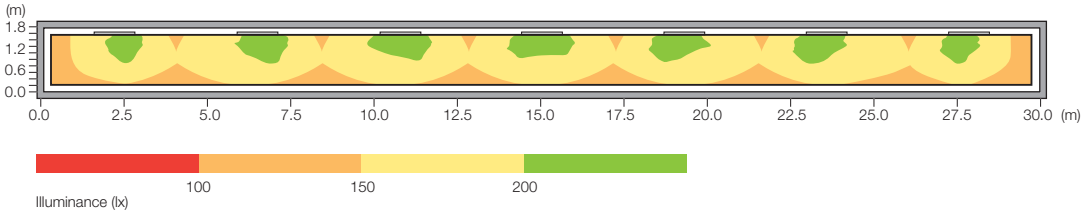
Laguna 1x38W			
Number of luminaires	12		
Total installed lighting power (W)	480		
Lighting Control Method	Manual switching	Absence detection	Absence detection and daylight dimming
Parasitic power (W)	30	36	43.8
LENI (kWh/m² per year)	**10.1**	**8.21**	**5.39**



Radial 1x35W			
Number of luminaires	9		
Total installed lighting power (W)	360		
Lighting Control Method	Manual switching	Absence detection	Absence detection and daylight dimming
Parasitic power (W)	25	31	36.85
LENI (kWh/m² per year)	**7.57**	**6.31**	**4.2**



Gibraltar 1x54W			
Number of luminaires	7		
Total installed lighting power (W)	427		
Lighting Control Method	Manual switching	Absence detection	Absence detection and daylight dimming
Parasitic power (W)	20	26	30.55
LENI (kWh/m² per year)	**8.99**	**7.37**	**4.61**

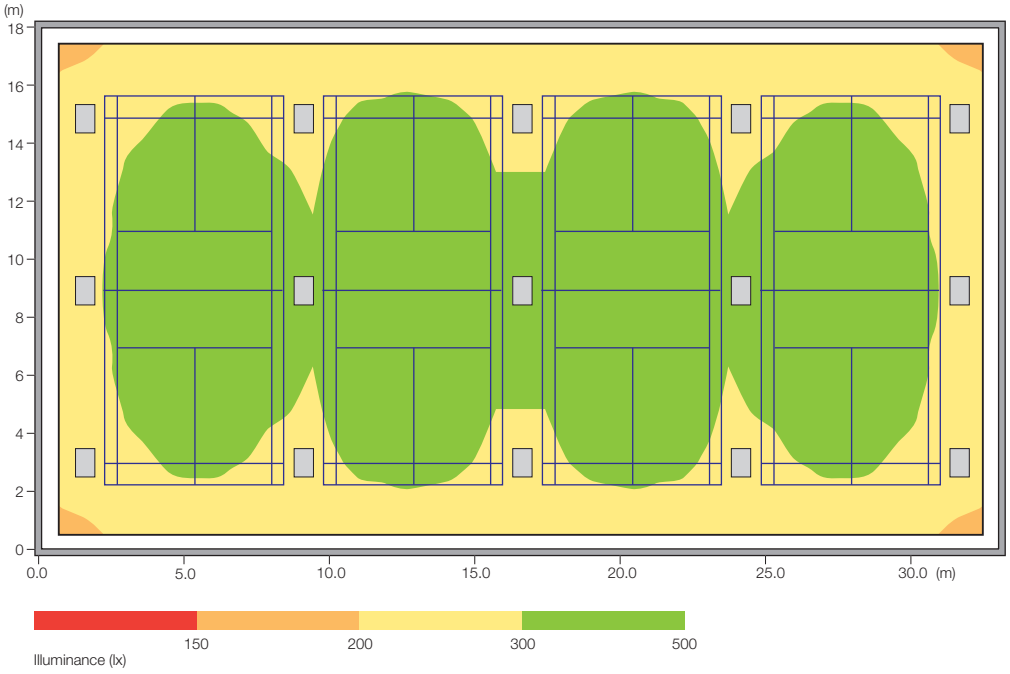


Sports Example

594m^2, 300 lux.

2000 hours per year during daylight, 2000 hours per year during darkness.

Serve 6x55W			
Number of luminaires	20		
Total installed lighting power (W)	5220		
Lighting Control Method	Manual switching	Absence	Absence and dimming
Parasitic power (W)	30	57	60.25
LENI (kWh/m^2 per year)	**23.75**	**18.69**	**14.58**



Product LENI Table

Product Code	Lamps	Total Lamp Lumens	Circuit Watts	Light Output Ratio	Efficacy		Typical LENI	Typical Application *(see inside back cover)*
					Luminaire Lumens per Watt	Lamp Lumens per Watt		
Downlighters								
Mirage MX20								
MX20H113P	1x13W TC-D	900	14	0.57	36.7	64.3	17.5	Circulation
MX20H213P	2x13W TC-D	1800	28	0.60	38.7	64.3	16.7	Circulation
MX20H118P	1x18W TC-D	1200	19	0.69	43.4	63.2	17.0	Circulation
MX20H218P	2x18W TC-D	2400	38	0.69	43.4	63.2	17.2	Circulation
MX20H113S	1x13W TC-D	900	14	0.60	38.5	64.3	17.1	Circulation
MX20H213S	2x13W TC-D	1800	28	0.60	38.5	64.3	18.0	Circulation
MX20H118S	1x18W TC-D	1200	19	0.57	36.2	63.2	17.0	Circulation
MX20H218S	2x18W TC-D	2400	38	0.57	36.2	63.2	18.6	Circulation
Mirage MD24								
MX24H218P	2x18W TC-D	2400	37	0.64	41.2	64.9	18.1	Circulation
MX24H126P	1x26W TC-D	1800	26	0.74	51.1	69.2	17.4	Circulation
MX24H226P	2x26W TC-D	3600	54	0.57	38.0	66.7	18.5	Circulation
MX24H132P	1x32W TC-T	2400	35	0.70	48.2	68.6	16.8	Circulation
MX24H232P	2x32W TC-T	4800	70	0.52	35.6	68.6	17.7	Circulation
MX24H142P	1x42W TC-T	3200	46	0.66	46.1	69.6	17.1	Circulation
MX24H242P	2x42W TC-T	6400	92	0.52	36.4	69.6	18.2	Circulation
MX24H157P	1x57W TC-T	4300	62	0.62	43.2	69.4	17.1	Circulation
MX24H218S	2x18W TC-D	2400	38	0.67	42.5	63.2	17.7	Circulation
MX24H126S	1x26W TC-D	1800	26	0.79	54.3	69.2	17.0	Circulation
MX24H226S	2x26W TC-D	3600	54	0.60	40.2	66.7	17.8	Circulation
MX24H218B	2x18W TC-D	2400	38	0.52	32.8	63.2	18.1	Circulation
MX24H126B	1x26W TC-D	1800	26	0.66	45.9	69.2	17.0	Circulation
MX24H226B	2x26W TC-D	3600	54	0.52	46.8	66.7	17.8	Circulation
MX24H132B	1x32W TC-T	2400	35	0.70	48.2	68.6	16.8	Circulation
MX24H232B	2x32W TC-T	4800	70	0.52	35.6	68.6	17.7	Circulation
MX24H142B	1x42W TC-T	3200	46	0.66	46.1	69.6	17.1	Circulation
MX24H242B	2x42W TC-T	6400	92	0.52	36.4	69.6	18.2	Circulation
MX24H157B	1x57W TC-T	4300	62	0.62	43.2	69.4	17.1	Circulation
Esprit								
ES113H	1x13W TC-D	900	14	0.60	38.3	64.3	19.0	Circulation
ES118H	1x18W TC-D	1200	19	0.77	48.3	63.2	17.0	Circulation
ES218H	2x18W TC-D	2400	38	0.69	43.6	63.2	17.7	Circulation
ES126H	1x26W TC-D	1800	26	0.69	46.2	69.2	17.4	Circulation
ES226H	2x26W TC-D	3600	54	0.61	40.5	66.7	17.8	Circulation
ES132H	1x32W TC-T	2400	35	0.60	41.1	68.6	17.8	Circulation
ES232H	2x32W TC-T	4800	70	0.52	35.7	68.6	18.7	Circulation
ES142H	1x42W TC-T	3200	46	0.59	41.0	69.6	17.7	Circulation
ES242H	2x42W TC-T	6400	92	0.48	33.4	69.6	19.6	Circulation
LDR Micro								
LDR910#20	20W dichroic	360	20	1.00	18.0	18.0	N/A	N/A
LDR917#20	20W dichroic	360	20	1.00	18.0	18.0	N/A	N/A
LDR Mini								
LDR920#20	20W dichroic	360	20	1.00	18.0	18.0	N/A	N/A
LDR925#20	20W dichroic	360	20	1.00	18.0	18.0	N/A	N/A
LDR927#20	20W dichroic	360	20	1.00	18.0	18.0	N/A	N/A

Product LENI Table

Product Code	Lamps	Total Lamp Lumens	Circuit Watts	Light Output Ratio	Efficacy		Typical LENI	Typical Application *(see inside back cover)*
					Luminaire Lumens per Watt	Lamp Lumens per Watt		
LDR Tilt								
LDR950#20	20W dichroic	360	20	1.00	18.0	18.0	N/A	N/A
LDR IP65								
LDR910#20/IP65	20W dichroic	360	20	1.00	18.0	18.0	N/A	N/A
Circo Fast								
FAS-C20-35-W + GB-C20TmE-P	20W CDM-Tm	1650	25	0.81	53.3	66.0	N/A	N/A
FAS-C20-35-W + GB-C35TmE-P	35W CDM-Tm	3300	43	0.81	62.4	76.7	N/A	N/A
FAS-C20-35-M + GB-C20TmE-P	20W CDM-Tm	1650	25	0.81	53.7	66.0	N/A	N/A
FAS-C20-35-M + GB-C35TmE-P	35W CDM-Tm	3300	43	0.81	62.4	76.7	N/A	N/A
FAS-C35-150-W + GB-C35E-P	35W CDM-T	3300	43	0.74	57.1	76.7	N/A	N/A
FAS-C35-150-W + GB-C70E-P	70W CDM-T	6600	80	0.74	61.4	82.5	N/A	N/A
FAS-C35-150-W + GB-C15E-P	150W CDM-T	14000	163	0.74	63.9	85.9	N/A	N/A
FAS-C35-150-M + GB-C35E-P	35W CDM-T	3300	43	0.79	60.8	76.7	N/A	N/A
FAS-C35-150-M + GB-C70E-P	70W CDM-T	6600	80	0.79	65.3	82.5	N/A	N/A
FAS-C35-150-M + GB-C15E-P	150W CDM-T	14000	163	0.79	68.0	85.9	N/A	N/A
FAS-S100-W + GB-S100E-P	100W white SON	9200	114	0.75	60.8	80.7	N/A	N/A
Circo Flex								
GB-C20TmE-P	1x20W CDM-Tm	1650	25	0.77	50.6	66.0	N/A	N/A
GB-C35TmE-P	1x35W CDM-Tm	3300	43	0.74	56.6	76.7	N/A	N/A
GB-C35E-P	1x35W CDM	3300	43	0.84	64.5	76.7	N/A	N/A
GB-C70E-P	1x70W CDM	6600	80	0.84	69.4	82.5	N/A	N/A
GB-S100E-P	1x100W STH	5000	114	0.75	33.0	43.9	N/A	N/A
Display								
Cascade Accent								
CSDAAW155155	2x55W TC-L	9600	116	0.58	47.8	82.8	N/A	N/A
Orbit								
GB-C35E-P + ORB-1LR-11	1x35W CDM-T	3300	40	0.59	48.6	82.5	N/A	N/A
GB-C70E-P + ORB-1LR-11	1x70W CDM-T	6600	80	0.59	48.6	82.5	N/A	N/A
GB-C35E-P + ORB-1LR-12	1x35W CDM-T	3300	40	0.64	52.7	82.5	N/A	N/A
GB-C70E-P + ORB-1LR-12	1x70W CDM-T	6600	80	0.64	52.7	82.5	N/A	N/A
GB-C35E-P + ORB-1LR-13	1x35W CDM-T	3300	40	0.56	45.9	82.5	N/A	N/A
GB-C70E-P + ORB-1LR-13	1x70W CDM-T	6600	80	0.56	45.9	82.5	N/A	N/A
GB-C35E-P + ORB-2LR-11	2x35W CDM-T	6600	40	0.59	97.3	165.0	N/A	N/A
GB-C70E-P + ORB-2LR-11	2x70W CDM-T	13200	80	0.59	97.3	165.0	N/A	N/A
GB-C35E-P + ORB-2LR-12	2x35W CDM-T	6600	40	0.64	105.4	165.0	N/A	N/A
GB-C70E-P + ORB-2LR-12	2x70W CDM-T	13200	80	0.64	105.4	165.0	N/A	N/A
GB-C35E-P + ORB-2LR-13	2x35W CDM-T	6600	40	0.56	91.9	165.0	N/A	N/A
GB-C70E-P + ORB-2LR-13	2x70W CDM-T	13200	80	0.56	91.9	165.0	N/A	N/A
GB-C35E-P + ORB-3LR-11	3x35W CDM-T	9900	40	0.59	145.9	247.5	N/A	N/A
GB-C70E-P + ORB-3LR-11	3x70W CDM-T	19800	80	0.59	145.9	247.5	N/A	N/A
GB-C35E-P + ORB-3LR-12	3x35W CDM-T	9900	40	0.64	158.1	247.5	N/A	N/A
GB-C70E-P + ORB-3LR-12	3x70W CDM-T	19800	80	0.64	158.1	247.5	N/A	N/A
GB-C35E-P + ORB-3LR-13	3x35W CDM-T	9900	40	0.56	137.8	247.5	N/A	N/A
GB-C70E-P + ORB-3LR-13	3x70W CDM-T	19800	80	0.56	137.8	247.5	N/A	N/A
GB-C35E-P + ORB-4LR-11	4x35W CDM-T	13200	40	0.59	194.5	330.0	N/A	N/A

Product Code	Lamps	Total Lamp Lumens	Circuit Watts	Light Output Ratio	Efficacy		Typical LENI	Typical Application *(see inside back cover)*
					Luminaire Lumens per Watt	Lamp Lumens per Watt		
GB-C70E-P + ORB-4LR-11	4x70W CDM-T	26400	80	0.59	194.5	330.0	N/A	N/A
GB-C35E-P + ORB-4LR-12	4x35W CDM-T	13200	40	0.64	210.8	330.0	N/A	N/A
GB-C70E-P + ORB-4LR-12	4x70W CDM-T	26400	80	0.64	210.8	330.0	N/A	N/A
GB-C35E-P + ORB-4LR-13	4x35W CDM-T	13200	40	0.56	183.8	330.0	N/A	N/A
GB-C70E-P + ORB-4LR-13	4x70W CDM-T	26400	80	0.56	183.8	330.0	N/A	N/A
GB-C35E-P + ORB-4SQR-11	4x35W CDM-T	13200	40	0.59	194.5	330.0	N/A	N/A
GB-C70E-P + ORB-4SQR-11	4x70W CDM-T	26400	80	0.59	194.5	330.0	N/A	N/A
GB-C35E-P + ORB-4SQR-12	4x35W CDM-T	13200	40	0.64	210.8	330.0	N/A	N/A
GB-C70E-P + ORB-4SQR-12	4x70W CDM-T	26400	80	0.64	210.8	330.0	N/A	N/A
GB-C35E-P + ORB-4SQR-13	4x35W CDM-T	13200	40	0.56	183.8	330.0	N/A	N/A
GB-C70E-P + ORB-4SQR-13	4x70W CDM-T	26400	80	0.56	183.8	330.0	N/A	N/A
Asymmetric Wall								
ASYU155S	1x55W TC-L	4800	58	0.54	44.3	82.8	N/A	N/A
ASYU255S	2x55W TC-L	9600	116	0.54	44.3	82.8	N/A	N/A
Strato								
STRA-C35E-M3#1	1x35W CDM-T	3300	43	0.68	51.8	76.7	N/A	N/A
STRA-C35E-M3#2	1x35W CDM-T	3300	43	0.71	54.7	76.7	N/A	N/A
STRA-C35E-M3#3	1x35W CDM-T	3300	43	0.72	55.6	76.7	N/A	N/A
STRA-C70E-M3#1	1x70W CDM-T	6600	80	0.68	55.7	82.5	N/A	N/A
STRA-C70E-M3#2	1x70W CDM-T	6600	80	0.71	58.8	82.5	N/A	N/A
STRA-C70E-M3#3	1x70W CDM-T	6600	80	0.71	59.8	82.5	N/A	N/A
Life Q								
LFQH324C1	3x24W T5	5250	79	0.60	40.1	66.5	N/A	N/A
LFQH324C2	6x24W T5	10500	158	0.60	40.1	66.5	N/A	N/A
LFQH324C3	9x24W T5	15750	237	0.60	40.1	66.5	N/A	N/A
LFQH324C4	12x24W T5	21000	316	0.60	40.1	66.5	N/A	N/A
LFQH324C6	18x24W T5	31500	474	0.60	40.1	66.5	N/A	N/A
Life L								
LFLH154A	1x54W T5	4450	61	0.30	22.1	73.0	N/A	N/A
LFLH154B	1x54W T5	4450	61	0.30	22.1	73.0	N/A	N/A
Suspended								
Vector								
VECW5H13570#	1x35W T5	3300	40	0.96	79.6	82.5	18.4	Office
VECW5H13590#	1x35W T5	3300	40	0.78	64.6	82.5	19.1	Office
VECW5H23560#	2x35W T5	6600	77	0.94	80.6	85.7	19.2	Office
VECW5H23590#	2x35W T5	6600	77	0.69	59.1	85.7	20.3	Office
VECW5H14970#	1x49W T5	4300	56	0.96	74.1	76.8	19.0	Office
VECW5H14990#	1x49W T5	4300	56	0.78	60.3	76.8	19.9	Office
VECW5H24960#	2x49W T5	8600	111	0.85	65.6	77.5	20.7	Office
VECW5H24990#	2x49W T5	8600	111	0.62	48.1	77.5	22.1	Office
VECW5H15470#	1x54W T5	4450	61	0.96	70.4	73.0	19.5	Office
VECW5H15490#	1x54W T5	4450	61	0.78	57.1	73.0	19.5	Office
VECW5H25460#	2x54W T5	8900	118	0.85	63.8	75.4	19.8	Office
VECW5H25490#	2x54W T5	8900	118	0.71	53.2	75.4	21.2	Office

Product LENI Table

Product Code	Lamps	Total Lamp Lumens	Circuit Watts	Light Output Ratio	Efficacy		Typical LENI	Typical Application *(see inside back cover)*
					Luminaire Lumens per Watt	Lamp Lumens per Watt		
Glide								
GLIW5H154#	1x54W T5	4450	61	0.81	59.2	73.0	20.4	Office
GLIW5H254#	2x54W T5	8900	118	0.61	45.8	75.4	22.7	Office
GLIW5H135#	1x35W T5	3300	40	0.81	67.0	82.5	18.9	Office
GLIW5H235#	2x35W T5	6600	77	0.61	52.0	85.7	21.4	Office
Foil								
FLL#30H221#	2x21W T5	3800	46	0.75	61.5	82.6	17.6	Education
FLL#30H228#	2x28W T5	5200	118	0.76	33.6	44.1	17.1	Education
FLL#30H239#	2x39W T5	6200	83	0.79	59.3	74.7	18.2	Education
FLL#30H254#	2x54W T5	8900	118	0.79	59.4	75.4	18.3	Education
Foil Duo								
FDL830H221#	2x21W T5	3800	46	0.64	53.1	82.6	19.3	Education
FDL830H235#	2x35W T5	6600	77	0.64	55.1	85.7	18.2	Education
FDL830H249#	2x49W T5	8600	111	0.64	49.8	77.5	20.7	Education
FDL830H254#	2x54W T5	8900	118	0.64	48.5	75.4	18.3	Education
Orias								
ORPWH128#	1x28W T5	2600	33	0.81	64.0	78.8	18.4	Office
ORPWH135#	1x35W T5	3300	40	0.81	67.0	82.5	18.9	Office
ORPWH149#	1x49W T5	4300	55	0.81	63.5	78.2	19.0	Office
ORPWH154#	1x54W T5	4450	60	0.81	60.2	74.2	20.4	Office
ORPWH228#	2x28W T5	5200	63	0.61	50.1	82.5	13.3	Office
ORPWH235#	2x35W T5	6600	80	0.61	50.1	82.5	21.4	Office
ORPWH249#	2x49W T5	8600	111	0.61	47.0	77.5	13.9	Office
ORPWH254#	2x54W T5	8900	119	0.61	45.4	74.8	22.7	Office
ORPDH128#	1x28W T5	2600	33	0.81	64.0	78.8	18.4	Office
ORPDH135#	1x35W T5	3300	40	0.81	67.0	82.5	18.9	Office
ORPDH149#	1x49W T5	4300	55	0.81	63.5	78.2	19.0	Office
ORPDH154#	1x54W T5	4450	60	0.81	60.2	74.2	20.4	Office
ORPDH228#	2x28W T5	5200	63	0.61	50.1	82.5	13.3	Office
ORPDH235#	2x35W T5	6600	80	0.61	50.1	82.5	21.4	Office
ORPDH249#	2x49W T5	8600	111	0.61	47.0	77.5	13.9	Office
ORPDH254#	2x54W T5	8900	119	0.61	45.4	74.8	22.7	Office
Recessed Fluorescent								
Softcell 3								
SOF3W5H314	3x14W T5	3600	47	0.66	50.6	76.6	24.3	Office
SOF3W5H414	4x14W T5	4800	62	0.64	49.3	77.4	22.3	Office
SOF3W5H324	3x24W T5	5250	79	0.64	42.3	66.5	22.6	Office
SOF3W5H424	4x24W T5	7000	102	0.69	47.4	68.6	21.3	Office
SOF35W5H314	3x14W T5	3600	47	0.56	43.2	76.6	24.3	Office
SOF35W5H414	4x14W T5	4800	62	0.60	46.4	77.4	22.3	Office

Product Code	Lamps	Total Lamp Lumens	Circuit Watts	Light Output Ratio	Efficacy		Typical LENI	Typical Application *(see inside back cover)*
					Luminaire Lumens per Watt	Lamp Lumens per Watt		
Vivant								
VIVM224	2x24W T5	3600	51	0.65	45.9	70.6	22.0	Office
VIVM414	4x14W T5	4800	62	0.63	49.0	77.4	23.1	Office
VIVM255	2x55W TC-L	9600	116	0.65	54.0	82.8	20.9	Office
VIV5M224	2x24W T5	3500	51	0.65	44.6	68.6	22.0	Office
VIV5M414	4x14W T5	4800	62	0.63	49.0	77.4	23.4	Office
VIV5M236	2x36W TC-L	5800	72	0.53	42.7	80.6	21.8	Office
Vivant Mist								
VIVMP414	4x14W T5	4800	62	0.62	47.9	77.4	23.2	Office
Vivant 300								
VIVM128	1x28W T5	1200	33	0.76	27.6	36.4	20.3	Office
VIVM228	2x28W T5	2400	62	0.59	22.7	38.7	21.1	Office
VIVM154	1x54W T5	4450	61	0.79	55.3	73.0	20.8	Office
VIVM254	2x54W T5	8900	118	0.59	44.2	75.4	20.9	Office
Spear Profile								
SPPH314	3x14W T5	3600	47	0.74	56.5	76.6	20.2	Office
SPPH414	4x14W T5	4800	62	0.68	52.6	77.4	21.1	Office
SPPH324	3x24W T5	5250	79	0.77	50.9	66.5	20.6	Office
Cirrus 300								
CIRH128	1x28W T5	1200	33	0.57	20.7	36.4	21.9	Office
CIRH228	2x28W T5	2400	62	0.57	22.1	38.7	21.7	Office
CIRH154	1x54W T5	4450	61	0.55	39.8	73.0	22.4	Office
CIRH254	2x54W T5	8900	118	0.56	42.2	75.4	22.7	Office
Cascade								
CSDWH414	4x14W T5	4800	62	0.73	56.2	77.4	19.4	Education
CSDWH224	2x24W T5	3500	46	0.72	54.6	76.1	20.1	Education
CSDWH140	1x40W TC-L	3500	44	0.69	55.1	79.5	19.2	Education
CSDWH240	2x40W TC-L	7000	89	0.69	54.1	78.7	19.1	Education
CSDWH155	1x55W TC-L	4800	58	0.66	54.5	82.8	19.0	Education
CSDWH255	2x55W TC-L	9600	116	0.69	56.9	82.8	18.2	Education
CSDPH414	4x14W T5	4800	62	0.47	36.5	77.4	21.7	Education
CSDPH224	2x24W T5	3500	46	0.50	37.9	76.1	22.0	Education
CSDPH140	1x40W TC-L	3500	44	0.47	37.4	79.5	22.5	Education
CSDPH240	2x40W TC-L	7000	89	0.42	33.0	78.7	22.4	Education
CSDPH155	1x55W TC-L	4800	58	0.47	38.9	82.8	21.1	Education
CSDPH255	2x55W TC-L	9600	116	0.42	34.8	82.8	21.1	Education
Cascade Retail								
CSDWH255RLV	2x55W TC-L	9600	116	0.66	54.4	82.8	25.9	Office
Spear								
S2W2H314	3x14W T5	3600	47	0.73	55.6	76.6	20.2	Office
S2W2H414	4x14W T5	4800	62	0.76	58.8	77.4	20.1	Office
Broadspread Contenda								
BCNW2H418	4x18W T8	4600	70	0.57	37.3	65.7	22.1	Office
BCNFPH418	4x18W T8	4600	70	0.60	39.4	65.7	22.1	Office

Product LENI Table

Product Code	Lamps	Total Lamp Lumens	Circuit Watts	Light Output Ratio	Efficacy		Typical LENI	Typical Application *(see inside back cover)*
					Luminaire Lumens per Watt	Lamp Lumens per Watt		
Spear Diffuser								
SFPH414	4x14W T5	4800	62	0.64	49.3	77.4	20.5	Office
SFPH324	3x24W T5	5250	79	0.64	42.3	66.5	23.0	Office
SFPH424	4x24W T5	7000	102	0.64	43.7	68.6	23.0	Office
Hygiene								
HYGP314	3x14W T5	3600	47	0.62	47.1	76.6	23.1	Office
HYGP414	4x14W T5	4800	62	0.62	47.7	77.4	22.3	Office
HYGP424	4x24W T5	7000	102	0.62	42.3	68.6	22.7	Office
HYGP428	4x28W T5	10400	124	0.62	51.7	83.9	21.6	Office
Duo Side Optic								
DUOSH414PXT	4x14W T5	4800	62	0.62	48.0	77.4	21.7	Office
DUOSH414VXT	4x14W T5	4800	62	0.69	53.7	77.4	20.5	Office
DUOSH324VXT	3x24W T5	5250	79	0.74	49.2	66.5	21.6	Office
DUOSH414WXT	4x14W T5	4800	62	0.64	49.6	77.4	20.5	Office
DUOSH324WXT	3x24W T5	5250	79	0.74	49.1	66.5	21.6	Office
Duo Centre Optic								
DUOCH324PXT	3x24W T5	5250	79	0.61	40.8	66.5	22.7	Office
DUOCH414VXT	4x14W T5	4800	62	0.67	51.8	77.4	20.5	Office
DUOCH324VXT	3x24W T5	5250	79	0.75	49.6	66.5	21.6	Office
DUOCH414WXT	4x14W T5	4800	62	0.74	57.3	77.4	20.5	Office
DUOCH324WXT	3x24W T5	5250	79	0.74	49.2	66.5	21.6	Office
Duo 500								
DUO5CH414VXT	4x14W T5	4800	62	0.54	42.3	77.4	20.5	Office
Duo Linear								
DUOCH228PST	2x28W T5	5200	62	0.53	44.7	83.9	22.7	Office
DUOCH128PST	1x28W T5	2600	33	0.67	52.9	78.8	20.7	Office
DUOCH228VST	2x28W T5	5200	62	0.78	65.0	83.9	18.6	Office
DUOCH128VST	1x28W T5	2600	33	0.74	58.5	78.8	20.0	Office
DUOCH228WST	2x28W T5	5200	62	0.77	64.3	83.9	18.6	Office
DUOCH128WST	1x28W T5	2600	33	0.70	54.9	78.8	20.0	Office
Cascade TSI								
CTSH414	4x14W T5	4800	62	0.59	45.8	77.4	21.7	Education
CTSH240	2x40W TC-L	7000	89	0.58	45.8	78.7	25.7	Education
Surface Fluorescent								
Laguna								
LNH228	1x28W 2D T5	2050	29	0.56	39.6	70.7	18.6	Circulation
LNH238	1x38W 2D T5	2850	40	0.56	39.9	71.3	18.4	Circulation
Horizon								
HRH228	1x28W 2D T5	2050	29	0.55	38.7	70.7	17.9	Circulation
HRH238	1x38W 2D T5	2850	40	0.55	39.0	71.3	18.4	Circulation
Lunar								
LUNH28W	1x28W 2D T5	2050	29	0.37	26.4	70.7	21.1	Circulation
LUNH38W	1x38W 2D T5	2850	40	0.37	26.6	71.3	19.9	Circulation

Product Code	Lamps	Total Lamp Lumens	Circuit Watts	Light Output Ratio	Efficacy		Typical LENI	Typical Application *(see inside back cover)*
					Luminaire Lumens per Watt	Lamp Lumens per Watt		
Flight								
FLT2369H	2x36W TC-L	5800	72	0.63	50.6	80.6	N/A	N/A
FLT2409H	2x40W TC-L	7000	89	0.63	49.4	78.7	N/A	N/A
FLT2559H	2x55W TC-L	9600	116	0.63	52.0	82.8	N/A	N/A
FLT3559H	3x55W TC-L	14400	174	0.63	52.0	82.8	N/A	N/A
FLT4559H	4x55W TC-L	19200	232	0.68	56.6	82.8	N/A	N/A
FLTF455H	4x55W TC-L	19200	232	0.68	56.6	82.8	N/A	N/A
Oasis Wall								
OAGW2H140	1x40W TC-L	3500	44	0.70	55.3	79.5	N/A	N/A
OAGW2H155	2x40W TC-L	7000	89	0.70	54.7	78.7	N/A	N/A
Vespere Wall								
VWMH236	2x36W TC-L	5800	72	0.40	32.2	80.6	23.2	Circulation
Comfort Surface								
CS128HW	1x28W T5	2600	33	0.53	41.8	78.8	20.4	Education
CS154HW	1x54W T5	4450	61	0.53	38.7	73.0	21.4	Education
CS135HW	1x35W T5	3300	40	0.53	43.7	82.5	20.2	Education
CS228HW	2x28W T5	5200	62	0.53	44.5	83.9	19.4	Education
CS254HW	2x54W T5	8900	118	0.53	40.0	75.4	21.2	Education
CS235HW	2x35W T5	6600	77	0.53	45.4	85.7	20.1	Education
CS136HW	1x36W T8	2600	37	0.57	40.1	70.3	19.4	Education
CS158HW	1x58W T8	4600	56	0.57	46.8	82.1	19.0	Education
CS236HW	2x36W T8	5200	70	0.55	40.9	74.3	17.8	Education
CS258HW	2x58W T8	9200	107	0.55	47.3	86.0	21.1	Education
Radial								
RADH128	1x28W T5	2600	33	0.85	66.9	78.8	17.4	Circulation
RADH135	1x35W T5	3300	40	0.85	70.1	82.5	17.0	Circulation
RADH149	1x49W T5	4300	56	0.85	65.2	76.8	17.4	Circulation
RADH154	1x54W T5	4450	61	0.81	59.3	73.0	17.8	Circulation
Stiletto Five								
STLH128	1x28W T5	2600	33	0.79	62.3	78.8	18.8	Education
STLH135	1x35W T5	3300	40	0.81	66.9	82.5	18.4	Education
STLH149	1x49W T5	4300	56	0.82	62.7	76.8	18.7	Education
STLH154	1x54W T5	4450	61	0.79	57.8	73.0	19.3	Education
STLH228	2x28W T5	5200	62	0.82	68.5	83.9	18.6	Education
STLH235	2x35W T5	6600	77	0.82	70.6	85.7	18.2	Education
STLH249	2x49W T5	8600	111	0.82	63.8	77.5	18.0	Education
Orias								
ORSWH128#	1x28W T5	2600	33	0.81	64.0	78.8	18.4	Office
ORSWH135#	1x35W T5	3300	40	0.81	67.0	82.5	18.9	Office
ORSWH149#	1x49W T5	4300	55	0.81	63.5	78.2	19.0	Office
ORSWH154#	1x54W T5	4450	60	0.81	60.2	74.2	20.4	Office
ORSWH228#	2x28W T5	5200	63	0.61	50.1	82.5	13.3	Office
ORSWH235#	2x35W T5	6600	80	0.61	50.1	82.5	21.4	Office
ORSWH249#	2x49W T5	8600	111	0.61	47.0	77.5	13.9	Office
ORSWH254#	2x54W T5	8900	119	0.61	45.4	74.8	22.7	Office

Product LENI Table

Product Code	Lamps	Total Lamp Lumens	Circuit Watts	Light Output Ratio	Efficacy		Typical LENI	Typical Application *(see inside back cover)*
					Luminaire Lumens per Watt	Lamp Lumens per Watt		
ORSDH128#	1x28W T5	2600	33	0.81	64.0	78.8	18.4	Office
ORSDH135#	1x35W T5	3300	40	0.81	67.0	82.5	18.9	Office
ORSDH149#	1x49W T5	4300	55	0.81	63.5	78.2	19.0	Office
ORSDH154#	1x54W T5	4450	60	0.81	60.2	74.2	20.4	Office
ORSDH228#	2x28W T5	5200	63	0.61	50.1	82.5	13.3	Office
ORSDH235#	2x35W T5	6600	80	0.61	50.1	82.5	21.4	Office
ORSDH249#	2x49W T5	8600	111	0.61	47.0	77.5	13.9	Office
ORSDH254#	2x54W T5	8900	119	0.61	45.4	74.8	22.7	Office
Healthcare								
Florence								
FLOX5454	2x54W T5	8900	118	0.54	40.6	75.4	N/A	N/A
FLOX5555	2x55W TC-L	9600	116	0.46	37.7	82.8	N/A	N/A
Medilight								
MED4R	3x54W T5	13350	179	0.54	40.3	74.6	N/A	N/A
Nightingale								
NX24R226	2x26W TC-D	3600	54	0.41	27.3	66.7	N/A	N/A
Surgeon								
SURGXR155	1x55W TC-L	4800	58	0.38	31.4	82.8	N/A	N/A
HDU								
HDUM455R	4x55W TC-L	19200	232	0.61	50.2	82.8	N/A	N/A
HDUN455R	4x55W TC-L	19200	232	0.61	50.2	82.8	N/A	N/A
Broadspread Asymmetric								
BASYH154	1x54W T5	4450	61	0.65	47.7	73.0	17.7	Circulation
BASYH154NL	1x54W T5	4450	68	0.65	42.8	65.4	18.3	Circulation
Gibraltar Corridor								
GIBYH128XT	1x28W T5	2600	33	0.92	72.1	78.8	16.6	Circulation
GIBYH154XT	1x54W T5	4450	61	0.87	63.8	73.0	17.0	Circulation
DTFN Elite TA								
DTFNWGH428TA	4x28W T5	10400	124	0.55	46.3	83.9	21.4	Healthcare
DTFNWGH454TA	4x54W T5	17800	236	0.57	43.0	75.4	21.8	Healthcare
DTFNWFH428TA	4x28W T5	10400	124	0.61	51.5	83.9	19.9	Healthcare
DTFNWFH454TA	4x54W T5	17800	236	0.54	40.9	75.4	21.8	Healthcare
DTFNAGH428TA	4x28W T5	10400	124	0.61	50.8	83.9	21.4	Healthcare
DTFNAGH354TA	3x54W T5	13350	179	0.59	44.2	74.6	23.0	Healthcare
DTFNAGH454TA	4x54W T5	17800	236	0.61	45.7	75.4	21.8	Healthcare
DTFNKH428TA	4x28W T5	10400	124	0.65	54.2	83.9	21.4	Healthcare
DTFNKH354TA	3x54W T5	13350	179	0.62	46.3	74.6	21.3	Healthcare
DTFNKH454TA	4x54W T5	17800	236	0.58	43.7	75.4	21.8	Healthcare

Product Code	Lamps	Total Lamp Lumens	Circuit Watts	Light Output Ratio	Efficacy		Typical LENI	Typical Application *(see inside back cover)*
					Luminaire Lumens per Watt	Lamp Lumens per Watt		
Horizon AL								
HAL128	1x28W 2D T5	2050	29	0.50	35.3	70.7	19.3	Circulation
HAL138	1x38W 2D T5	2850	40	0.50	35.6	71.3	18.9	Circulation
HAL155	1x55W 2D	4800	58	0.50	41.4	82.8	19.7	Circulation
HAL128NL	1x28W 2D T5 1x7W night-light	2050	36	0.50	28.5	56.9	20.7	Circulation
HAL138NL	1x38W 2D T5 1x7W night-light	2850	47	0.50	30.3	60.6	20.1	Circulation
HAL155NL	1x55W 2D 1x7W night-light	4800	65	0.50	36.9	73.8	20.5	Circulation
Mirage AL								
MX24ALH218	2x18W TC-D	2400	38	0.39	24.5	63.2	22.2	Circulation
MX24ALH226	2x26W TC-D	3600	54	0.39	25.8	66.7	19.8	Circulation
MX24ALH218T	2x18W TC-D	2400	38	0.22	13.7	63.2	27.3	Circulation
MX24ALH226T	2x26W TC-D	3600	54	0.22	14.4	66.7	24.5	Circulation
Vigilant								
VIGX5454	3x54W T5	13350	179	0.57	42.7	74.6	N/A	N/A
Esprit MRI								
ESTH75	1x75W TH	1000	75	0.85	11.3	13.3	N/A	N/A
Clean Area								
Lamina								
LAMD128	1x28W T5	2600	33	0.98	77.3	78.8	19.8	Healthcare
LAMD154	1x54W T5	4450	61	0.88	64.4	73.0	21.4	Healthcare
Curie Elite								
CUWGH414	4x14W T5	4800	62	0.56	44.8	77.4	22.0	Healthcare
CUWGH424	4x24W T5	7000	102	0.55	37.5	68.6	24.5	Healthcare
CUWGH228	2x28W T5	5200	62	0.54	45.3	83.9	22.3	Healthcare
CUWGH428	4x28W T5	10400	124	0.55	46.3	83.9	21.4	Healthcare
CUWGH254	2x54W T5	8900	118	0.51	38.6	75.4	24.2	Healthcare
CUWGH454	4x54W T5	17800	236	0.57	43.0	75.4	21.8	Healthcare
CUAGH414	4x14W T5	4800	62	0.63	49.1	77.4	22.0	Healthcare
CUAGH424	4x24W T5	7000	102	0.63	43.5	68.6	22.8	Healthcare
CUAGH228	2x28W T5	5200	62	0.59	49.3	83.9	22.3	Healthcare
CUAGH428	4x28W T5	10400	124	0.61	50.8	83.9	21.4	Healthcare
CUAGH254	2x54W T5	8900	118	0.56	42.2	75.4	22.5	Healthcare
CUAGH354	3x54W T5	13350	179	0.59	44.2	74.6	23.0	Healthcare
CUAGH454	4x54W T5	17800	236	0.61	45.7	75.4	21.8	Healthcare
Lister								
LISKH414	4x14W T5	4800	62	0.66	50.8	77.4	12.5	Healthcare
LISKH424	4x24W T5	7000	102	0.59	40.6	68.6	12.5	Healthcare
LISKH228	2x28W T5	5200	62	0.54	44.9	83.9	12.5	Healthcare
LISKH428	4x28W T5	10400	124	0.64	54.0	83.9	12.5	Healthcare
LISKH254	2x54W T5	8900	118	0.51	38.4	75.4	12.5	Healthcare
LISKH354	3x54W T5	13350	179	0.62	46.1	74.6	12.5	Healthcare
LISKH454	4x54W T5	17800	236	0.57	43.4	75.4	12.5	Healthcare

Product LENI Table

Product Code	Lamps	Total Lamp Lumens	Circuit Watts	Light Output Ratio	Efficacy		Typical LENI	Typical Application *(see inside back cover)*
					Luminaire Lumens per Watt	Lamp Lumens per Watt		
DTFN Elite								
DTFNWGH414	4x14W T5	4800	62	0.56	44.8	77.4	22.0	Healthcare
DTFNWGH424	4x24W T5	7000	102	0.55	37.5	68.6	24.5	Healthcare
DTFNWGH228	2x28W T5	5200	62	0.54	45.3	83.9	22.3	Healthcare
DTFNWGH428	4x28W T5	10400	124	0.55	46.3	83.9	21.4	Healthcare
DTFNWGH254	2x54W T5	8900	118	0.51	38.6	75.4	24.2	Healthcare
DTFNWGH454	4x54W T5	17800	236	0.57	43.0	75.4	21.8	Healthcare
DTFNWFH414	4x14W T5	4800	62	0.64	49.9	77.4	22.0	Healthcare
DTFNWFH424	4x24W T5	7000	102	0.57	39.0	68.6	24.5	Healthcare
DTFNWFH228	2x28W T5	5200	62	0.52	43.9	83.9	23.5	Healthcare
DTFNWFH428	4x28W T5	10400	124	0.61	51.5	83.9	21.4	Healthcare
DTFNWFH254	2x54W T5	8900	118	0.50	37.5	75.4	24.2	Healthcare
DTFNWFH454	4x54W T5	17800	236	0.54	40.9	75.4	21.8	Healthcare
DTFNAGH414	4x14W T5	4800	62	0.63	49.1	77.4	22.0	Healthcare
DTFNAGH424	4x24W T5	7000	102	0.63	43.5	68.6	22.8	Healthcare
DTFNAGH228	2x28W T5	5200	62	0.59	49.3	83.9	22.3	Healthcare
DTFNAGH428	4x28W T5	10400	124	0.61	50.8	83.9	21.4	Healthcare
DTFNAGH254	2x54W T5	8900	118	0.56	42.2	75.4	22.5	Healthcare
DTFNAGH354	3x54W T5	13350	179	0.59	44.2	74.6	23.0	Healthcare
DTFNAGH454	4x54W T5	17800	236	0.61	45.7	75.4	21.8	Healthcare
DTFNKH414	4x14W T5	4800	62	0.68	52.3	77.4	22.0	Healthcare
DTFNKH424	4x24W T5	7000	102	0.61	41.8	68.6	24.5	Healthcare
DTFNKH228	2x28W T5	5200	62	0.58	48.6	83.9	22.3	Healthcare
DTFNKH428	4x28W T5	10400	124	0.65	54.2	83.9	21.4	Healthcare
DTFNKH254	2x54W T5	8900	118	0.55	41.5	75.4	24.2	Healthcare
DTFNKH354	3x54W T5	13350	179	0.62	46.3	74.6	21.3	Healthcare
DTFNKH454	4x54W T5	17800	236	0.58	43.7	75.4	24.1	Healthcare
DTFA Elite								
DTFAWGH414	4x14W T5	4800	62	0.54	41.5	77.4	22.0	Healthcare
DTFAWGH424	4x24W T5	7000	102	0.51	34.7	68.6	24.5	Healthcare
DTFAWGH228	2x28W T5	5200	62	0.47	39.6	83.9	22.3	Healthcare
DTFAWGH428	4x28W T5	10400	124	0.54	44.9	83.9	21.4	Healthcare
DTFAWGH254	2x54W T5	8900	118	0.45	33.9	75.4	24.2	Healthcare
DTFAWGH454	4x54W T5	17800	236	0.55	41.6	75.4	21.8	Healthcare
DTFAWFH414	4x14W T5	4800	62	0.60	46.2	77.4	22.0	Healthcare
DTFAWFH424	4x24W T5	7000	102	0.53	36.1	68.6	24.5	Healthcare
DTFAWFH228	2x28W T5	5200	62	0.46	38.5	83.9	23.5	Healthcare
DTFAWFH428	4x28W T5	10400	124	0.60	50.0	83.9	21.4	Healthcare
DTFAWFH254	2x54W T5	8900	118	0.44	32.9	75.4	24.2	Healthcare
DTFAWFH454	4x54W T5	17800	236	0.56	42.3	75.4	21.8	Healthcare
DTFAAGH414	4x14W T5	4800	62	0.59	45.5	77.4	22.0	Healthcare
DTFAAGH424	4x24W T5	7000	102	0.59	40.3	68.6	22.8	Healthcare
DTFAAGH228	2x28W T5	5200	62	0.52	43.3	83.9	22.3	Healthcare
DTFAAGH428	4x28W T5	10400	124	0.59	49.3	83.9	21.4	Healthcare
DTFAAGH254	2x54W T5	8900	118	0.49	37.0	75.4	22.5	Healthcare
DTFAAGH354	3x54W T5	13350	179	0.58	42.9	74.6	23.0	Healthcare
DTFAAGH454	4x54W T5	17800	236	0.59	44.3	75.4	21.8	Healthcare

Product Code	Lamps	Total Lamp Lumens	Circuit Watts	Light Output Ratio	Efficacy		Typical LENI	Typical Application *(see inside back cover)*
					Luminaire Lumens per Watt	Lamp Lumens per Watt		
DTFAKH414	4x14W T5	4800	62	0.63	48.4	77.4	22.0	Healthcare
DTFAKH424	4x24W T5	7000	102	0.56	38.7	68.6	24.5	Healthcare
DTFAKH228	2x28W T5	5200	62	0.51	42.6	83.9	22.3	Healthcare
DTFAKH428	4x28W T5	10400	124	0.63	52.6	83.9	21.4	Healthcare
DTFAKH254	2x54W T5	8900	118	0.48	36.4	75.4	24.2	Healthcare
DTFAKH354	3x54W T5	13350	179	0.60	44.9	74.6	21.3	Healthcare
DTFAKH454	4x54W T5	17800	236	0.56	42.3	75.4	24.1	Healthcare
DTBY								
DTBYWFH228	2x28W T5	5200	62	0.52	43.8	83.9	23.5	Healthcare
DTBYWFH254	2x54W T5	8900	118	0.50	37.4	75.4	24.2	Healthcare
DTBYKH228	2x28W T5	5200	62	0.58	48.4	83.9	22.3	Healthcare
DTBYKH254	2x54W T5	8900	118	0.55	41.4	75.4	24.2	Healthcare
Industrial								
Trimpak T5								
TP128H	1x28W T5	2600	33	0.96	75.6	78.8	29.9	Factory
TP154H	1x54W T5	4450	61	0.96	70.0	73.0	31.5	Factory
TP135H	1x35W T5	3300	40	0.96	79.2	82.5	30.1	Factory
TP180H	1x80W T5	6150	88	0.96	67.1	69.9	33.8	Factory
TP228H	2x28W T5	5200	62	0.93	78.0	83.9	30.7	Factory
TP254H	2x54W T5	8900	118	0.93	70.1	75.4	32.4	Factory
TP235H	2x35W T5	6600	77	0.93	79.7	85.7	30.0	Factory
TP280H	2x80W T5	12300	172	0.93	66.5	71.5	33.2	Factory
Trimpak								
TP14HF	1x36W T8	2600	37	0.85	59.7	70.3	31.9	Factory
TP15HF	1x58W T8	4600	56	0.85	69.8	82.1	33.8	Factory
TP16HF	1x70W T8	5550	68	0.85	69.4	81.6	34.1	Factory
TP24HF	2x36W T8	5200	70	0.89	66.1	74.3	30.3	Factory
TP25HF	2x58W T8	9200	107	0.89	76.5	86.0	32.1	Factory
TP26HF	2x70W T8	11100	129	0.89	76.6	86.0	32.9	Factory
ACF Duralite T5								
ACF154HP	1x54W T5	4450	61	0.83	60.6	73.0	34.6	Factory
ACF135HP	1x35W T5	3300	40	0.85	70.0	82.5	31.2	Factory
ACF254HP	2x54W T5	8900	118	0.87	65.7	75.4	32.4	Factory
ACF235HP	2x35W T5	6600	77	0.87	74.7	85.7	30.0	Factory
ACF Duralite								
ACF14HFP	1x36W T8	2600	37	0.63	44.0	70.3	38.2	Factory
ACF15HFP	1x58W T8	4600	56	0.65	53.0	82.1	40.4	Factory
ACF24HFP	2x36W T8	5200	70	0.60	44.3	74.3	35.3	Factory
ACF25HFP	2x58W T8	9200	107	0.61	52.9	86.0	38.8	Factory
ACFDN								
ACFDN14HP	1x36W T8	2600	37	0.68	48.1	70.3	35.6	Factory
ACFDN24HP	2x36W T8	5200	56	0.69	64.0	92.9	33.6	Factory
ACFDN15HP	1x58W T8	4600	70	0.68	45.0	65.7	38.6	Factory
ACFDN25HP	2x58W T8	9200	107	0.69	59.2	86.0	36.5	Factory

Product LENI Table

Product Code	Lamps	Total Lamp Lumens	Circuit Watts	Light Output Ratio	Efficacy		Typical LENI	Typical Application *(see inside back cover)*
					Luminaire Lumens per Watt	Lamp Lumens per Watt		
Strike								
STRH128	1x28W T5	2600	33	0.87	68.7	78.8	29.9	Factory
STRH135	1x35W T5	3300	40	0.88	72.6	82.5	29.0	Factory
STRH149	1x49W T5	4300	56	0.88	67.8	76.8	29.6	Factory
STRH154	1x54W T5	4450	61	0.87	63.6	73.0	31.5	Factory
STRH228	2x28W T5	5200	62	0.84	70.8	83.9	29.3	Factory
STRH235	2x35W T5	6600	77	0.87	74.8	85.7	28.4	Factory
STRH249	2x49W T5	8600	111	0.87	67.7	77.5	30.4	Factory
STRH254	2x54W T5	8900	118	0.84	63.7	75.4	30.4	Factory
Hibay								
BA250S	1x250W SON-E	27000	275	0.81	79.9	98.2	21.8	Warehouse
BA400S	1x400W SON-E	48000	440	0.81	142.0	174.5	22.9	Warehouse
BA250H	1x250W HQI-E	20000	275	0.81	35.4	43.5	21.8	Warehouse
BA400H	1x400W HQI-E	30500	460	0.81	54.0	66.3	22.9	Warehouse
Harrier								
HR250S	1x250W SON-T	27000	275	0.79	77.7	98.2	21.8	Warehouse
HR250H	1x250W HQI-T	20000	275	0.72	52.7	72.7	23.7	Warehouse
HR400S	1x400W SON-T	48000	440	0.72	79.0	109.1	20.4	Warehouse
HR400H	1x400W HQI-T	30500	460	0.72	48.0	66.3	22.0	Warehouse
HRM250S	1x250W SON-T	27000	275	0.75	74.0	98.2	20.3	Warehouse
HRM250H	1x250W HQI-T	20000	275	0.72	52.2	72.7	21.8	Warehouse
HRM400S	1x400W SON-T	48000	440	0.75	82.3	109.1	20.4	Warehouse
HRM400H	1x400W HQI-T	30500	460	0.72	47.6	66.3	22.0	Warehouse
HRR250S	1x250W SON-T	27000	275	0.81	79.2	98.2	20.3	Warehouse
HRR250H	1x250W HQI-T	20000	275	0.75	54.5	72.7	21.8	Warehouse
HRR400S	1x400W SON-T	48000	440	0.81	88.0	109.1	20.4	Warehouse
HRR400H	1x400W HQI-T	30500	460	0.75	49.7	66.3	22.0	Warehouse
Serve 6								
SLBH655G	6x55W TC-L	28800	348	0.68	55.9	82.8	24.3	Warehouse
Aerial								
AERH680	6x80W T5	36900	516	0.81	57.6	71.5	23.1	Warehouse
AERH480	4x80W T5	24600	348	0.91	64.3	70.7	22.3	Warehouse
AERH380	3x80W T5	18450	260	0.88	62.1	71.0	24.1	Warehouse
Enterprise								
ENH255	2x55W TC-L	9600	116	0.55	45.2	82.8	13.0	Circulation
Euroflood Mini								
SC70	70W HQI	5500	89	0.68	42.0	61.8	28.1	Warehouse
SC150	150W HQI	11000	170	0.68	44.0	64.7	28.0	Warehouse
SC70	70W SON-TS	5900	83	0.68	48.3	71.1	24.9	Warehouse
SC150	150W SON-TS	14500	170	0.68	58.0	85.3	24.8	Warehouse
SC300	300W TH	5000	300	0.68	11.3	16.7	74.0	Warehouse

Product Code	Lamps	Total Lamp Lumens	Circuit Watts	Light Output Ratio	Efficacy		Typical LENI	Typical Application *(see inside back cover)*
					Luminaire Lumens per Watt	Lamp Lumens per Watt		
Euroflood Midi								
SC250S	250W SON-T	27000	281	0.74	71.5	96.1	22.0	Warehouse
SC400S	400W SON-T	48000	440	0.74	33.8	45.5	17.6	Warehouse
SC250H	250W HQI-T	20000	281	0.74	95.3	128.1	25.8	Warehouse
SC400H	400W HQI-T	36000	460	0.74	9.1	12.2	18.8	Warehouse
Euroflood SON								
EFS70S	70W SON-E	5600	83	0.77	51.6	67.5	26.0	Warehouse
EFS150S	150W SON-T	14500	170	0.75	63.7	85.3	21.9	Warehouse
EFS250S	250W SON-T	27000	275	0.75	73.6	98.2	21.8	Warehouse
EFS400S	400W SON-T	48000	440	0.75	81.8	109.1	20.4	Warehouse

Notes:

“Education - design to 300 lux, with absence and dimming controls. Room dimensions 10m x 6m with 3m ceiling. Daylight Factor > 3%.”

“Office - design to 500 lux, with absence and dimming controls. Room dimensions 12m x 30m with 3m ceiling. Daylight Factor > 3%.”

“Factory - Design to 300 lux, with absence control. Room dimensions 30m x 40m with 7.5m ceiling. Daylight Factor = 0%.”

“Warehouse - Design to 200 lux, with absence control. Room dimensions 50m x 40m with 10m ceiling. Daylight Factor = 0%.”

“Circulation - Design to 150 lux, with presence detection. Room dimensions 30m x 2m with 2.4m ceiling. Daylight Factor = 0%.”

“Office - design to 500 lux, with absence and dimming controls. Room dimensions 12m x 30m with 3m ceiling. Daylight Factor > 3%.”

Lighting for Life

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