

light source selection 395



defining fluorescent lamp life 396



lighting quality 397



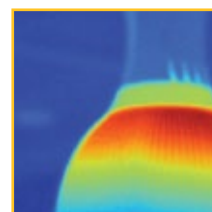
lamps fluorescent 398



lamps HID & tungsten 400



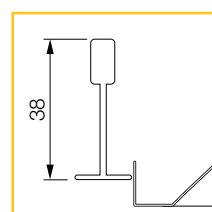
MCB Ratings 401



testing 402



ingress protection (IP) 403



ceiling compatibility 404

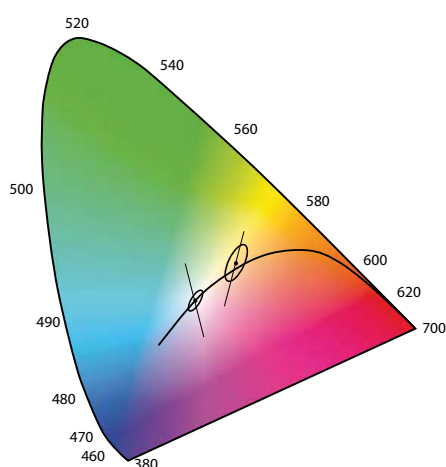


index 406

The lighting industry is going through a revolution and as we have witnessed in a few short years, LED technology has now leapt ahead. LED luminaires are no longer tucked away providing accent lighting in dark corners, LEDs are now a practical option for a wide range of applications.

Offering high light flows, excellent economy, and a typical lifespan of between 50,000 and 70,000 hours, LEDs are here to stay. It's time to do the sums and find out how you can best benefit from the new technologies available.

Understanding LED technology



Consistency is critical

It's critical that users get a consistent quality of light from their light source.

The light source within an LED is a semi conductor. The nature of the process by which semi-conductors are made leads to wide variations in colour temperature between different LEDs. Manufacturers sort their products into bins according to their colour temperature performance. The fewer bins your LEDs come from, the more consistent the light you will get from them.

Another issue to be considered is the degree of deviation in colour temperature in the product. This is known as chromaticity, and is measured in MacAdam ellipses. The MacAdam system ranks colour quality on a scale of 0 to 10. At the higher end of the scale you can see clear differences in certain applications, particularly when lighting a white surface or when an LED strip is near a white wall. It is recommended that LEDs for indoor applications should be below MacAdam 5 SDCM

100% LOR – Absolute Photometry

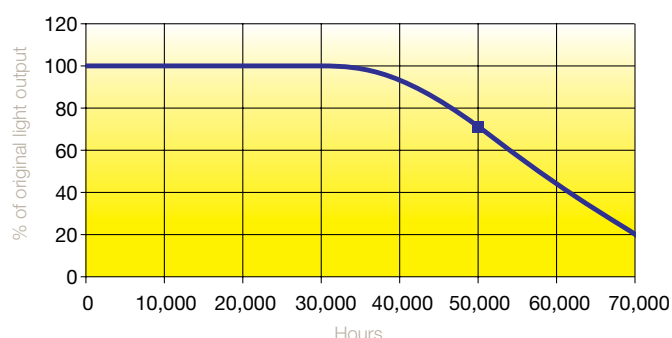
Absolute photometry is the method of measurement described in the American standard LM79 for luminaires with an LED as a source of light. Due to the lack of an approved European standard, LM79 is being widely adopted by companies in countries that lack their own standard.

The standard refers to absolute output from the fixture rather than the traditional relative method of measuring lamps alone, and then comparing the output figure to the output of the lamps when it is within the luminaire. Therefore, the luminaire under test will be shown to have an LOR of 100%.

The reason you cannot measure an LED or an array of LED in isolation as you would a conventional source is due to the fact that the LEDs need to be mounted on a material, which will determine the operating temperature of the LEDs. The operating temperature will contribute to the output of the luminaire.

Establishing the life of an LED Luminaire

A well-designed LED luminaire made with high quality parts and rigorously tested thermally to ensure the LEDs, electronic components and drivers are not thermally stressed will have a lifespan of 50,000 to 70,000 hours. That is equivalent to 15 – 20 years in a building lit for 9 hours a day. Unlike conventional lighting, an LED does not fail suddenly as it burns out. Instead, the light flow reduces over time, with the end of the luminaire's lifespan defined as the point at which this reduction reaches 70% of the original output. As with any electronic item, there will of course be the occasional failure.



Zhaga

Whitecroft Lighting Ltd, as part of the Fagerhult Group of Companies is one of the founding members of Zhaga. Zhaga is an industry-wide cooperation between companies aimed at enabling the interchangeability of LED light sources made by different manufacturers. Interchangeability is achieved by defining interfaces for a variety of application-specific light engines.

Zhaga specifications cover the physical dimensions, as well as the photometric, electrical and thermal behavior of LED light engines. The introduction of Zhaga specifications is an ongoing process and as such there will be a number of compliant and non-compliant LED modules in the lighting industry.

defining fluorescent lamp life

Lamp Life

The rated life of a lamp is given by manufacturers based upon IEC test criteria. In this way, comparisons can be made between light sources and between manufacturers. It is expressed in terms of the average number of hours operation until failure.

By giving the option to specify standard or long life lamps, Whitecroft Lighting recognise the benefits to the life cycle costs of an installation.

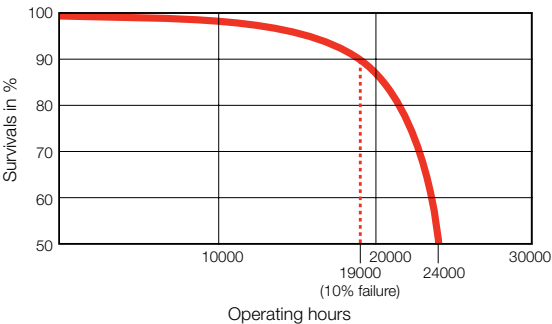
There have been significant developments in long life fluorescent lamps. Where currently available, a full range of long life lamps are listed on the following pages

A summary of typical fluorescent lamp life shows the potential to extend the time between planned maintenance cycles

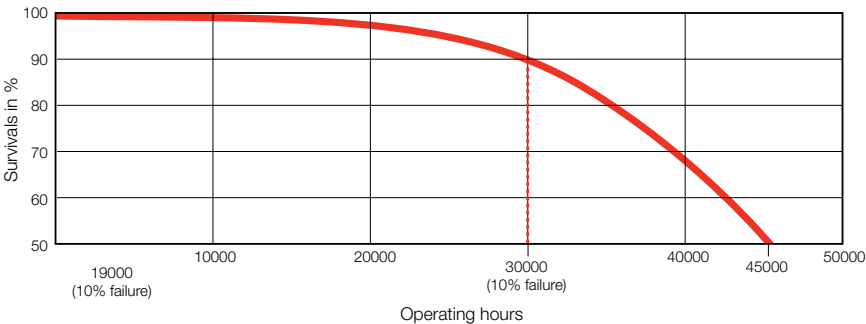
Typical Lamp Life Life

Lamp Type	Standard (hrs)	Long Life (hrs)
TC-D	13,000	33,000
TC-L	20,000	36,000
T8	20,000	55,000
T5	24,000	45,000

The life expectancy graphs show the potential extended life when selecting T5 lamps:



Life expectancy (IEC 60901) – Standard Lamps (T5)



Life expectancy (IEC 60901) – Long Life Lamps (T5)

Using occupancy and usage figures, a comparison can be made in the following installations. It can be seen that by installing long life lamps maintenance cycles can be drastically reduced.

Typically these are:

Location	Yearly Usage	Planned Maintenance Cycle (Based on 10% failure)	
		Standard Lamp	Long Life Lamp
Office	3000 hrs	6 yrs	10 yrs
Education	2000 hrs	9 yrs	15 yrs
Healthcare	7000 hrs	2 yrs	4 yrs
Retail	5000 hrs	3 yrs	6 yrs

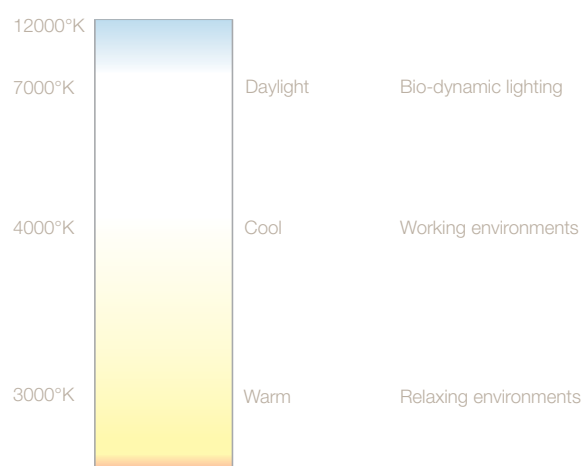
lighting quality

Selecting the best light source for an application raises a number of options to be considered. Amongst these considerations are light source colour temperature, colour rendering index and the light source life.

Colour Temperature

The characteristics of a light source is evaluated by the manufacturer in terms of its colour temperature. This is a measurement given in degrees Kelvin (°K). The colour temperature of a light source defines its 'whiteness', 'yellowness' or 'blueness' – i.e. its warmth or coldness. It does not define how natural or unnatural the colours of objects will appear when lit by the source, this is defined by the colour rendering index.

Lamp Colour (°K)



Colour Rendering Index (Ra)

To help indicate how colours appear under various light sources, a system was devised to mathematically compare how a light source shifts the appearance of a series of sample colours compared to a reference source. The CRI shows the ability of a light source to faithfully reproduce colours in comparison with a natural source. Light sources with a high Ra value are desirable in colour-critical applications such as healthcare, graphical work and retail.

It is therefore essential to specify both the colour temperature and colour rendering index when selecting lamps

Typical Lamp CRI Figures

- Fluorescent lamps with CRI 80+ will produce a first class environment
- Specialist CRI 90 are available. Currently used in some healthcare areas and specialist retail applications where colour rendering is critical.
- Typically HID sources will have low CRI figures. These range from CRI 5 – 70
- Modern CMH lamps can achieve CRI 80 – 90
- White LED solutions all typically exceed CRI 80



Colour rendition CRI 80



Colour rendition CRI 60

lamps fluorescent

Standard Lamps

T5 Linear Fluorescent - Ra85

Wattage	Nominal Length	Cap	Initial Lumens @25C 2700K, 3000K, 3500K, 4000K	Life to 50% Fail 3H cycle	Life to 10% Fail 3H cycle
14W HE	549	G5	1250	24000	19000
21W HE	849	G5	1920	24000	19000
24W HO	549	G5	1750	24000	19000
28W HE	1149	G5	2625	24000	19000
35W HE	1449	G5	3325	24000	19000
39W HO	849	G5	3100	24000	19000
49W HO	1449	G5	4375	24000	19000
54W HO	1149	G5	4450	24000	19000
80W HO	1449	G5	6550	24000	19000

Philips - MASTER TL5

Also available in 6500K (initial lumens are lower)

T5 ECO Linear Fluorescent - Ra85

Wattage	Nominal Length	Cap	Initial Lumens @25C 3000K, 3500K, 4000K	Life to 50% Fail 3H cycle	Life to 10% Fail 3H cycle
13W HE	549	G5	1150	25000	21000
19W HE	849	G5	1800	25000	21000
20W HO	549	G5	1650	25000	21000
25W HE	1149	G5	2600	25000	21000
32W HE	1449	G5	3100	25000	21000
34W HO	849	G5	3250	25000	21000
45W HO	1449	G5	4100	25000	21000
50W HO	1149	G5	4450	25000	21000
73W HO	1449	G5	6550	25000	21000

Philips - MASTER TL5 Eco

Not all colour temp available
Also available in 6500K (initial lumens are lower)

T8 Triphosphor Linear Fluorescent - Ra85

Wattage	Nominal Length	Cap	Electronic Ballast - Preheat		
			Initial Lumens @25C 2700K, 3000K, 3500K, 4000K	Life to 50% Fail 3H cycle	Life to 10% Fail 3H cycle
36W	1199	G13	3350	20000	17000
58W	1500	G13	5240	20000	17000
70W	1764	G13	6200	20000	17000

Philips - MASTER TL-D Super 80

Philips - MASTER TL-D Xtra
Also available in 6500K (initial lumens are lower)

TC-L Compact - Ra80/Ra82 (dependent on colour temperature)

Wattage	Nominal Length	Cap	Electronic Ballast - Preheat		
			Initial Lumens @25C 3000K, 3500K, 4000K, 6500K	Life to 50% Fail 3H cycle	Life to 10% Fail 3H cycle
36W	410	2G11	2900	20000	14000
40W	535	2G11	3500	20000	14000
55W	535	2G11	4800	20000	14000

Philips - MASTER PL-L 4 Pin

Not all colour temp available

TC-D Compact 4 Pin - Ra82

Wattage	Nominal Length	Cap	Electronic Ballast - Preheat		
			Initial Lumens @25C 2700K, 3000K, 4000K	Life to 50% Fail 3H cycle	Life to 10% Fail 3H cycle
13W	131	G24q-1	900	13000	8000
18W	143	G24q-2	1200	13000	8000
26W	164	G24q-3	1800	13000	8000

Philips - MASTER PL-C 4 Pin

Long Life Lamps

T5 Linear Fluorescent Long Life - Ra85

Initial Lumens @ 25C 3000K, 4000K	Life to 50% Fail 3H cycle	Life to 10% Fail 3H cycle
4375	45000	30000
4450	45000	30000
6240	45000	30000

Philips - MASTER TL5 High Output Xtra

T8 Triphosphor Linear Fluorescent Long Life - Ra85

Electronic Ballast - Preheat		
Initial Lumens @ 25C 3000K, 4000K	Life to 50% Fail 3H cycle	Life to 10% Fail 3H cycle
3350	55000	46500
5200	55000	46500
6150	55000	46500

4000K only for 70W
Also available in 6500K (initial lumens are lower)

TC-L Compact Long Life - Ra80/Ra82 (dependent on colour temperature)

Electronic Ballast - Preheat		
Initial Lumens @ 25C 3000K, 4000K	Life to 50% Fail 3H cycle	Life to 10% Fail 3H cycle
2900	36000	25000
3500	36000	25000
4800	36000	25000

4000K only for 40W
Philips - MASTER PL-L Xtra 4 Pin

TC-D Compact 4 Pin Long Life - Ra82

Electronic Ballast - Preheat		
Initial Lumens @ 25C 3000K, 4000K	Life to 50% Fail 3H cycle	Life to 10% Fail 3H cycle
1200	33000	22000
1800	33000	22000

Philips - MASTER PL-C Xtra 4 Pin

Ra>90 Lamps

T5 Linear Fluorescent - Ra91-93 (dependent on colour temperature)

Initial Lumens @ 25C 4000K	Life to 50% Fail 3H cycle	Life to 10% Fail 3H cycle
1400	24000	19000
3700	24000	19000
3800	24000	19000

Philips - MASTER TL5 High Output 90 De Luxe
Also available in 6800K

T8 Triphosphor Linear Fluorescent - Ra91-93 (dependant on colour temperature)

Electronic Ballast - Preheat		
Initial Lumens @ 25C 3000K, 4000K, 53000K	Life to 50% Fail 3H cycle	Life to 10% Fail 3H cycle
2800	20000	17000
4600	20000	17000

Philips - MASTER TL-D 90 De Luxe
Also available in 6500K (initial lumens are lower)

TC-L Compact - Ra90

Electronic Ballast - Preheat		
Initial Lumens @ 25C 3000K, 5300K	Life to 50% Fail 3H cycle	Life to 10% Fail 3H cycle
2350	20000	14000
3650	20000	14000

Philips - MASTER PL-L 90 De Luxe 4 Pin

lamps fluorescent

Standard Lamps

PLR-ECO - Ra82

Wattage	Nominal Length	Cap	Electronic Ballast - Preheat		
			Initial Lumens @25C 3000K & 4000K	Life to 50% Fail 3H cycle	Life to 10% Fail 3H cycle
14W	100	GR14q-1	1050	24000	19000
17W	122	GR14q-1	1250	24000	19000

Philips - MASTER PL-R Eco 4 Pin

TC-T Compact - Ra82

Wattage	Nominal Length	Cap	Electronic Ballast - Preheat		
			Initial Lumens @25C 2700K, 3000K, 4000K	Life to 50% Fail 3H cycle	Life to 10% Fail 3H cycle
18W	112	GX24q-2	1200	13000	8000
26W	127	GX24q-3	1800	13000	8000
32W	139	GX24q-3	2400	13000	8000
42W	161	GX24q-4	3200	13000	8000
57W	198	GX24q-5	4300	13000	8000

Philips - MASTER PL-T 4 Pin

TC-S Compact - Ra82

Wattage	Nominal Length	Cap	Electronic Ballast - Preheat		
			Initial Lumens @25C 2700K, 3000K, 4000K	Life to 50% Fail 3H cycle	Life to 10% Fail 3H cycle
5W	89	2G7	250	13000	8000
7W	119	2G7	400	13000	8000
11W	280	2G7	900	13000	8000

Philips - MASTER PL-S 4 Pin

T5 Circular - Ra85

Wattage	Nominal Length	Cap			
			Initial Lumens @25C 3000K, 4000K	Life to 50% Fail 3H cycle	Life to 10% Fail 3H cycle
40W	305	2GX13	3300	12000	8000
55W	305	2GX13	4200	12000	8000
60W	379	2GX13	5000	12000	8000

Philips - MASTER TL5 Circular

2D T5 Compact Square - Ra82

Wattage	Nominal Length	Cap		
			Initial Lumens @25C 2700K, 3000K	Rated Life
28W	204	GR10q-4	2150	21000
38W	204	GR10q-4	3020	21000
55W	206	GR10q-4	3900	8050

GE 2D® watt-miser - 28W, 38W and Biax (2D) - 55W
*3K only

Long Life Lamps

TC-T Compact Long Life - Ra82

Initial Lumens @25C 3000K, 4000K	Electronic Ballast - Preheat	
	Life to 50% Fail 3H cycle	Life to 10% Fail 3H cycle
2300	33000	20000
3200	33000	20000
4300	33000	20000

Philips - MASTER PL-T Xtra 4 Pin

lamps HID and tungsten halogen

Standard Lamps

HQI-E Master HPI Plus

Wattage	Nominal Length	Cap
70W	156	E27
100W	186	E40
150W	227	E40
250W	226	E40
400W	284	E40

Philips - MASTER City White CDO-ET Plus (70W, 100W, 150W) & MASTER HPI Plus (250 & 400W)

Initial Lumens @25C 2800K, 2900K	Colour Temp (K)	Colour Rendering	Life to 50% Fail	Life to 20% Fail
7230	2900	87	16000	12000
9400	2890	87	18000	14000
15100	2830	85	18000	14000
18000	4500*	69	20000	11000
32500	4500	69	20000	11000

*Also available in 6700K

HQI-T/CDO-TT

Nominal Length	Cap	Lumens @ 25C	Colour Temp (K)	Colour Rendering	Life to 50% Fail	Life to 20% Fail
156	E27	7500	2800	90	16000	12000
211	E40	16500	2800	87	18000	14000
257	E40	28300	3000	88	18000	12000
286	E40	32000	4500	65	20000	11000

Philips - MASTER City White CDO- TT (150W & 250W) & MASTER HPI-T Plus (400W)

HQI-TS

Wattage	Nominal Length	Cap
70W	118	R7s
150W	135	R7s

GE Arcstream® double ended UVC

Luminous Flux	Colour Temp (K)	Colour Rendering	Rated Life
5500	4200	70	6000
12000	4200	70	6000

*Also available in 3000K

CDM-TD Double Ended

Wattage	Nominal Length	Cap
70W	120	RX7s
150W	138	RX7s

Philips - MASTER Colour CDM-TD

Luminous Flux	Colour Temp (K)	Colour Rendering	Life to 50% Fail	Life to 20% Fail
6000	4200	92	16000	15000
14200	4200	92	16000	15000

Also available in 3000K

CDM-T

Wattage	Nominal Length	Cap
35W	103	G12
70W	103	G12
150W	110	G12

Philips - MASTER Colour CDM-T

Luminous Flux	Colour Temp (K)	Colour Rendering	Life to 50% Fail	Life to 20% Fail
3300	4200	84	12000	10000
6600	4200	92	12000	10000
12700	4200	96	12000	10000

Also available in 3000K

CDM-Tm Mini

Wattage	Nominal Length	Cap
20W	52	PGJ5
35W	52	PGJ5

Philips - MASTER Colour CDM-Tm Mini

Luminous Flux	Colour Temp (K)	Colour Rendering	Life to 50% Fail	Life to 20% Fail
1650	3000	85	12000	11000
3000	3000	90	12000	11000

SON-E

Wattage	Nominal Length	Cap
70W	156	E27
150W	227	E40

Philips - SON (70W) & SON Comfort (150W)

Luminous Flux	Colour Temp (K)	Colour Rendering	Life to 50% Fail	Life to 20% Fail
5810	2000	25	28000	19000
12500	2150	65	24000	16000

SON-T

Wattage	Nominal Length	Cap
50W	156	E27
70W	156	E27
150W	210	E40
250W	257	E40
400W	283	E40

Philips - MASTER SON-T PIA Plus

Luminous Flux	Colour Temp (K)	Colour Rendering	Life to 50% Fail	Life to 20% Fail
4400	2000	25	30000	22000
6600	2000	25	30000	22000
18000	2000	25	36000	26000
33300	2000	25	36000	26000
56500	2000	25	36000	26000

SDW-T (White SON)

Wattage	Nominal Length	Cap
100W	149	PG12-1

Philips - MASTER SDW-T

Luminous Flux	Colour Temp (K)	Colour Rendering	Life to 50% Fail	Life to 20% Fail
5000	2500	83	15000	10000

240V Halogen

Wattage	Nominal Length	Cap
70W	105	E27

Osram - Halolux Ceram Eco

Luminous Flux	Colour Temp (K)	Colour Rendering	Life
1180	2800	100	2000

Tungsten Halogen Double Ended

Wattage	Nominal Length	Cap
330W	119	R7s

GE - Halogen Linear

Luminous Flux	Colour Temp (K)	Colour Rendering	Life
7000	3000	100	1000

MCB ratings

Approximate maximum quantity of high frequency ballast controllable by type 3/type C MCB's

Ballast Rating (Watts)	Lamp Type	C10 MCB	C16 MCB
Linear Fluorescent			
1 x 14	T5 (HE)	29	48
2 x 14	T5 (HE)	29	48
3 x 14	T5 (HE)	29	48
4 x 14	T5 (HE)	29	48
1 x 21	T5 (HE)	29	48
2 x 21	T5 (HE)	29	48
1 x 24	T5 (HO)	29	48
2 x 24	T5 (HO)	12	20
1 x 28	T5 (HE)	29	48
2 x 28	T5 (HE)	29	48
1 x 35	T5 (HE)	29	48
2 x 35	T5 (HE)	29	48
1 x 36	T8	29	48
2 x 36	T8	29	48
1 x 39	T5 (HO)	29	48
2 x 39	T5 (HO)	12	20
1 x 49	T5 (HO)	29	48
2 x 49	T5 (HO)	12	20
1 x 54	T5 (HO)	29	48
2 x 54	T5 (HO)	12	20
1 x 58	T8	29	48
2 x 58	T8	12	20
1 x 70	T8	29	48
2 x 70	T8	12	20
1 x 80	T5 (HO)	29	48
2 x 80	T5 (HO)	12	20

Compact Fluorescent

1 x 13	TC-D	29	48
2 x 13	TC-D	29	48
2 x 14	PLR	29	48
1 x 17	PLR	29	48
2 x 17	PLR	29	48
1 x 18	TC-D/L/T	29	48
2 x 18	TC-D/L/T	29	48
1 x 22	T5 Circular	29	48
1 x 26	TC-D/T	29	48
2 x 26	TC-D/T	12	20
1 x 28	2D	29	48
1 x 32	TC-D	29	48
1 x 36	TC-L	29	48
2 x 36	TC-L	12	20
1 x 38	2D	29	48
1 x 40	TC-L	29	48
2 x 40	TC-L	12	20
1 x 42	TC-D	29	48
1 x 55	TC-L	29	48
2 x 55	TC-L	12	20

Approximate max quantity of discharge lamps controllable by type 6/type C MCB's

Lamp Power and Type	C10 MCB	C16 MCB	C20 MCB
HID			
20W CDM-TM	28	45	
35W CDM-T	28	45	
50W SON	19	31	39
70W SON & HQI	12	18	23
150W SON & HQI	7	11	14
250W SON & HQI	5	7	9
400W SON & HQI	3	4	5

(Data based on 240V 50Hz, luminaires fitted with compensation capacitor)

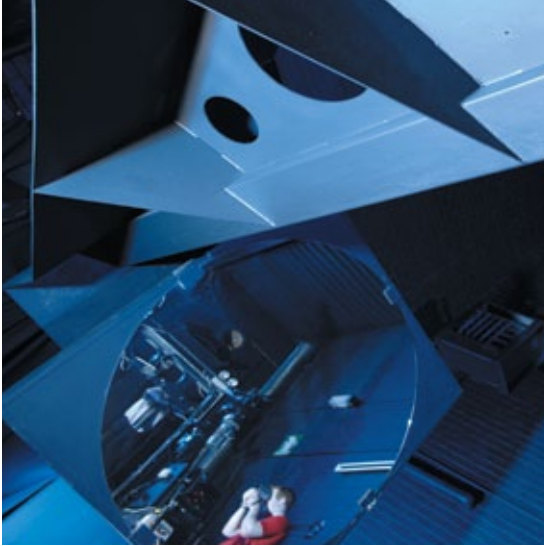
Approximate max quantity of LED luminaires controllable by type 6/ type C MCB's (Please refer to website for a complete list of all LED luminaires)

Luminaire	Product Code	Qty Per MCB Type	
		10A Type C	16A Type C
Mirage LED	MLA11XXXX + MLH25W	11	19
	MLA11XXXX + MLY25W	29	48
	MLA20XXXX + MLH25W	11	19
	MLA20XXXX + MLY25W	29	48
	MLA30XXXX + MLH50W	12	20
	MLA30XXXX + MLY50W	12	20
Life M	LM6Y14KP	14	22
	LM12Y34KP	14	22
Foil LED	FPA848Y40S	21	34
	FPA848Y80S	10	17
ACF LED	ALH114K	21	34
	ALH124K	21	34
	ALH134K	21	34
	ALH254K	10	17
	ALH264K	10	17
	ALH274K	10	17
Stilleto LED	STLLH114K	21	34
	STLLH124K	21	34
	STLLH134K	21	34
	STLLH154K	10	17
	STLLH164K	10	17
	STLLH174K	10	17
Horizon LED	HRL93K	50	80
	HRL123K	50	80
	HRL104K	50	80
	HRL134K	50	80
Centurion LED	CL703KXXX	50	80
	CL903KXXX	50	80
	CL804KXXX	50	80
	CL1104KXXX	50	80
Concert S 500	CN500XXXXXX	Not Available	48
Concert S 1000	CN1000XXXXXX	Not Available	48
Concert M	CNHXXXXXXX	50	80
Echo LED	EC280-H154KG	25	40
	EC280-H404KG	25	40
PowerBay CX	PCXAH6KC	12	18

This table is provided for general guidance only. If specific advice is required, please contact Technical Support for ballast characteristics. This information should then be relayed to the MCB manufacturers for advice on suitable breaker types.

testing

Utilising state of the art test facilities, Whitecroft Lighting ensure all luminaires and components are to the very highest standard of design, performance, construction and safety.



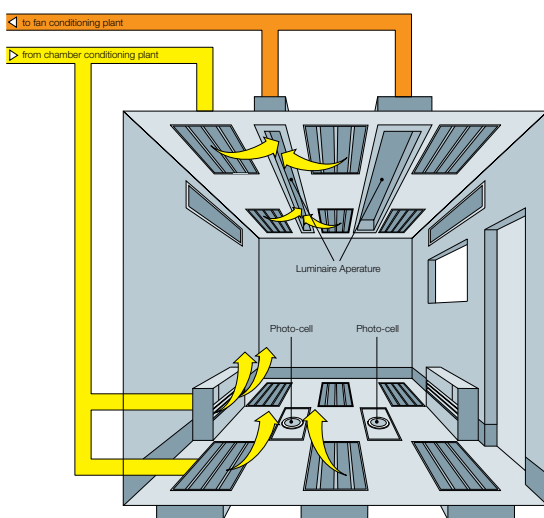
Photometry

The in-house goniophotometer is a device incorporating a large mirror and photocell to measure light output from a luminaire at varying angles. It is precision controlled by a computer programme. This enables the luminous characteristics of luminaires to be measured and recorded. Using this data, electronic files can be created to enable lighting designers to plan and evaluate the performance of luminaires within a project. The photometer is BSi certified to BS 5225



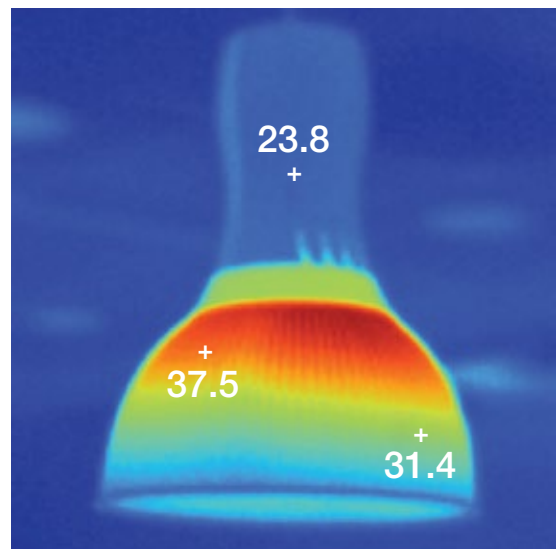
Integrating Sphere

The in-house Integrating Sphere is used for the measurement of light output from LED and compact sources. Measurements are carried out by a Spectroradiometer connected to the sphere. Using a Spectroradiometer gives the ability to determine Total Luminous Flux (lumens), Correlated Colour Temperature, Colour Rendering Indices and Chromaticity Coordinates from a light source.



Calorimeter

The calorimeter chamber at Whitecroft Lighting is a special purpose environment for testing both the air handling and thermal characteristics of luminaires. Many luminaires are capable of being used as an integral air return path. Testing enables accurate flow rates to be recorded and used in HVAC calculations.



Thermal Testing

The thermal characteristics of a luminaire can effect both it's operation and safety to users. Evaluation of these issues throughout the design stages ensures that all luminaires are fully tested and compliant to British Standards specifications. Using the latest in thermal imaging technology, accurate measurements ensure product performance and reliability through life.

ingress protection (IP)



The ingress protection (IP) rating denotes the protection against solid foreign objects and harmful ingress of water provided by the luminaire enclosure. If no code is marked, the luminaire is deemed to be IP20.

First Numeral

Protection against ingress of solid foreign objects

IP Requirements

0	No protection.
1	Full penetration of 50mm sphere not allowed and shall have adequate clearance from hazardous. Contact with hazardous parts not permitted.
2	Full penetration of 12.5mm diameter sphere not allowed. The jointed finger shall have adequate clearance from hazardous parts.
3	The access probe of 2.5mm diameter shall not penetrate.
4	The access probe of 1mm diameter shall not penetrate.
5	Limited ingress of dust permitted (no harmful deposit).
6	Totally protected against ingress of dust.

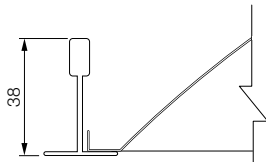
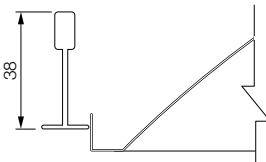
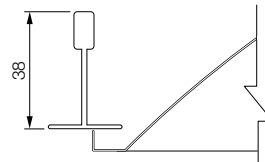
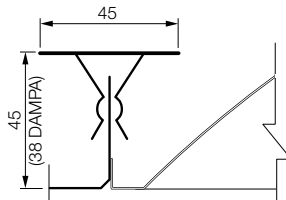
Second Numeral

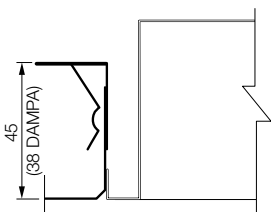
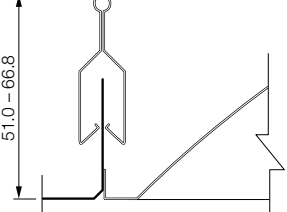
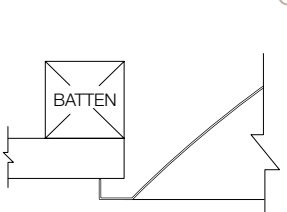
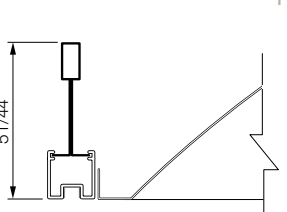
Protection against harmful ingress of water

IP Requirements

0	No protection.
1	Protected against vertically falling drops of water. Limited ingress permitted.
2	Protected against vertically falling drops of water with enclosure tilted 15° from the vertical. Limited ingress permitted.
3	Protected against sprays to 60° from the vertical. Limited ingress permitted.
4	Protected against water splashed from all directions. Limited ingress permitted.
5	Protected against low-pressure jets of water from all directions. Limited ingress permitted.
6	Protected against strong jets of water.
7	Protected against the effects of immersion between 15cm and 1m.
8	Protected against longer periods of immersion under pressure.

ceiling compatibility matrix

Ceiling Type Luminaire Type		Exposed T Grids				Spring T Grids	
		T25 Lay in (A)	T15 Lay in (A)	T15 Tegular (B)	T15/T25 Pull Up (C)	SAS 120 (D)	Armstrong Orcal 1800 (D)
Asymmetric Wallwasher page 76		✓	✓				
Broadspread Asymmetric page 166		✓	✓		✓ ₂		
Cascade 600/TSI/Retail page 152		✓	✓				
Cascade 1200/Retail page 158		✓	✓				
Cascade Edge page 136		✓		✓			✓ ₁
Curie Elite page 346							
DTFA Elite page 348					✓ ₅	✓	✓
DTFN Elite page 352							
Duo 2 Linear page 147							✓ ₁
Duo 2 page 142		✓	✓	✓ ₂			✓ ₁
Duo 600 Consult page 330					✓	✓	✓
Duo Line page 164		✓	✓		✓ ₂		
Gibraltar page 165		✓	✓				
HDUM page 328					✓ ₅	✓	✓
HDUN page 328							
Hygiene *600 x 600 page 162					✓	✓*	✓*
Life L page 62					✓		
Life M page 130					✓		
Life Q/P/Colour page 68					✓	✓	✓
Lister ² page 356					✓ ₅	✓	✓
Softcell 3 - 600 page 148		✓		✓		✓	✓
Softlighter page 134		✓		✓			✓ ₁
Spear Diffuser page 161		✓	✓		✓ ₂		
Spear Profile page 159		✓		✓			
Surgeon 65 (Non-modular) page 327							
Surgeon 65 (Modular) page 327					✓	✓	✓
Vivant 600 page 150		✓		✓		✓	✓
Integration Details	A	B		C		D	
							
	T25 Exposed T Lay in T15 Exposed T Lay in	T15 Tegular		T15/T25 Pull Up		SAS 120 Spring T Armstrong Orcal 1800 Spring T Burgess Clip in Spring T Dampa Clip in Tile	
Notes	1 – Half spring T and must run perpendicular to lamp (as integration detail E) 2 – Additional support bracket kit required 3 – Additional ceiling integration frame required 4 – Suspension via threaded drop rods supplied by others 5 – T25 only – contact Whitecroft Technical for T15 application 6 – Luminaire to be supported from full height T25/T15 main runners only 7 – Spring T orientation parallel to lamp unless stated otherwise						

Spring T Grids					see note 7	Plasterboard	Alugrids	
Burgess Clip in (D)	Dampa Clip in (D)	Armstrong Orcal 3000 (F)	SAS 150 (F)	Burgess 'A' Bar (F)		Prepared Aperture (G)	SAS AL 15/16 (H)	SAS AL 15/08 (H)
						✓ 2		
						✓ 3		
✓ 1		✓	✓	✓		✓ 3	✓	✓
						✓		
✓	✓	✓	✓	✓				
						✓		
✓ 1		✓	✓	✓		✓		
✓ 1		✓	✓	✓		✓ 2		
✓		✓	✓	✓		✓		
						✓ 2		
						✓ 2		
✓	✓	✓	✓	✓				
						✓		
✓*		✓* 2	✓* 2	✓* 2		✓* 2		
						✓		
		✓	✓	✓				
✓		✓	✓	✓		✓		
✓	✓	✓	✓	✓		✓		
✓			✓					
✓ 1		✓	✓	✓		✓ 3	✓	✓
						✓ 2		
						✓		
✓	✓	✓	✓	✓				
✓			✓			✓		✓
✓			✓					✓
								
Half Spring T Detail		SAS 150 Spring T Armstrong Orcal 3000 Spring T Burgess A Bar Spring T		Cut/Prepared Aperture		SAS Alugrid AL15/16 Decorative T SAS Alugrid AL15/08 Decorative T		
Please contact Whitecroft Technical Department for any application not shown Refer to relevant catalogue page for specific part number to fit each ceiling type								