

Technical A-Z

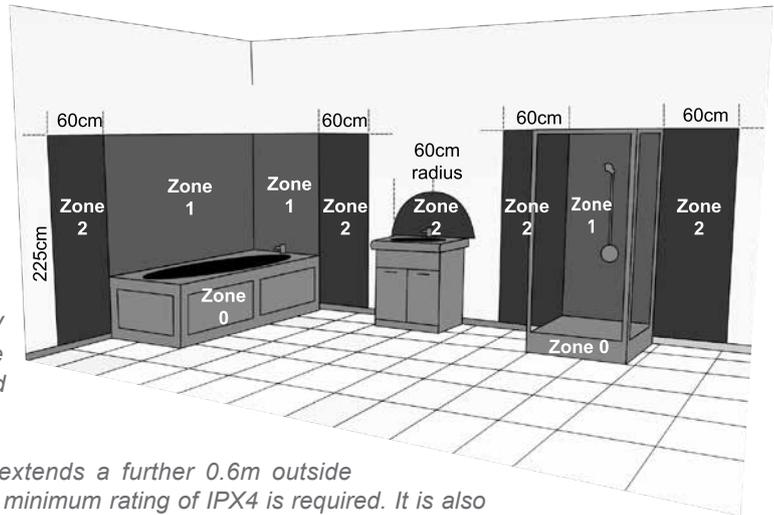
AC Alternating Current	<i>Alternating Current. The movement or flow of electric charge that periodically changes direction. AC current is the format that electricity is supplied in.</i>
Accent Lighting	<i>A synonym for display or highlighting.</i>
Air-Handling	<i>A type of recessed modular that can be used to either supply air (heating or air conditioning) to a room, remove air from a room, or do both. The air-handling capability is expressed in litres per second. Grade (from American Iron and Steel Institute) of Stainless Steel used in Collezione Italiana products.</i>
	<i>316L is a low carbon content grade of Stainless Steel, giving excellent corrosion resistance properties. Due to its corrosion resistance AISI316L is also known as Marine Grade. All Stainless Steel requires a degree of maintenance to ensure its appearance does not tarnish over time. (see ASSCK – Stainless Steel Cleaning Kit below)</i>
Aluminium Reflector Lamp	<i>Designed and manufactured to filter the majority of generated heat forwards, in the direction of the emitted light.</i>
Ambient Lighting	<i>The level of background light, usually low and supplemented by Task or Accent lighting.</i>
Ambient Temperature	<i>Surrounding - the ambient temperature is the temperature of the air that surrounds the fixture in the room. A critical criterion for fixture selection especially in extreme temperature environments. Ansell interior luminaires are rated for use in ambient temperatures up to 25c unless otherwise stated.</i>
Analogue Dimming 1-10V	<p><i>This ballast requires an analogue (1-10V) signal from an external source to instruct the ballast dim. The ballast within the luminaire will provide the required output dependent upon the 1-10V signal received from the external source which operates the ballast accordingly.</i></p> <p><i>This system is commonly employed in larger installations with scene-set controllers or energy management systems. Digital dimming is also used for PIR presence detection and automatic daylight sensing.</i></p> <p><i>Each luminaire requires a 3 core mains supply (L E N) and an additional 1-10V signal cable, normally a 2 core 0.75mm² flexible cable. This is looped around any luminaires to be dimmed together (check with the Dimming Controller supplier as there are a maximum number of ballasts which can be connected together, dependent upon lamp type and wattage). An additional unswitched live is required if the luminaire incorporates emergency control gear.</i></p>
Anti-Ligature	<i>This is a luminaire that is free from points where a cord could be fastened to create a ligature point. If a fitting is classed as Anti-Ligature the ligature risk is eliminated by designing it in such a way that it is not possible for a cordlike object to be looped or tied around it.</i>
ASSCK	<i>Stainless Steel Cleaning Kit To ensure Inox/AISI316L Stainless Steel products from the Collezione Italiana range maintain their high quality finish and appearance, we recommend regular (every 3-4 months) cleaning by using the ASSCK kit.</i>
Asymmetric Distribution	<i>Non-symmetric distribution of light. In many cases, the luminous intensity (light output) may be more pronounced in one direction. Commonly found on floodlights to allow them to be aimed downwards, keeping unwanted upward light spillage to a minimum.</i>
Average Rated Life	<i>A value given to the light source, typically lamp manufacturers' quote a figure in hours at which 50% of lamps are surviving.</i>
Azimuth	<i>The orientation angle in the horizontal plane, commonly referred to in floodlighting schemes.</i>

Bathroom Zones

Bathroom luminaire installations must comply with legislation. Please see section 701 of BS EN 7671:2008 (17th Edition Wiring Regulations)

Zone 0 – This is inside the bath or shower. Any fitting used in these areas must be SELV and IPX8

Zone 1 – This is the area above the bath to a height of 2.25m from the floor. In this zone a minimum rating of IPX4 is required. If a 230V luminaire is used, the circuit must be protected by a 30mA RCD.



Zone 2 – This area extends a further 0.6m outside Zone 1. In this zone a minimum rating of IPX4 is required. It is also recommended to have luminaires with a rating of IPX4 around the wash basin (with 0.6m radius of the tap).

Outside Zones - Anywhere outside Zones 0, 1 and 2 are classed as outside zones (excluding specific areas) providing water jets are not used, so the minimum rating is IPX0. If water jets are to be used a minimum of IPX5 is required. Full details can be found in the IEE Wiring Regulations.

**Note – The area under the bath is classed as an outside zone providing there is a bath panel in situ which can only be removed with aid of a tool.*

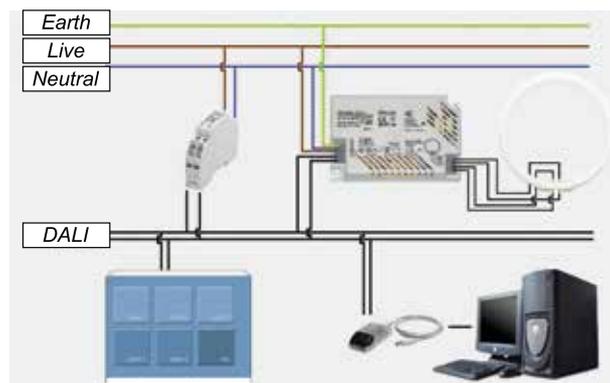
Ballast	A device used to operate fluorescent and HID lamps. The ballast, while limiting and regulating the lamp current during operation, provides the necessary voltage to the lamp.
Ballast Losses	Power, which is supplied to ballast but is not converted into lamp energy. Ballast loss is dissipated as heat. There are strict guidelines to ensure only efficient ballasts are used, to avoid unnecessary energy consumption.
Ballast Lumen Factor (BLF)	The ballast lumen factor (BLF) is the ratio of the light output of the lamp when operated under emergency lighting conditions compared to normal mains supply. Typically this figure will be below 0.1 (10%) and per lamp operated on emergency control gear.
BC	Bayonet Cap lampholder/lamp cap.
Beam Angle	Somewhat misleading angle of light spread, to which the intensity has fallen of to 50% of the peak value.
Binning (LED)	Binning is the process of methodically sorting and grouping LED's according to some measured parameter or set of parameters. This allows design engineers to systematically specify an LED and it allows the manufacturer to order LED's that function consistently like the specified part. Binning also makes it possible to re-order LED's that match the original.
Brightness	What the eye actually sees. Not to be confused with luminance, which is what a lightmeter, reads.



BSI	<i>British Standards Institute. The UK National Standards Body - www.bsigroup.com</i>
	<p>Key Standards applicable include</p> <p><i>BS 476 part 21 Fire test for building Materials (i-Cage Range)</i></p> <p><i>BS 5225 Photometric Data for Luminaires</i></p> <p><i>BS 5266 Code of practice for Emergency Lighting</i></p> <p><i>BS7671 Requirements for Electrical Installations (Wiring Regulations)</i></p> <p><i>BS EN 60570 Track systems for Luminaires</i></p> <p><i>BS EN 60598-1 Luminaires - General requirements and tests</i></p> <p><i>BS EN 60598-2-2 Luminaires – Specific requirements, Recessed Luminaires</i></p> <p><i>BS EN 60598-2-5 Luminaires – Specific requirements, Floodlights</i></p> <p><i>BS EN 60598-2-6 Luminaires – Specific requirements, In-built Transformers</i></p> <p><i>BS EN 60598-2-22 Luminaires - Specific requirements, Emergency Lighting</i></p> <p><i>BS EN 61047 Electronic Transformers</i></p>
Building Regulations	<i>Legal requirements for the installer to adhere to regarding equipment installed in to a building. Standards exist for Domestic and Non-Domestic premises and there are variations in the different countries of the UK.</i>
Burning Position	<i>All HID lamps have a rated burning position, meaning they will only operate correctly in that orientation. All Ansell luminaires supplied with HID lamps, have a correctly rated lamp for the typical function of the luminaire. For installations where a luminaire may be used unconventionally, lamp suitability should be checked.</i>
Candela (CD)	<i>The SI unit of luminous intensity. The intensity of a light source in a Specific direction.</i>
Capsule Lamp	<i>A small extra low voltage lamp that normally fits into a luminaire with its own reflector.</i>
Capacitor	<i>Component that stores electrical energy. Often used for power factor correction and lamp regulation.</i>
CCT	<i>See Colour Temperature</i>
CE	<i>European Community conformity mark. This denotes that the item conforms with the requirements of relevant EU Directives</i>
CELMA	<i>Federation of National Manufactures for Luminaires and Electrotechnical Components for Luminaires. A powerful European body committed to improving standards, particularly 'Green issues' within the lighting industry. www.celma.org</i>
CFL	<i>See Compact Fluorescent Lamp.</i>
CIBSE	<i>The Chartered Institute of Building Service Engineers. The Society of Light and Lighting, a division of CIBSE, publishes many Lighting Guides, widely used as references for the choice of luminaire and recommended Illuminance level most suitable for a specific area. www.cibse.org</i>
Class I 	<i>Luminaires in this class are electrically insulated and provided with connection with earth.</i>
Class II 	<i>These types of luminaire are designed and constructed so that protection against electric shock does not rely on basic insulation only. This can be achieved by means of reinforced or double insulation. No provision for Earthing is provided.</i>
Class III 	<i>Protection against electric shock relies on the supply of Safety Extra Low Voltage (SELV) and in which voltages higher than those of SELV are not generated (Max.50V ac or below).</i>

CS	<i>Cold Store version. A luminaire, normally the Ansell ADP range can be supplied as an option equipped with control gear to allow operation in Cold Store Areas down to -30c. Emergency versions are not available due to the effect of temperature on the battery cells, hindering the ability to hold a charge.</i>
Cold Lumens (LED)	<i>Please see "Hot Lumens"</i>
Colour Appearance	<i>General expression for the impression when looking at a light source eg. Warm or Cool.</i>
Colour Rendering (Ra)	<i>The appearance of surface colours when illuminated by light from a given source. Good colour rendering implies similarity of appearance to that under an acceptable light source, such as natural daylight.</i>
Colour Rendering Index (CRI)	<i>Measurement of the degree to which the colours of surfaces illuminated by a given light source conform to the same surfaces under a reference source. CRI (also sometimes shown as Ra) is expressed as a number where 100 indicates that there is no colour shift as under natural light. Typically High Pressure Sodium lamps would be approximately Ra=25, Metal Halide Lamps Ra=65, Triphosphor Fluorescent lamps Ra=80+</i>
Colour Temperature (Light sources)	<i>Measured in degrees Kelvin. The Lower the Kelvin figure, the Warmer the lamp Colour Temperature e.g. 2700°K is very warm and 6500°K is very cool/Daylight. Warm White generally refers to >3000 °K, White/Intermediate =3500 °K and Cool White <4000 °K</i>
Compact Fluorescent	<i>Small fluorescent lamps from 5W to 57W that are sufficiently compact to emulate an incandescent lamp. The term also applies to TC-L lamps up to 55W.</i>
Cool Beam Lamp	<i>A lamp designed to filter heat backwards, such as dichroic reflector lamps.</i>
Corona	<i>A band/ring of light around an object also commonly referred to as a Halo effect.</i>
Corridor Function	<i>Corridor Function is a setting of HFDD Dimmable control gear for operation with a PIR (standard on/off). Dimmable ballasts reduces light output to 3-5% when the area is unoccupied and increases to full light output when PIR is activated.</i>
Cos ϕ	<i>Cos ϕ is the expression of the power factor. Most high power factor luminaire have a figure >0.85, with Electronic High Frequency >0.90-0.95. A low power factor luminaire can have significantly more current draw in the circuit, resulting in larger capacity cables and switching required.</i>
DALI	<p><i>Digital Addressable Lighting Interface.</i></p> <p><i>A Dimming system that employs DALI protocol-based technology (i.e.digital control signals) to control electronic ballasts, controllers and sensors belonging to the system. Each system component has its own device-specific address, and this makes it possible to implement individual device control.</i></p>

The DALI system offers 64 individual addresses, 16 group addresses and the ability to program each ballast with up to 16 scenes.

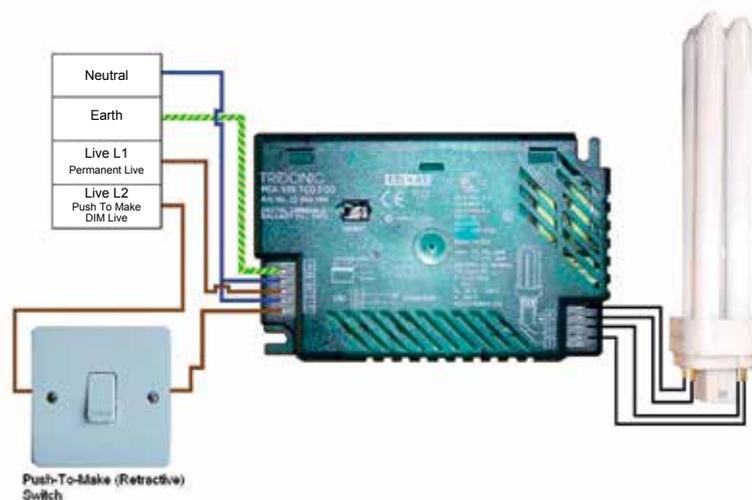


Data Sheets	Are available for Ansell products to enable Operation and Maintenance manuals to be completed. These can be obtained via www.anselluk.com , Ansell Sales Offices and Sales Personnel.
DC Direct Current	DC (direct current) is the unidirectional flow or movement of electric charge carriers (which are usually electrons). The intensity of the current can vary with time, but the general direction of movement stays the same at all times. As an adjective, the term DC is used in reference to voltage whose polarity never reverses.
Dichroic Reflector	Dichroic reflector lamps are lamps that reflect light forwards despite the fact that the heat is transmitted backwards through the rear of the lamp.
Dimmers & Dimming	The process by which lamps are dimmed from 100% to a minimum level that is not always zero. It is not possible to dim switch start or other standard fluorescent luminaires, which have conventional control gear. Luminaires that are required to be dimmed will need special control gear for this operation and typically additional circuit wiring.
Direct Lighting	Lighting in which the greater part of the luminous flux from the luminaires reaches the surface (usually the working plane) directly, i.e. without reflection from surrounding surfaces.
Directional Lighting	Lighting a display object predominately from one direction. Directional lighting can be used to great effect in retail, display windows or even exterior floodlighting, producing strong modelling/shadows to accentuate the object.
Disability Glare	Glare from, for example, facing a spotlight or bright sunlit window that impairs the ability to see.
Discharge Lamps	Fluorescent lamps are medium pressure discharge lamps but high-pressure lamps include Metal Halide, Ceramic Metal Halide, and High-pressure Sodium lamps.
Discomfort Glare	Glare that does not impair the ability to see, but that will cause over time a certain subconscious discomfort.
DLOR	Downward Light Output Ratio. The ratio of the total light output of a luminaire below the horizontal.
DMX	<p>(Digital Multiplex) is a standard for digital communication networks that are commonly used to control stage lighting and effects. It was originally intended as a standardised method for controlling light dimmers, which, prior to DMX512, had employed various incompatible proprietary protocols. It soon became the primary method for linking controllers (such as a lighting console) to dimmers and special effects devices such as fog machines and intelligent lights.</p> <p>DMX has also expanded to uses in non-theatrical interior and architectural lighting, at scales ranging from strings of Christmas lights to electronic billboards. The use of DMX can now be used to control almost anything, reflecting its popularity in theatres and venues.</p>
Double Insulation	Insulation comprising both basic insulation and supplementary insulation. Also referred to as Class II
Efficiency	Ratio of power supplied to wattage dissipated.
Efficacy	A metric term used to compare light output to energy consumption. Efficacy is measured in lumens per watt. Efficacy is similar to efficiency, but is expressed in dissimilar units. For example, if a 100-watt source produces 9000 lumens, then the efficacy is 90 lumens per watt
Electromagnetic Ballast (Magnetic Ballast)	Ballast that uses a copper wire winding around a solid core assembly to transform electrical current to start and operate fluorescent and high intensity discharge (HID) lamps.

Electronic Ballasts (High Frequency)	The efficiency of fluorescent lamps can be improved by increasing the frequency of the mains voltage supplied to them. Electronic ballasts and controls can be used to increase the normal mains frequency of 50/60Hz to 25/30KHz improving lamp efficiency by approximately 10%. Electronic ballasts also consume less power than conventional ballasts and when combined with other efficiency benefits, electronic ballasts can achieve savings of around 20% compared to conventional 50/60Hz systems with the same light output levels.
EMC	Electromagnetic Compatibility. Many Electrical items produce unintentional interference, EMC ensures these levels are within guidelines and should therefore not cause unwanted interference with other equipment.
Emergency Lighting	Lighting provided for use when the main lighting installation fails enabling safe exit from a building.
Emergency Lighting Testing	Testing An Emergency Lighting Installation should undergo regular periodic testing to ensure the luminaires are correctly functioning, also to maintain the condition of the batteries. The testing should be recorded in a log book and follow the schedule of <ul style="list-style-type: none"> • Daily – Visual Check that the charge indicator LED is illuminated • Monthly – A Functional test, that the luminaire operates when mains supply is disconnected • Annually – As Monthly test but for the full rated duration of the luminaire (3hrs)
Enclosed Rated Lamp	Refers to HID Metal Halide lamps that are specifically designed for the installation into an enclosed fixture (e.g. Floodlight). The lamp has only basic protection by a single barrier of the lamp. This means protective glass and covers are required.
Escape Route Lighting	Emergency lighting provided on a defined route to ensure that the means of escape from a point in a building to the final exit.
ELV	Extra low voltage: voltage range from (1V – 50V).
E27 (ES)	Edison Screw (lampholder or lamp cap).
E40 (GES)	Giant Edison Screw (lampholder or lamp cap) common on larger wattage HID lamps.
F Mark	This symbol indicates downlights that are not suitable for covering with insulation which has minimum size requirements such that it is visible above the ceiling after installation. The second F Mark symbol is for downlights that are not suitable for normally flammable ceilings.
Filament	The tungsten coil that glows to incandescence when an electric current passes through it.
Fire-Rated	A luminaire, usually a downlight, which has been designed to function also as a fire barrier when installed into a building.
Flicker	A visible oscillation in the luminous flux/light output.
Flood Beam	Reflector lamps and luminaires with in built reflectors having a beam spread of more than 60°
Fluorescent lamps	A lamp, which produces light by a gas discharge that in turn, causes a phosphor coating inside the glass envelope or tube to produce light by fluorescence. Fluorescent lamps produce much more dispersed light than 'point' sources such as incandescent, halogen or discharge lamps. This quality, along with their outstanding energy efficiency, make them ideally suited for illuminating many large open areas such as offices and industrial buildings. Standard traditional fluorescent lamps use halophosphate lamp coatings. These lamps are used where low initial cost is the most important factor. However, higher performance lamps using triphosphor coatings, are now increasingly being used as they provide better colour rendering and significant energy savings. All compact fluorescent and T5 lamps are Triphosphor as standard.



Fluorescent Tubes T12, T8, T5 etc	Refers to their diameter of the lamp glass in eighths of an inch, i.e. 12/8 (38mm) 8/8 (26mm) 5/8(16mm) and respectively. Lamps may be linear or compact fluorescent type.
Fluorescent Lamps - Effects of temperature change	Fluorescent lamps are designed to produce their optimum light output at an ambient temperature of 25°C. However, when installed in a luminaire; the temperature of the air surrounding a lamp can change and affect the light output of the lamp. In cold rooms for example the light output may only be 50% of the rated figure.
Flux	(Lumens) falling on to a surface.
Frequency	Rate of alternation in an AC current. Expressed in cycles per second or hertz (Hz).
General Lighting	Lighting designed to illuminate the whole of an area uniformly without provision for special local requirements.
Glare	Refers to the difficulty seeing in the presence of bright light such as direct or reflected sunlight or artificial light such as direct LED output. Because of this, some luminaires include opal diffusers or reflectors to provide an anti-glare function.
Hazardous Area	An environment in which a risk of fire or explosion exists. Commonly referred to as Zone 1, Zone 2 etc, but not to be confused with the Zones of space in bathroom areas. Ansell do not offer any equipment suitable for Hazardous areas.
Hertz (Hz)	Cycles (frequency) per second.
HFDD	HFDD refers to High Frequency Digital Dimming control gear. This control gear is available in a number of options HFDD /1, HFDD/2 and HFDD/3. Each option comes supplied with a different dimming method to suit the needs or requirements of the installer.
HFDD/1	<p>SWITCH DIM – SwitchDIM operation for ON / OFF and dimming is by means of a push - to-make (retractive) switch, and is the simplest form of dimming. A brief operation of the switch (<0.6sec), will switch ON or OFF. When the push to make switch is held, the ballast is dimmed. On a further push, the ballast is dimmed in the opposite direction.</p> <p>For full operation the circuit should be as shown below, using a 4 core installation (switched live, permanent live supply, neutral and earth).</p> <p>An additional Unswitched live is required if the luminaire incorporates emergency control gear.</p>

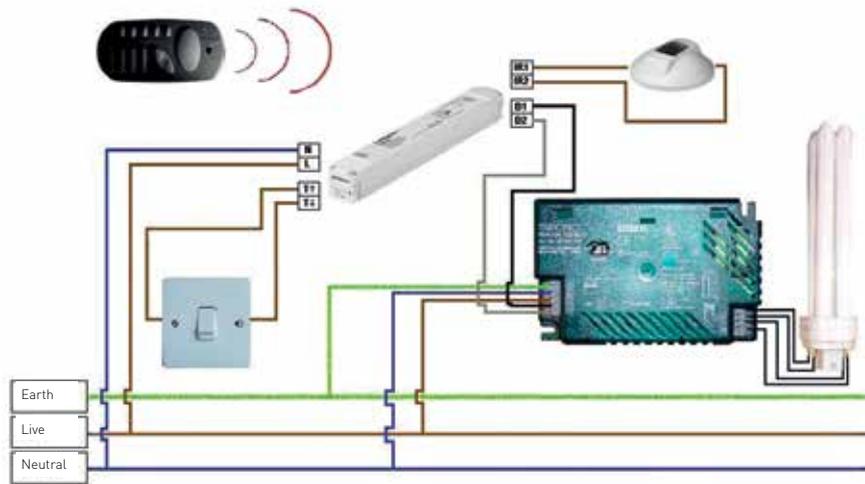


HFDD/2

DIGITAL DIMMING (DSI) – This ballast require a digital (DSI) signal from an external source to instruct the ballast to switch ON /OFF and dim. A Digital Serial Interface (DSI) translates the signals from the controller and operates the ballast.

This system is commonly employed in larger installations with scene-set controllers or energy management systems. Digital dimming is also used for Infra-Red remote control, PIR presence detection and automatic daylight sensing.

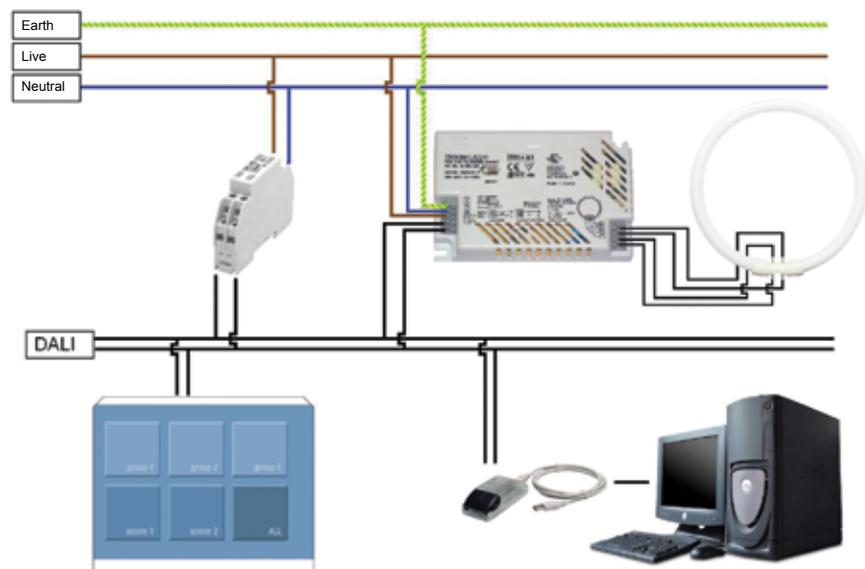
Each luminaire requires a 3 core mains supply (L E N) and an additional DSI signal cable, normally a 2 core 0.75mm² flexible cable. This is looped around any luminaires to be dimmed together (check with the Dimming Controller supplier as there are a maximum number of ballasts which can be connected together, dependent on lamp type and wattage). An additional Unswitched live is required if the luminaire incorporates emergency control gear.



HFDD/3

DALI - A Dimming system that employs DALI (Digital Addressable Lighting Interface) protocol-based technology (i.e. digital control signals) to control electronic ballast, controller and sensor belonging to the system. Each system component has its own device-specific address, and this makes it possible to implement individual device control.

The DALI system offers 64 individual addresses, 16 group addresses and the ability to program each ballast with up to 16 scenes.

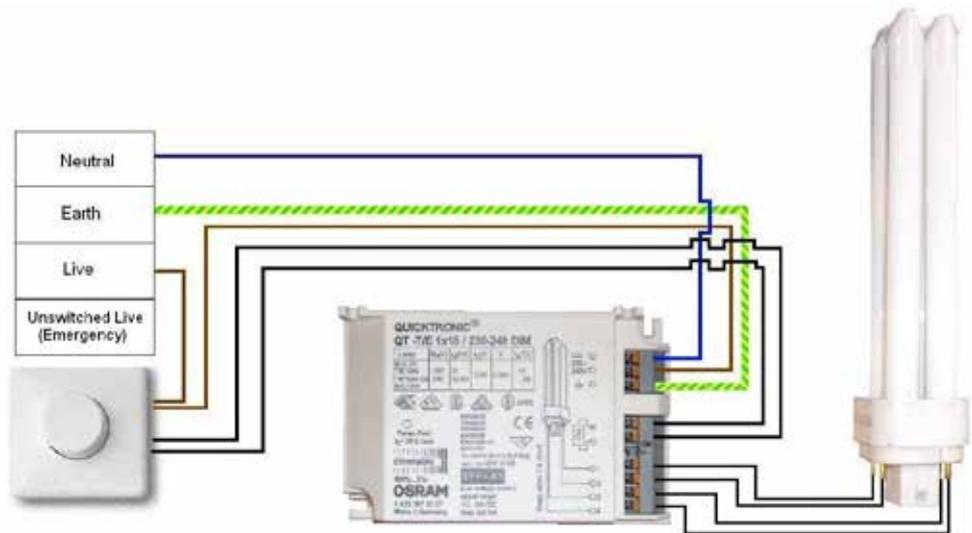


HFDD/4

Analogue Dimming also known as High Frequency Regulating (HFR) – employs the use of a control voltage, either 0-10V DC or 1-10V DC. Both are similar, only the 0-10V will dim down to approximately. 6% of light output and 1-10V will only dim to approximately. 10% of light output.

The method of control for this system is by means of either a rotary or slider potentiometer. Analogue (HFR) dimming ballasts can also be used with many available scene-set or mood-set controllers.

Each luminaire requires a 3 core mains supply (L E N), and an additional 1-10V signal cable, normally a 2 core 0.75mm² flexible cable. This is looped around any luminaires to be dimmed together. An additional unswitched live is required if the luminaire incorporates emergency control gear.

**High Power Factor**

A circuit/control gear with a .9 or higher rating power factor, which is achieved by using a capacitor or Electronic Ballast.

Hot Lumens

Refers to the LED package or luminaire which can be tested in a number of ways. The first is the quick screening test performed on the LED output, in which a current pulse is applied to the LED and the light output is measured. This is the 'cold' lumen test and results in the highest lumen value that can be achieved but does not represent what lumen output will be achieved during normal operation.

The second way is to apply constant DC current to the LED with the case at a temperature that represents the temperature that may be reached inside the luminaire. The 'hot' lumen value is much closer to the value that the LED package, or luminaire, will emit once it has reached optimum temperature.

High Risk Task Area

A requirement within Emergency Escape Lighting provided to ensure the safety of people involved in a potentially dangerous process or situation and to enable proper shut down procedures for the safety of the operator and other occupants of the premises.

Hot Restart/Strike

The phenomenon of re-striking the arc in a HID light source after a momentary power loss. Hot restart occurs when the arc tube has cooled a sufficient amount. Some lamps also employ 2 arc tubes to allow hot re-strike.

(hm)

Usually the vertical distances between a luminaire and the working plan, but sometimes the distance between the luminaire and the floor.



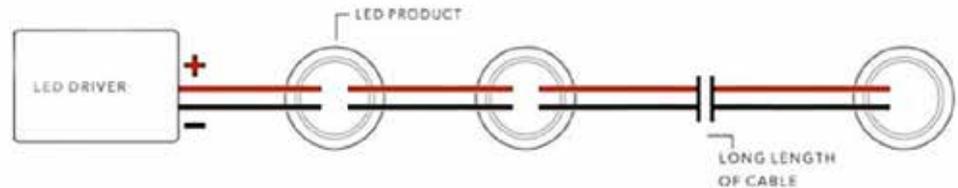
iCage	<i>Ansell Lighting innovative range of fire rated downlights.</i>		
Ignitor	<i>A device, which provides a control high voltage (3.0- 4.5kV) pulse to ignite a gas discharge lamp. Two basic types are available, impulse Ignitor and superimposed Ignitor.</i>		
Illuminance	<i>A photometric term that quantifies the light on a surface or plane. It is expressed in lumens per m² (lux). This can be calculated or measure with a lightmeter.</i>		
Illumination	<i>The density of luminous flux on a surface this parameter shows how “bright” the surface point appears to the human eye.</i>		
Intensity of Light	<i>This is the power of visible radiation in a particular direction measured in Candelas.</i>		
Incandescent Lamp	<i>A lamp which produces light by electrically heating a filament.</i>		
Indirect Glare	<i>Glare produced from a reflective surface.</i>		
Indirect Lighting	<i>A system by which light is reflected from a primary surface, usually ceiling or walls, before reaching the working/task plane. Some luminaires by their design offer indirect lighting.</i>		
Induction Lighting	<i>The internal electrodeless lamp or induction light is a gas discharge lamp in which the power required to generate light is transferred from outside the lamp envelope to the gas inside via an electric or magnetic field, in contrast with a typical gas discharge lamp that uses internal electrodes connected to the power supply by conductors that pass through the lamp envelope.</i>		
IP Ratings	<i>The designation to indicate the degree of protection consists of the characteristic letter IP followed by two numerals. The first numeral indicates the degree protection against the ingress of solid of objects, whereas the second numeral refers to the degree of protection against the ingress of water. The following symbols are appropriate:</i>		
Classification of Ingress Protection		<i>Protection Against ingress of Water</i>	
	IP20	<i>Greater than 12mm</i>	<i>Non-protected</i>
	IP21	<i>Greater than 12mm</i>	<i>Dripping water</i>
	IP22	<i>Greater than 12mm</i>	<i>Dripping water (up to 15° angle)</i>
	IP23	<i>Greater than 12mm</i>	<i>Spraying water (up to 60° angle)</i>
	IP40	<i>Greater than 1mm</i>	<i>Non-protected</i>
	IP43	<i>Greater than 1mm</i>	<i>Spraying water (up to 60° angle)</i>
	IP44	<i>Greater than 1mm</i>	<i>Splashing water</i>
	IP54	<i>Dust-protected</i>	<i>Splashing water</i>
	IP55	<i>Dust-protected</i>	<i>Water jets</i>
	IP64	<i>Dust-tight</i>	<i>Splashing water</i>
	IP65	<i>Dust-tight</i>	<i>Water jets</i>
	IP66	<i>Dust-tight</i>	<i>Powerful Water jets</i>
	IP67	<i>Dust-tight</i>	<i>Water immersion</i>
IP68	<i>Dust-tight</i>	<i>Submersion to declared depth</i>	
Initial Lumens	<i>Lumen output of a lamp after it has been operating 100 hours.</i>		
Input Voltage	<i>Voltage provided to a ballast/luminaire by the power supply.</i>		



Inrush Current	<i>A transient condition, generally lasting 5-10 milliseconds that occurs during ballast start-up. Largely dependent upon ballast circuit design. Wire wound transformers can have in rush currents up to 40 times their running current making the correct selection of circuit protection devices vital.</i>
Illuminance	<i>The amount of light.</i>
Illumination Level	<i>Refers to light levels of a space at other than initial or rated conditions. This term considers light loss factors such as lamp lumen depreciation, luminaire dirt depreciation, and room surface dirt depreciation.</i>
Iridescence	<i>Occurs when a reflector, especially those made of anodized aluminium, separates the wavelengths in the light produced by the CFL's rare-earth phosphors. This can result in a 'rainbow' effect seen on the Aluminium surface.</i>
Isolux Diagram	<i>A diagram showing contours of equal illuminance. Can be used to determine the direct illuminance on a plane.</i>
Kelvin	<i>A measurement of temperature. $1^{\circ} F = 256^{\circ} \text{Kelvin}$. $1^{\circ} C = 274^{\circ} \text{Kelvin}$. Used to measure colour temperature. The SI unit of temperature used to express colour temperature. The temperature in Kelvin (K) is approximately equal to the temperature in Celsius ($^{\circ}C$) plus 273.</i>
Kwh	<i>The kilowatt-hour (symbolised kWh) is a unit of energy equivalent to one kilowatt of power expended for one hour of time. This figure is required to complete energy comparison calculations.</i>
Lamp	<i>A device which converts electrical energy into light. Can be Tungsten filament, Fluorescent or HID.</i>
Lamp Darkening	<i>Through life, some darkening of the arc tube, most apparent near the ends of the lamp, will occur due to the deposits of electrode material on the inside wall surface. This is quite normal with lamp ageing and cannot be avoided. It is typically seen on T5 lamps that due to their smaller diameter are not possible to have cathode shields fitted, also lamps that have been excessively operated on Emergency lighting circuits. Other causes are radiated heat reflected back onto the arc tube or poor luminaire design allowing excessive heating of lamp heating.</i>
LED	<i>Light-emitting Diode. Ultra-bright light-emitting diodes based on material combinations such as Aluminium Gallium Indium Phosphide (AlGaInP) and Gallium Arsenide (GaAs) which cover half the visible spectrum, ranging from yellowish-green to red. Since developments in the early 1990's, this technology has been undergoing continuous improvements to increase the efficiency of the LED.</i>
LED Driver / Converter	<i>An LED driver is a device that manages power and controls the current flow for an LED lighting product. LED lighting does not require high voltage, and depending on the application, could even use batteries or solar power. In the HB-LED lighting market, the term driver is usually applied to a device that can accept an input voltage and produce the required voltage. An important factor that affects the correct selection of a particular driver is the way in which multiple LEDs are actually wired together.</i>
LED Life	<i>Figures published refer to the L50, L70 or L75 classification system where the number relates to the percentage of light output. So a 30,000hr L70 LED would be expected to have 70% of its rated output at 30,000hrs. LED's are subject to very small operating temperature parameters and figures quoted are typically at 25c. Building a LED into a luminaire can result in the operating temperature being outside the design parameters and the life being adversely affected.</i>

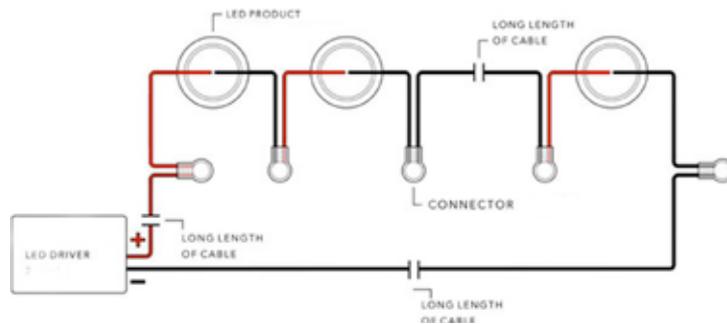
LED Parallel Wiring

Parallel wiring means that each component has the same supply voltage and all fittings on the circuit will have the same voltage across the luminaire terminals. The battery current (Amps) is divided by the number of luminaires on the circuit. If one luminaire fails then the remaining fittings on that circuit will stay lit.



LED Series Wiring

Series wiring means that each component has the same current and the battery voltage is divided by the number of luminaires on the circuit. If one luminaire fails then the remaining fittings on that circuit will NOT stay lit. **Please note that incorrect wiring of an LED can result in irreparable damage to the LED and associated power supplies.**



LED White

Previously, the only way to produce white LED light was by the additive colour mixing of the three basic colours using so-called MULTILED, i.e., three semiconductor chips (red, green and blue LED) had to be combined. Today, manufacturers can produce white LED light with only a single chip. In luminescence conversion, only a blue LED is used, whose light stimulates a luminescent substance that emits yellow light, the system produces the colour white. Depending on the composition of the luminescent substance, various white tones can be achieved such as warm white, cool white etc

LIA



Ansell Lighting is a code of practice accredited member of this leading UK trade organisation. Ansell have elected to participate in the LIA Code of Practice Scheme that is designed to substantiate Members' claim of conformity and the BSEN standard.

By taking part in this scheme all of our manufacturing facilities are audited on an annual basis to ensure compliance and quality.

www.thelia.org.uk

Lighting Design

Ansell offer a lighting design service provided by a team of vastly experienced and industry qualified staff. A simple to complete form is available to ensure designs are prepared with all of the correct criteria taken into consideration.

Light Meter

or exposure meter. A device use for the measurement of light intensity. This should have a cosine corrected sensor, usually a convex shape, to measure light falling on to it from all directions and a digital readout for accuracy.

Light Spillage/Trespass

Unwanted or nuisance light which is spilled beyond the boundry of the illuminated property or area.

Lm/W	<p><i>Lm/W can be separated into two categories: Lumens per Watt and Luminaire Lumens per Watt. Each can be used dependent upon the requirement and application type.</i></p> <p><i>Lumen per Circuit Watt is a measure of the efficacy of a light source in terms of the total lamp lumens compared to the power consumed. For example, a 100-watt fixture producing 1750 lumens gives 17.5 lumens per watt.</i></p> <p><i>Luminaire Lumens per Circuit Watt is a measure of the total lamp lumens and how the luminaire manipulates this light (L.O.R.) compared to the power consumed. For example, a 100-watt fixture producing 1750 lumens with a L.O.R. of 0.50 gives 35 luminaire lumens per watt.</i></p>
LOR	<i>Light Output Ratio. The ratio of the total light output of a luminaire under stated conditions to that of the lamp or lamps under reference conditions. The higher the figure, the more efficient the luminaire is. LOR may consist of any ratio of DLOR and/or ULOR.</i>
LDL	<i>Lighting Design Lumens. Lamps vary in flux output, both between themselves and through their operating lives. This is a nominal value which representative of the average light output of each type or size of lamp throughout life.</i>
Lumen	<i>Standard unit of luminous flux. Describes the quantity of light emitted by a light source or received by a surface.</i>
Luminance	<i>The physical measure of brightness measured by the luminous intensity of the light emitted or reflected in a given direction from a surface element divided by the area of the element in the same direction. The SI unit of luminance is the candela per square metre (Cd/m²) It is very difficult to determine other than with a luminance meter.</i>
Luminous Efficiency	<i>The ratio of the luminous flux emitted by a lamp to the power consumed by the lamp. When the power consumed by the control gear is taken into account this term is sometimes known as lamp circuit luminous efficacy and is expressed in lumens/circuit watts.</i>
Lux	<i>The metric unit of measure for illuminance of a surface. One lux is equal to one lumen per metre-squared.</i>
Maintained Luminaire	<i>A luminaire containing one or more lamps all of which operate from the normal supply or from the emergency supply when required.</i>
Metal Halide Lamp	<i>A high intensity discharge (HID) lamp, which uses a mercury discharge modulated by other additives to give, enhance colour and efficiency.</i>
Mercury Lamp	<i>A type of high intensity discharge (HID) lamp in which most of the light is produced by radiation from mercury vapour. Available in clear and phosphor-coated lamps.</i>
Microwave Sensor (MWS)	<i>Microwave Sensor(MWS) Sophisticated presence detector that uses low power Microwave signals which are then reflected by moving persons and measured using the "Doppler effect" method. As lamps will have life expectancy affected by frequent switching, sensors integral to Ansell luminaires have been configured to maximise lamp life.</i>
M3	<i>Maintained 3hour, Mode and duration (minimum with fully charged batteries) of an Emergency luminaire. To ensure the full duration is achieved, Emergency luminaires must be correctly maintained to condition the batteries.</i>
Night Light (NL)	<i>A light source used only to provide low levels of illumination at night, for security or safe movement of persons. This may either be a standalone luminaire or an option incorporated within a luminaire used for general lighting. Low wattage compact fluorescent lamps are ideal for this application.</i>
NiCd	<i>The nickel-cadmium battery (NiCd battery or NiCad battery) is a type of rechargeable battery using nickel oxide hydroxide and metallic cadmium as electrodes. The abbreviation Ni-Cd is derived from the chemical symbols of nickel (Ni) and cadmium (Cd)</i>

NiMh	<i>A nickel–metal hydride battery, abbreviated NiMH or Ni–MH, is a type of rechargeable battery. Its chemical reactions are somewhat similar to the largely obsolete nickel–cadmium cell (NiCd). NiMH use positive electrodes of nickel oxyhydroxide (NiOOH), like the NiCd, but the negative electrodes use a hydrogen-absorbing alloy instead of cadmium, being in essence a practical application of nickel–hydrogen battery chemistry. A NiMH battery can have two to three times the capacity of an equivalent size NiCd, and their energy density approaches that of a lithium-ion cell.</i>
Noise	<i>Conventional copper wound ballast's at normal supply frequencies can generate a low level 'hum'. HF electronic ballasts emit no perciveable noise.</i>
Noise (Electronics)	<i>In electronics, noise is a random fluctuation in an electrical signal, a characteristic of all electronic circuits. Noise generated by electronic devices varies greatly, as it can be produced by several different effects. Thermal noise is unavoidable at non-zero temperature, while other types depend mostly on device type (such as shot noise,[1][2] which needs steep potential barrier) or manufacturing quality and semiconductor defects, such as conductance fluctuations.</i>
Non-Maintained Luminaire	<i>The lamp is off when the mains power is available to charge the batteries. Upon supply failure the lamp is energised from the battery pack.</i>
Obtrusive light	<i>Light from any luminaire which causes discomfort or impedes the view of the night sky.</i>
Occupancy Sensor	<i>Control device that turns lights off after the space becomes unoccupied. May be Microwave, ultrasonic, infrared or other type. Care should be taken that switching cycles do not impede the life of the lamp. It is recommended that a minimum of 20mins ON is used</i>
Open (anti-panic) Area Lighting	<i>A part of Emergency Escape Lighting provided to avoid panic and provides illumination-allowing people to reach a place where an escape route can be identified.</i>
Open Rated Lamp	<i>Refers to HID Metal Halide lamps that are specifically designed for the installation into an open fixture (e.g. High Bay). The lamp has a second means of protection by a shield around the arc tube within the lamp. So no protective glass or cover is required from the luminaire.</i>
Operating Efficacy	<i>A term used which qualifies the efficacy of a lighting installation in use. Specifically operating efficacy is the quotient of the installed efficacy of the installation and the load factor. It is expressed in Lumens per watt (Lm/W)</i>
Operating Frequency	<i>Refers to the frequency at which the output of a lamp or LED source operates per second. Typically the operating frequency is the same as the input frequency (50Hz). Electronic or high frequency control gear can be used, and this will increase the operating frequency significantly into an operating frequency that the human eye cannot detect.</i>
Part L	<i>New legislation due for release in 2013 encompasses energy efficiency design criteria of new & existing buildings in relation to lighting installations, which must be met to achieve building regulations.</i>
PIR	<i>Passive InfraRed (Detectors) are a type of occupancy sensor. Ansell do not recommend HF compact fluorescent luminaires controlled by PIR's and they should have a minimum of a 20 minute switching cycle.</i>
	<i>The PIR's are suitable for LED lamps / luminaires. LED lamps / luminaires can be switched at any frequency but provision must be taken for the in-rush current of the LED control gear. Ansell recommends the use of branded PIR devices.</i>
Phosphor	<i>The powder coating in an electric discharge lamp is the phosphor. The most common chemical used to make white light is calcium halophosphate. Other colours can be produced by a variety of other chemicals.</i>



Photocell	A light-sensing device used to control luminaires and dimmers in response to detected light levels.
Phase Cut Off / Resistive Dimmers	Devices used to vary the brightness of a light. By decreasing or increasing the RMS voltage and, hence, the mean power to the lamp, it is possible to vary the intensity of the light output. Although variable-voltage devices are used for various purposes, the term dimmer is generally reserved for those intended to control light output from resistive incandescent, halogen, and (more recently) compact fluorescent lights (CFLs) and light-emitting diodes (LEDs). More specialised equipment is needed to dim fluorescent, mercury vapor, solid state and other arc lighting.
Photometrics	Photometrics is a term that expresses the result of scientifically tested Ansell Lighting products to produce information that can be used in lighting design packages such as Relux. This information is available for download at www.anselluk.com/downloads
Pre-heat	A type of ballast/lamp circuit that is designed to heat up a fluorescent lamp before high voltage is applied to start the lamp. This prolongs life of the lamp as is less harmful during starting. Also called Warm-Start.
Ra	See Colour Rendering
Rated Duration	Manufactures declared duration for a battery operated Emergency Lighting unit, specifying the minimum time for which it will operate after mains failure. This is normally one or three hours (when fully charged) From initial install, 24hours is required to reach full charge and 12-14hrs from subsequent discharges.
REACH	Registration, Evaluation, Authorisation & restriction of Chemicals. An EU Directive covering the use of hazardous chemicals used in the manufacturing process and supply of products.
Relux 	The Ansell Lighting design department utilises Relux as the standard lighting design package and visual presentation tool. This programme is available free for download from www.relux.biz
Resistive Dimmer	See Phase Cut Off Dimmer
RoHS 	Restriction of Hazardous Substances (2002/95/EC) is an article 95 directive, meaning it is consistent across all European Union member states. Since July 1st 2006 the use of hazardous substances is restricted in products, to prevent damage to the environment. The prohibited substances are Lead, Mercury, Cadmium, Hexavalent Chromium, Polybrominated Biphenyls and Polybrominated Diphenyl Ethers.
RM3	Remote Maintained 3hour, Luminaire where the Emergency control gear is separate from the main luminaire housing, typically due to lack of space for the additional emergency components. The emergency control gear must be enclosed and within 1.0m of the main luminaire. Otherwise it is classed as a central battery system and then must be wired in flame resistant cable.
Safety Glass	A necessity on most HID luminaires for UV protection and protection against lamp implosion. Usually made from toughened/tempered or borosilicate glass.
SBC	Small Bayonet Cap (lampholder or lamp cap).
Self-Contained Emergency Luminaire	The most common type of Emergency lighting luminaire, where all of the components are within one luminaire. This can include gear boxes connected directly to individual luminaires but outside the main luminaire housing.

Self Test Emergency	<i>The Self-Test circuit utilises an accurate internal clock which is programmed to interrupt the permanent mains supply at set intervals thus initiating emergency lighting tests. The Self Test units are supplied pre-programmed to initiate short duration tests once every month, a one third duration test after six months and a full duration test once every 12 months (as recommended in BS5266 and EN50172).</i>
SELV	<i>Separated Extra-Low Voltage. An extra-low voltage system, which is electrically separated from Earth and from other systems in such a way that a single fault cannot give rise to the risk of electric shock.</i>
Sensor Options	
ASEN1 & SEN1	<i>This sensor option is for a presence detector which has an on / off operation only (IP65 version available).</i>
ASEN3 & SEN3	<i>This sensor option is for a presence detector complete with a regulating photocell. The regulating photocell will detect ambient light in the application and reduce the light output of the fitting accordingly. Note – Luminaire must have HFDD control gear installed (IP65 version available).</i>
SES	<i>Small Edison Screw (lampholder or lamp cap).</i>
Service Illuminance	<i>is illuminance recommended for the assumed standard conditions of the application, as specified within the CIBSE guide.</i>
Starter	<i>A device used with a ballast to start a fluorescent lamp. Starters should always be replaced at the same time as lamps to ensure efficient operation.</i>
Stroboscopic Effect	<i>The optical elusion of motion in which moving objects appear stationary when illuminated with periodically changing light. This is due to the movement of the item occurring at the same frequency as the supply to the lamp, normally 50Hz or 50 times per second. This can be particularly dangerous in industrial applications but can be cured by using high frequency control gear.</i>
Sustained Emergency	<i>This term refers to a twin lamp emergency luminaire in which each lamp has it's own function. One of the two lamps will operate for maintained / switched operation and the second lamp will only operate in emergency mode.</i>
Sustainability HID Lamps	<i>HID lamps that have two arc tubes installed to share the operational workload and providing extended lamp life and higher lamp maintenance.</i>
Symmetrical Distribution	<i>Symmetric distribution of light. In many cases, the luminous intensity (light output) is distributed exactly the same either side of the lighting plane. Commonly found on floodlights, downlights and projectors.</i>
Task lighting	<i>Localised lighting intended for a specific task, examples include bedhead reading lights, desk lamps and inspection bench lighting.</i>
Timed ignitors	<i>Optional safety feature to protect the ignitor from overheating. Timed ignitors will 'shut down' if they are not successful in striking a lamp after a number of attempts, thus protecting the circuit and luminaire from potential damage that constant ignition voltages can cause.</i>
Titan LED	<i>Ansell Lighting dedicated LED fire rated downlight.</i>
t°C	<i>Rated value of the casing's maximum operating temperature. Typically marked on control gear components.</i>
Thermal Cut-out	<i>A protection from overheating due to abnormal lamp conditions (rectifier effect, short circuit or overload), with automatic restart after cooling. If a lamp is in a cycle of, runs for a duration, turns off, then restarts and runs for the duration again, it is likely that a thermal cut-out is operating.</i>

Thermal Performance	<i>This term refers to the design / thermal management of a luminaire.</i>
TP(a)	<i>Fire Retardant Thermoplastic: this is an indication of fire performance and can only be applied to materials that have achieved the appropriate standards. All polycarbonate materials 3mm or thicker as well as PVC can be classified as TP(a) according to building regulations Part B.</i>
Transformer	<i>A device by which the voltage of alternating current is changed. Traditional transformers are constructed by copper wire wound around an iron core, Electronic transformers are also commonly found. Typically used for supplying low voltage lamps, most transformers can be dimmed. The success of dimming depends on many factors including the type of dimmer and transformer used. Ansell can not recommend particular dimmers and suggest that the dimmer supplier is consulted for compatibility.</i>
Transient Voltage	<i>A sudden surge of high voltage on a power distribution circuit, usually caused by lightning or the switching on/off of heavy loads, especially motors.</i>
Triphosphor Lamp	<i>The fluorescent coating made up of 3 different phosphors on the inside of lamps that gives enhanced colour rendering. Compact fluorescent and T5 lamps are Tri-Phosphor as standard. T8 lamps will become Tri-phosphor only as less efficient Halophosphate lamps are phased out.</i>
Tungsten Filament	<i>A tungsten filament is coiled then coiled again to make it more efficient and robust. Whilst a wire heated to over 525°C will act as a light source, the melting point of tungsten is 3419°C.</i>
Tw	<i>Maximum permitted winding temperature of the ballast under normal operating conditions.</i>
ULOR	<i>Upward Light Output Ratio The ratio of the total light output of a luminaire above the horizontal.</i>
Utilisation Factor	<i>The proportion of the luminous flux emitted by a light source, which reaches the working plane.</i>
UV Ultra Violet	<i>Invisible radiation that is shorter in wavelength and higher in frequency than visible violet light (literally beyond the violet light). Lamps that emit varying degrees of long wave ultraviolet light, which does cause harm or degradation overtime, may require filters to absorb the UV. A 'failed' lamp that does not emit any visible light is still capable of emitting high levels of UV light but is not noticed as the lack of visible light gives the impression that the lamp is not operating. The high levels of UV can then cause damage to materials, particularly plastics, with dis-colouration and crumbling of the material. Therefore failed lamps should always be replaced immediately. Ultraviolet light source can be used to create special lighting effects with fluorescent materials. UV sources can be incandescent, fluorescent, or preferably HID lamps.</i>
UV filter	<i>Attachment for absorbing UV radiation from the beam. Glass makes a very effective filter.</i>
Visual Field	<i>The human visual field is much wider than most suppose with Altitude +60° - 60° and Azimuth 120° window.</i>
Voltage	<i>The electric potential which exists between two components in an electrical circuit. Lamps are rated in terms of wattage at a specific voltage. Operating a lamp at another voltage from that which it is rated may cause the lamp to burn at less than full intensity or to burn out very quickly.</i>
Watt (W)	<i>The unit for measuring electrical power. It defines the rate of energy consumption by an electrical device when it is in operation. The energy cost of operating an electrical device is calculated as its wattage times the hours of use. In singlephase circuits, it is related to volts and amps by the formula: Volts x Amps x Power Factor = Watts. (Note: For AC circuits, Power Factor must be included.)</i>

WEEE

Compliance with the Waste Electrical and Electronic Equipment Directive.
 This covers the collection, treatment and recycling of equipment at end of life. WEEE producer numbers are
 Ansell Electrical Products (Warrington) - **WEE/FH0429XT**
 Ansell Sales and Distribution (Belfast) - **WEE/GJ0292UQ**

When supplied as B2B EEE the producer invokes regulation 9.2 and passes all WEEE obligations to the end user.

White Light

Although scientists call the light that comes from light bulbs and the Sun as “white” light, it is not really white. White light is a combination of all the colours in a rainbow. This mixture of colours is called the light spectrum.

Products within the Collezione Italiana range have a finish that gives the appearance of wood, whilst having the advantages of a durable, weather resistant material.

The process starts with a corrosion resistant aluminium extrusion, then a film transfer and cellulose resin is then applied by a process called Sublimation. This process does not have any harmful or polluting waste, making it very safe to both humans and our environment.

The final result is a seamless finish that is perfectly applied to the profile of the Collezione Italiana product. Extensive laboratory testing including in saline mist for over 1500 continuous hours in order to simulate coastal conditions, has been successfully completed. Giving confidence in this highly realistic finish.

Working Plane

The horizontal, vertical, or inclined plane in which the visual task lies. If no information is available, the working plane may be considered to be the horizontal and 0.75m above the floor for offices (desk height), horizontal and 0.85m-1.0m above the floor for industrial (bench) applications.

Zenith

The direction directly above the luminaire (180° angle). Term used in floodlighting designs.



Technical Lamp Types

Lamp Type Voltage(V)	Rating (W)	Light Flux (lm)	Illustration	Cap/Base Type	Colour	Temperature
PL-S	5	250		G23	4000K	230
	7	400				
	9	600				
	11	900				
PL-C (2-Pin)	10	600		G24 d-1	4000K	230
	13	900		G24 d-1		
	18	1,200		G24 d-2		
	26	1,800		G24 d-3		
PL-C (4-Pin)	10	600		G24 q-1	4000K	230
	13	900		G24 q-1		
	18	1,200		G24 q-2		
	26	1,800		G24 q-3		
PL-T	13	900		GX24 q-1	4000K	230
	18	1,200		GX24 q-2		
	26	1,800		GX24 q-3		
	32	2,400		GX24 q-3		
	42	3,200		GX24 q-4		
	57	4,300		GX24 q-5		
	70	5,200		GX24 q-6		
Megaman Clusterlite	60W	4,000		E27	4000K	230
PL-L	18	1,200		2G11	4000K	230
	24	1,800				
	36	2,900				
	40	3,500				
	55	4,800				
	80	6,000				
TC-DD (2 Pin)	16	1,050		GR8	3500K	230
	28	2,050				
TC-DD (4 Pin)	16	1,050		GR10q	3500K	230
	28	2,050				
	38	2,700				
T5c	40	3,400		2GX13	4000K	230
	55	4,300				
GX53	7	350		GX53	2700K/4000K	230
	9	450				
	11	570				
	13	650				
T5 Miniature	4	150		G5	3500K	230
	6	260				
	8	420				
	13	850				
T5 High Efficiency	14	1,350		G5	4000K	230
	21	2,100				
	28	2,900				
	35	3,650				
T5 High Output	24	2,000		G5	4000K	230
	39	3,500				
	49	4,900				
	54	5,000				
	80	7,000				
T8 Triphosphor	18	1,350		G13	4000K	230
	36	3,350				
	58	5,200				
	70	6,000				

Lamp Type	Rating (W)	Light Flux (lm)	Illustration	Cap/Base Type	Colour Temperature	Voltage (V)
T8 Halophosphor	15	950		G13	3500K	230
	18	1,150				
	30	2,175				
	36	2,850				
	58	4,600				
	70	5,500				
T8 LED Tubes	10	1050		G13	4500K	230
	18	2000				
	22	2350				
SONE-I	70	5,300		E27	2000K	230
SONT	150	15,000		E40	2000K	230
	250	27,500				
	400	50,000				
SONT	1,000	130,000		E40	2050K	230
SONE	250	26,000		E40	2000K	230
	400	47,500				
MBF	80	3,800		E27	4100K 4000K	230
	125	6,500				
MBF	250	15,000		E40	3500K	230
	400	22,500				
HQI-TS	70	5,500		RX-7	4200K	230
	150	10,000				
HQI-E	70	5,300		E27	4000K	230
	150	13,300				
HQI-E	250	23,800		E40	4000K	230
	400	41,000				
HQI/T (MBI/T)	200	20,000		E40	4000K	230
	250	18,900				
	320	30,000				
	400	32,400				
HPI/T	250	19,000		E40	4000K	230
	400	33,000				
HQI/T (MBI/T)	1,000	85,000		E40	6000K	230
	2,000	240,000				415
CDM-T	35	4,000		G12	3000K	230
	70	7,750				
	150	15,000				
CDM-TC	35	4,000		G8.5	3000K	230
	70	7,650				
GLS Halogen	30	405		B22	2700K	230
	46	700				
	70	1,200				
Striplight	60	710		S19	2700K	230
G4	20	260		G4	2900K	12
G9	40	490		G9	2900K	230
	60	820				