

Raytec White-Paper Tips from 100 Years in Light

Raytec's lighting experts with over 100 years combined experience in lighting reveal their personal tips for CCTV and general area illumination.

Tips from 100 Years in Light

Cameras, just like people, need light to see at night. So every security professional will benefit from a core understanding of light.

Despite the importance of lighting, it is sometimes overlooked or specified incorrectly when it comes to the design and installation of a security system; often due to a lack of understanding.

Raytec are 100% focussed on lighting and six of Raytec's lighting experts who each have over 10 year's personal experience of lighting design (and collectively over 100 years) reveal their personal tips and practical guidelines for making lighting design, specification, installation and set-up much easier and more effective. This article will help all security professionals to understand the basic principles of light and get the most out of their security system at night.

This paper will cover the following topics:

- Optimal lighting and camera integration
- The importance of real life testing
- Identifying new opportunities with White-Light
- White-Light design and specification
- The impact of badly designed lighting
- The true cost of ownership of your lighting

Raytec Lighting Experts

Tony Whiting

Managing Director (Joint)
20 Years



Shaun Cutler

Managing Director (Joint)
15 Years



David Lambert

Sales and Marketing Director
10 Years



Steve Devlin

Field Sales Engineer
30 Years



Derek Plummer

White-Light Design
40 Years



Peter Hulme

White-Light Design
20 Years



Optimal Lighting and Camera Integration

Pro-Tip “Don’t look into the light!” David Lambert, Sales and Marketing Director

Camera alignment and set-up is crucial for achieving the best CCTV images at night and the highest level of security.

Cameras, just like human beings, rely on light reflected from objects in the scene to produce an image, so it is crucial to correctly position your lighting to fully illuminate your chosen scene and match the angle of illumination to your camera field of view.

Consider Figure 1. If your illumination is positioned so that it looks into the camera lens (or a human’s eyes), not only will it produce glare, but it will result in a scene that is not properly illuminated and an image with white-out or over exposure.

Figure 2 shows a scene which is correctly illuminated with the lighting positioned alongside the camera looking out onto the scene and using the correct output angle for the scene requirements. With the correct alignment and set-up, users can achieve even illumination across the entire scene, with excellent clarity, no dark spots or over exposure, for the best images at night.



Figure 1



Figure 2

The optimal position for your illuminator is adjacent to the camera and pointing out and down towards the scene.

Take care when locating your illuminator near a dome camera – we generally advise at least a 1 metre separation to avoid the possibility of light entering the dome and creating unwanted reflections.



Optimal Lighting and Camera Positioning



Pro-Tip “Quality of Light means two things – distribution of light and amount of light. Both need to be correct to achieve best performance” David Lambert, Sales and Marketing Director

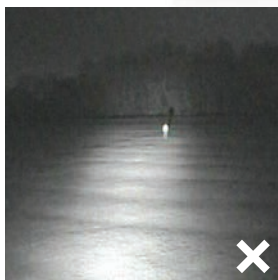
The distribution of light and the amount of light govern the quality of night-time CCTV images. For this reason it is critical to match the angle of illumination to the camera field of view to achieve the correct distribution (spread of light) and full coverage for your specific scene.

Distribution of Light

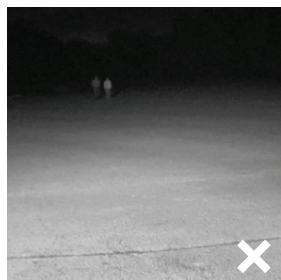
The correct illumination angle for a specific scene requirement could range anywhere from 5° for ultra long distance applications, right up to full 360° coverage for dome camera applications.

A narrow beam of light on a wide camera field of view can produce a bright spot or over exposure on the image and wide angle illumination on a narrow scene results in light wastage and reduced performance.

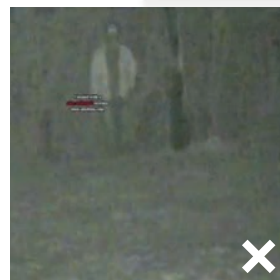
The examples below clearly illustrate the advantage of matching the angle of the illumination to the field of view of the camera.



Too Narrow - Hot spot



Too Wide - Distance Not Achieved. Wasted Light



Not Enough Optical Power - Noisy, Poor Contrast



Angle of Illumination Aligned to Camera FOV - Evenly Illuminated. No Over Exposure

Lighting solutions that provide the ability to alter the angle of the illumination will always be able to provide the best possible solutions and Raytec have developed a number of solutions to provide maximum flexibility:

- Raytec's Adaptive Illumination™ can be used to quickly and easily alter the horizontal angle of illumination on site to match the camera field of view, anywhere from 10-180° (model dependant). The vertical angle of the illumination can also be altered by tilting the unit up or down to match the requirements of a particular scene.
- Raytec also offer lighting solutions with interchangeable lensing. This means that you can match the angle of illumination with the field of view of the camera at all times – slotting in a different angle lens if required.

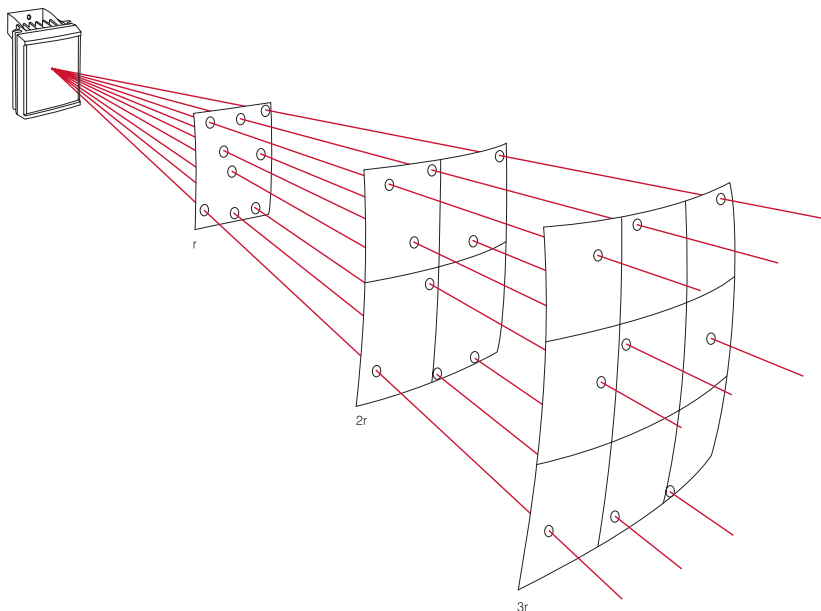
Quantity of Light

A basic understanding of the inverse square law will help ensure that you achieve better lighting design, and have enough illumination to achieve excellent night time CCTV images. But what is critical to understand is that, as you increase your distance, it's not as simple as merely increasing your light by the same amount.

The Inverse Square Law

Light obeys the inverse square law, so to fully understand the way that light travels, and its impact on CCTV systems, an understanding of the inverse square law is required.

The inverse square law in relation to lighting states that the intensity of a diverging light source is inversely proportional to the square of the distance from that source. As light travels away from a point source it spreads both vertically and horizontally and therefore intensity decreases – not as a linear function, but as a square function. This means that if light travels double the distance, there will not be $\frac{1}{2}$ power intensity (which would be a linear law) but there will be a $\frac{1}{4}$ of the original power intensity (a square law).



There are two ways that lighting designers can use the inverse square law to help design a lighting system.

1. To calculate the number of illuminators required to illuminate a certain distance (**Distance Ratio**)
2. To calculate how far multiple lamps will illuminate (**Power Ratio**)

1. Distance Calculator

Given the distance achieved by one illuminator, designers can calculate how many illuminators are required to achieve a different distance.

To work out simple distances such as x2 distance, x3 distance it is simply a matter of squaring the distance multiplier.

Practical Examples

To achieve double (x2) the distance = 4 x the original power is required (2^2) (or 4 illuminators)

To achieve triple (x3) the distance = 9 x the original power is required (3^2) (or 9 illuminators)

2. Power Calculator

To work out the distance of multiple illuminators, simply find the square route of the number of required illuminators then multiply that number by the achievable distance of 1 illuminator.

Practical Example:

How far will 6x RM200-AI-10's cover?

Square route of 6 is 2.45.

6 x RM200-AI-10's will cover 2.45 times the distance of 1 x RM200-AI-10

2.45 x 300m (984ft) (the distance of 1 illuminator) = 735m (2,411ft)

***Pro-Tip** “High end cameras deserve high end lighting. Don’t skimp on the lighting if you’ve paid for good cameras”* David Lambert, Sales and Marketing Director

Sometimes, dedicated CCTV lighting may NOT be considered essential during the design of a scheme. Existing street lighting or ambient light from buildings or windows might be considered as adequate illumination for CCTV. Sometimes the user may make do with lighting that is not specified correctly for the scene and then compensate by using camera settings to boost the image quality.

However, if you want to achieve good CCTV performance and high levels of security, there are several reasons to note why this approach is flawed.

Automatic Gain Control

Automatic Gain Control (AGC) allows low light levels to be enhanced within the camera. However, if you already have a poorly lit CCTV image which will most likely be ‘noisy’ and pixellated (from a lack of correctly aligned and evenly distributed illumination) the AGC will not only amplify light levels but it will also amplify the noise. So whilst your image may be brighter, the level of detail and clarity will be significantly reduced.

With high levels of gain and a noisy image, there are additional disadvantages. One disadvantage is increased bandwidth and storage if you are using a network camera system. The noisy and constantly moving image creates a high level of data to be transmitted and also prevents video compression from working correctly. Video compression is an essential part of a megapixel camera’s operating mode because without it, a lot more video data has to be transmitted and stored. This is because most compression techniques are based on the principle of only sending the updated data – i.e. those parts of the image that have moved or changed. The problem is that even though the scene may be static, the compression software is tricked by the noise in a poorly-lit scene into thinking that the whole image is ‘moving’. So huge amounts of useless data is transmitted and stored.

Video analytics are also affected by a noisy and poorly lit scene. Not only will the video analytics system not be able to search for and identify subjects and objects on scene, due to the poor level of detail and clarity, but the noisy and constantly moving image may cause the motion detection system to raise false alarms.

If light levels on-scene are good enough from the use of appropriate CCTV lighting, then the amount of gain required should be minimal thus improving picture quality and reducing bandwidth and storage requirements. Video analytics systems required good quality images – day and night – to work effectively.

Shutter Speed

With insufficient lighting on scene, a known trick to improve light levels is to reduce the shutter speed of the camera to lengthen the exposure time so that the camera can capture the maximum amount of light per frame. This may brighten a static image, but for a dynamic and moving scene, the shutter speed will be too slow to capture movement in real time and motion blur will occur.

However, with the right QUANTITY & QUALITY of targeted light on scene, cameras with good sensitivity to light are able to use faster shutter speed settings, allowing full frame rate operation, catching movement with no motion blur even in low light environments.

If the light is correctly aligned to the camera field of view and delivering an even spread of illumination, often as little as 2-3 lux of illumination is needed to produce high quality images at light.

The importance of real life testing

– not all scenes and scenarios are the same

Pro-Tip “Covert lighting requires special cameras and special lenses.
We recommend 850nm in 99% of installations.” Steve Devlin, Field Sales Engineer

If you are considering utilising 940nm Infra-Red LED lighting for a covert CCTV application, then it is crucial to understand that it will have a significant effect on the overall performance of your security system in terms of achievable distances.

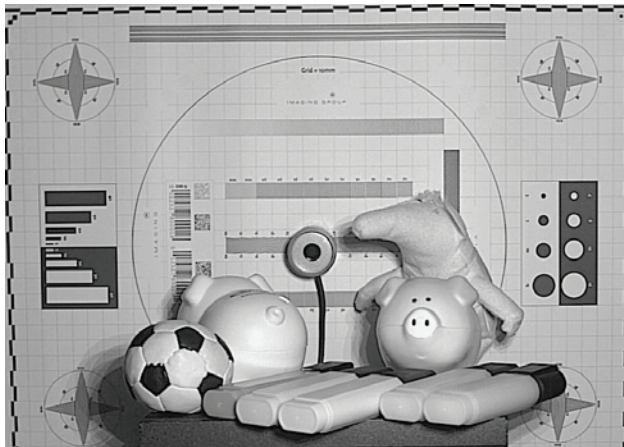
850nm is the industry standard Infra-Red wavelength to which the majority of cameras are most sensitive. 850nm IR units produce a distinct red glow. 940nm is an Infra-Red wavelength which is predominantly utilised for covert applications where a visible red glow from IR illumination is not acceptable – e.g. railway or military applications. With a 940nm IR unit, the human eye would only see an extremely faint red glow – if you were very close.

What is crucial to understand about 940nm Infra-Red lighting is that because cameras are significantly less sensitive at 940nm compared to 850nm, achievable distances with 940nm are significantly reduced – you can expect to achieve 40% less distance or more. At 940nm you need the most sensitive cameras to produce the best results.

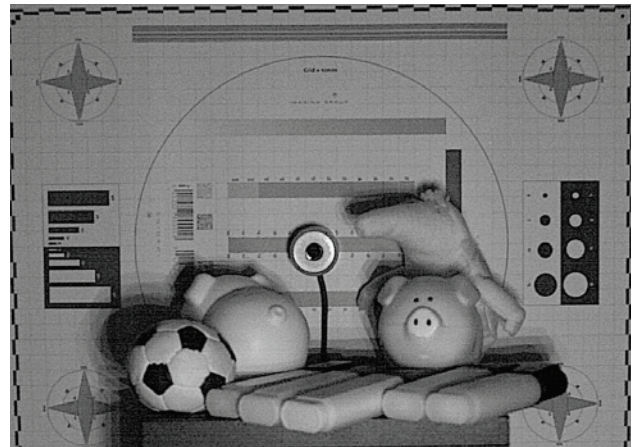
It IS possible to achieve good distances and high quality images with fully covert lighting, but the careful selection of your camera and lens is crucial. Raytec have worked with a lot of camera technology partners over the years and we'd be happy to take a look at your chosen camera and calculate the impact on distance when using 940nm Infra-Red LED lighting.

Not only do cameras have to work harder to produce acceptable pictures at 940nm, lenses are also working towards the edge of the performance window. Transmission at 940nm will be lower and focus shift from daytime to night-time operation at 940nm is more pronounced.

Our clear advice is that, unless absolutely necessary for operational requirements – ie military, police or railways – 850nm will also provide better pictures, longer achievable distances and easier focussing than 940nm.



850nm Infra-Red LED



940nm Infra-Red LED

***Pro-Tip** Lighting for cameras and security systems delivers best results when set-up at night.*” Steve Devlin, Field Sales Engineer

Infra-Red Only: Focussing & Alignment

It can be challenging to set up cameras and Infra-Red lighting during the day. Even if you set it up with an IR filter during the day, you won't always get a true representation of the scene and how the images will look at night.

IR filters are designed to fit over the camera lens to cut out all other wavelengths of light except Infra-Red. They can be used during day time set-up to mimic a night-time scene, so that the camera can see where the Infra-Red light from the illuminator will fall on the scene without disturbance from other light forms. Installers often use this technique in an attempt to set-up their Infra-Red illuminators in the correct position and angle for the scene in hand – but this technique can cause problems and has limited success.

In our experience, there really is no substitute for getting out on scene AT NIGHT.

IR filters can cause additional transmission problems. The filter acts creates a barrier and prevents a proportion of the reflected light from the scene passing through the lens to the camera chip. It can reduce the available light by 25% - and hence reduce overall system performance.

White-Light: Alignment

There are less issues when setting up White-Light systems during the day with regards to focussing.

However, the same alignment issues exist in bright light conditions – but because White-Light is visible, alignment issues are easier to overcome.



Day time set-up



Night time set-up

Pictures above highlight the issues with alignment and focusing when cameras are set-up during the day. The picture on the left shows the lighting is misaligned and out of focus.

Raytec Solutions

The focusing issue can be improved by ensuring that sufficient light is provided so that the camera and lens are not working at the edge of their performance envelope. 850nm lighting will always cause less focus shift than 940nm. There are a wide range of IR corrected lenses available which can significantly help with focus shift.

Raytec are delighted to announce the development of a Dedicated Daytime Set-Up Tool (DST) which will help the installer ensure that their lighting is pointing in exactly the right direction – even when commissioned during the day. The DST will be available from Q2/2013.

Identifying New Opportunities with Light

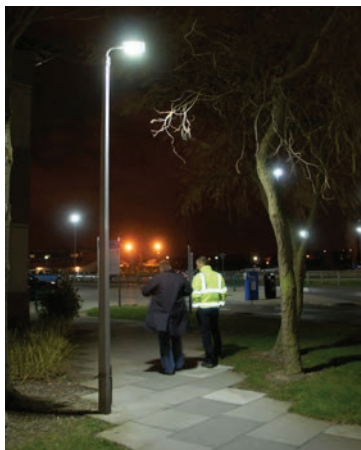
Pro-Tip “Explore the opportunity for White-Light installations...historically as an industry we may have missed some significant sales opportunities. Always quote a CCTV system with a lighting option. And consider looking beyond the camera to providing multi-purpose illumination” Shaun Cutler, Joint MD

Often lighting is left to electrical contractors who do not always have the knowledge and expertise when it comes to lighting for security and safety. But the position and performance of the lighting on site has a dramatic effect on not only camera performance but also public safety. For this reason, security professionals are urged not only to take responsibility for the cameras on site but the lighting too.

More and more frequently installers provide lighting for surveillance cameras but possibly miss the chance to provide exterior general site lighting. There are significant opportunities for security integrators to increase sales, especially given the fact that the facility manager responsible for general lighting is often the same person security integrators work with when designing and installing a CCTV system.

White-Light can obviously be used for a wide variety of purposes including a combined solution for both camera lighting and general area illumination. It provides good visibility and a safe, welcoming environment for onsite personnel and even-illumination with no dark spots, whilst also providing the same crystal clear, energy saving White-Light to deliver excellent CCTV images from the site surveillance system.

Hospital – Case Study



Raytec and a local installer had already installed Infra-Red LED lighting for B&W cameras around key surveillance points for a large UK hospital. Following this installation, they identified the opportunity to deliver further energy and cost savings by upgrading the hospital's existing old style exterior site lighting to new high performance, low energy White-Light LED. RAYLUX White-Light illumination replaced metal halide lighting in the car park and RAYLUX Urban lighting replaced sodium lighting on pathways, delivering improved safety and visibility, long life, reliability and significant energy and maintenance cost savings. The accurate colour rendition of the new White-Light LED units also allows the site colour camera system to achieve better surveillance images during the hours of darkness.

Following the installation, the hospital is making 70% power savings, has reduced their CO2 emissions by 40 tonnes of per year, and are set to save £80,000 on running costs and maintenance over the ten year minimum life of the installation.

Pro-Tip “Don’t be Shy. Raytec are here to assist you. Ask us to help, use our tools and our people. Let us make your life easier – let us make you look good”. Shaun Cutler, Joint MD

Installers can utilise Raytec’s full support and expertise when pursuing lighting projects. Whether you are using Infra-Red or White-Light, Raytec’s team of expert lighting designers can help you design and specify the best lighting for your project requirements, for the highest level of night time surveillance and site safety, and energy and cost efficiency.

Raytec Lighting Design Service

Working closely with the customer, Raytec will firstly determine the purpose of the lighting for the specific application - whether that will be long distance CCTV lighting along a perimeter or wide angle dome camera lighting, lighting for safety within a car park, industrial lighting for a manufacturing facility perhaps, or an entirely bespoke application.

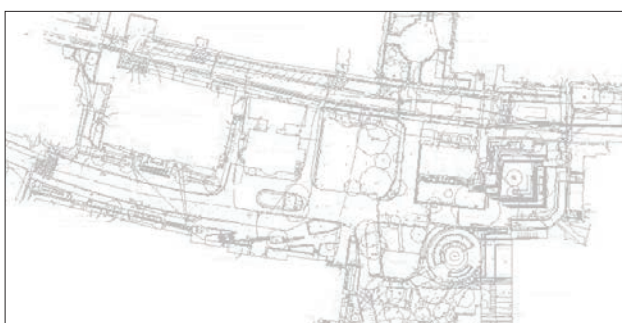
With the original site drawings from the customer, or even using satellite images, Raytec use lighting design software to create tailored lighting solutions to highlight the best lighting positions, minimum number of fittings and detailed lighting levels to meet the specific requirements of each project.

All Raytec White-Light products are photometrically tested by an independent laboratory to determine the exact power and light distribution of each unit. Using this photometric data in conjunction with lighting design software, Raytec lighting designers are able to provide a lighting solution which adheres to any specific lighting requirements. These can include details of whether the lighting is on a horizontal plane (lighting down onto a scene for general area lighting) or a vertical plane (lighting out across a scene for CCTV lighting), specific lux levels and uniformity requirements as well as other important performance characteristics.

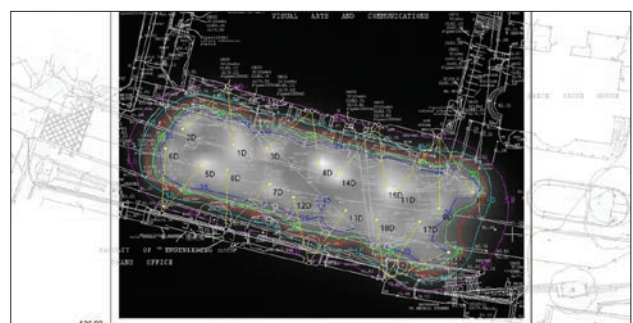
Raytec can provide both 2D and 3D lighting designs.

2D Lighting Design Process

A 2D design is used to plot the individual light fittings onto the site plan, indicate the direction and spread of the illumination, and use contour lines to show detailed lux levels within different areas. This type of design explains exactly how Raytec will achieve the desired outcome, and can be used as a guide during the installation stage.



Customer's Original Site Drawing of University Campus

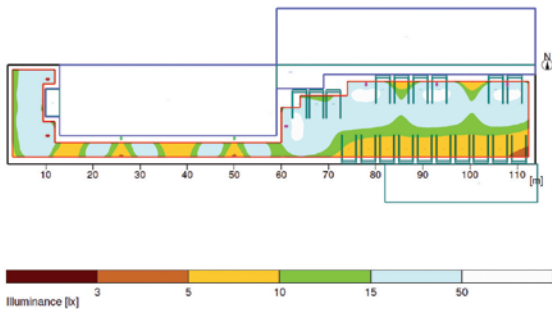


2D Lighting Design Showing Detailed Light Levels

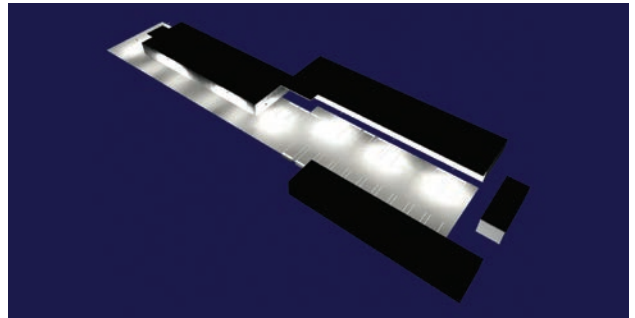
3D Lighting Design Process

A 3D design is used to provide the customer with a visual representation of what the final installed lighting solution will actually look like.

If the customer requires, Raytec can also provide visits to site to provide a detailed survey, and provide an energy and cost saving report analysis of the savings made possible by switching to LED technology.



2D Design Lighting Design of a Car Park Showing Detailed Light Levels



3D Design of a Car Park Showing Visual Representation

Other Raytec Services and Resources include

- Monthly Webinar Sessions – learn basic and advanced theoretical and practical lessons on lighting; topics include - 'Comparing Lighting Specifications', 'Lighting Fundamentals', 'Lighting Design' and many more
- Technology Alliance Partner Program (TAPP) Resource Centre – Library of Camera Test Footage to see Raytec LED lighting working with your chosen camera
- Resource Centre - Technical Articles and White Papers for Download: including Lighting for Network Cameras and How to Specify Lighting for Dome Cameras
- Practical Test Nights – Public and Private Sessions (trial your chosen camera/lens/lighting combination)
- Dedicated Installer/End User Training
- Online Forums – LinkedIn Discussion Group: (live discussion between industry professionals – ask questions and get feedback from the experts)



White-Light design and specification

Pro-Tip “Identify the purpose of the lighting – different purposes require different lighting”. *Derek Plummer, White-Light Design*

Whether you are utilising White-Light illumination for either safety or security, or a number of visible illumination applications, getting the design and specification stage right is crucial to the success of the installation and the final outcome i.e. whether your colour CCTV images are bright enough, or whether your site has good enough visibility.

Defining the purpose is critical to ensuring that the client is satisfied with the final lighting scheme. The choice of product is influenced heavily by this requirement.

- **What is the purpose of the lighting?**

- Security
- Amenity
- Personnel
- Multi-Purpose

- **What is the final application?**

- CCTV illumination
- Car Park
- Perimeter
- Prison
- Critical Infrastructure
- Footpath

Different purposes require different lighting approaches. Different project applications may have specific tender documents or related standards to adhere to including meeting the minimum illumination requirements for high levels of safety and security.

Example 1

Purpose: Multi-Purpose Lighting (CCTV and General Area Illumination)

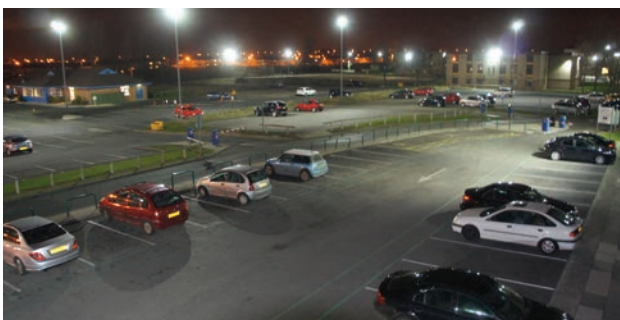
Application: Car Park

Lighting Requirements:

Visible illumination for safety and security. Minimum illuminance level of 10 lux on the ground. Cameras require illumination for 360 degree vision. Utilise existing columns.

Approach:

3 x wide angle White-Light units around the top of each 10m column providing even spread of light for good visibility and improved safety, as well as a high CRI (colour rendition) allowing the site dome cameras to generate good colour images at night.



Example 2

Purpose: Amenity
Application: Campus footpaths

Lighting Requirements:

Visible illumination for safety. Minimum illuminance level of 5 lux on the ground.
Avoid too much upward spill and light pollution.

Approach:

Urban White-Light illumination, providing elliptical beam pattern onto the designated pathway and campus areas. Targeted, even spread of crisp and clear illumination on key areas, to achieve good visibility and safety. Environmental shield to avoid upward light spill.



Pro-Tip *“Always look for fixing points and utilise what is already there”.*

Derek Plummer, White-Light Design

Raytec are here to help at all stages of your lighting design, specification and installation, but a good tip for helping to reduce installation costs is to utilise existing columns and fixing points. You can always specify your lighting to utilise the position of the existing lighting locations. This can be significantly more cost effective compared to the cost for a new lighting column which can be extremely expensive.

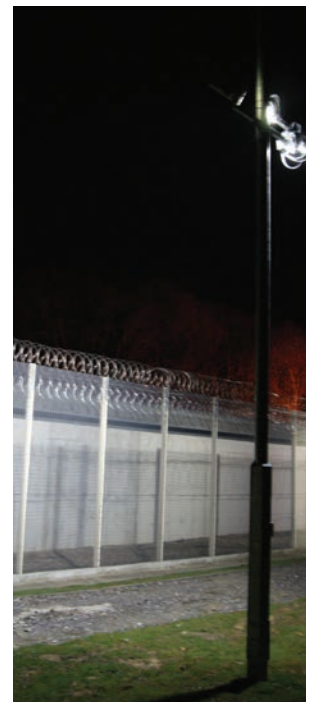
And remember – you may not need lighting on every column.

Think smart. Using the minimum amount of lighting, whilst still achieving good levels of illumination, will result in further savings.

In a lot of cases, opting for a carefully targeted, colour corrected White-Light LED solution used in place of a solution such as sodium lighting can reduce the number of fittings by half! Not to mention the energy and cost savings achieved by switching to a low energy, zero maintenance LED solution.



400W Sodium Lighting Per Column



100W RAYLUX LED Lighting Every 2nd Column

Pro-Tip “Use your eyes for a visual check. Look for dark areas and obstructions”.

Derek Plummer, White-Light Design

Site drawings are essential for specifying the right illumination to meet the demands of the specific project requirements. From a professional site drawing Raytec lighting designers can plot lighting positions, calculate beam distances, angles and lux levels. But what site drawings can't always indicate is whether there are any obstructions or environmental factors that need special consideration.

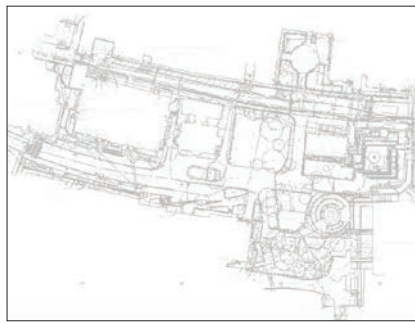
It may seem obvious, but when planning your lighting scheme you need to assess whether there is anything blocking the light, such as bushes, trees, canopies, temporary structures etc. Hills and the lay of the land can also affect how light travels and is reflected. Consider also whether there are any dark or shrouded areas that need additional lighting. These are all things to consider when designing your lighting scheme.

Use Raytec's free lighting design service when planning your lighting scheme.

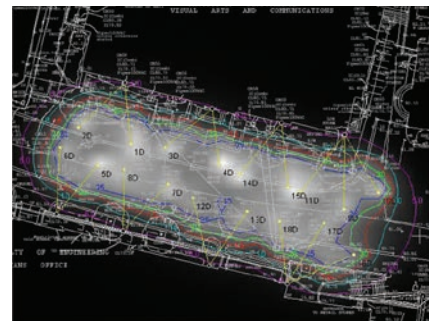
Raytec lighting design experts can advise on the best lighting configuration for the exact needs of your site. They can also accompany you to site to help complete a thorough survey so that you can achieve the most professional results at the end. If a site visit is not possible, then satellite pictures are a great start.



Satellite Image



Site Drawing



Detailed Lighting Design

The impact of badly designed lighting

Pro-Tip “Merely guessing where to place the fittings, and providing the most powerful product results in unnecessary light pollution and wasted energy and money”. Peter Hulme White- Light Design

At Raytec we design lighting by considering exactly where the light needs to go, using the minimum amount required, therefore reducing power consumption and light pollution.

When thinking about the design of an installation, the key objective for achieving the most energy and cost efficient installation is using the minimum number of fittings possible and utilising existing lighting columns where possible, whilst still achieving an even spread of illumination.

– Raytec’s lighting design team can help you to achieve this balance.

Many traditional ‘visible’ lighting solutions aim for high lux levels on the scene – this is not always required and it can often result in the reduction of CCTV image quality caused by high contrast between overlit and darkly lit areas, excessive light pollution and excessive energy consumption.

LED lighting technology allows you to target and control the beam to angle the light exactly where you need it, to avoid over illumination and upward light spill.



Traditional Lighting:

High energy, uncontrolled beam - more light pollution and less energy efficient. Poor quality of light creating some dark, unsafe areas and poor colour rendition for CCTV.



White-Light LED Lighting:

Low energy, targeted lighting - less pollution and more energy efficient. Better quality of light for a safe evenly lit area, and good colour rendition for CCTV.

Pro-Tip “If it looks right, it is right - a very simple cliché but extremely relevant to all aspects of lighting”. Peter Hulme White-Light Design

Does the object/target scene represent the same colours it would during the day?



Sodium Lighting



White-Light LED

Can you see the whole scene? Is anything hidden? Is any part over illuminated?



Note: The front of this scene is evenly lit with White-Light LED, and the back of this scene is poorly lit with sodium lighting. Take notice of the dark hidden car park at the back left of the scene. Could you detect and identify an intruder?

True costs and benefits of LED lighting

***Pro-Tip** “Consider the true cost of ownership of your lighting. Lower cost products may not deliver the performance, reliability and quality that you or your customer is looking for. Make sure the manufacturer you choose is capable of supporting its products and honouring its warranty”. Tony Whiting, Joint MD*

The true cost of illumination relates not just to the initial cost of the product but the overall life-cost of the project including the performance, flexibility, reliability and energy efficiency of your chosen solution and the design time, the ease, speed and quality of the actual installation.

How do you measure performance of different illuminators?

How can you be sure that the claimed distances by manufacturers are reliable? Where did the figures come from?

To evaluate the real “quality” or performance of any illuminator, it is important to know how much total power (or light) the illuminator outputs and where it distributes the light.

These two factors combine to define the ‘quality of the light’ and support the claimed distances by manufacturers.

1. Total Light Output (Power)

Total Light Output gives a measure of the total useable energy emitted from a light fitting. This is typically measured in an integrating sphere where all the power (light) emitted from an illuminator is detected.

For visible light (White-Light) the total amount of light emitted which is visible to the human eye is described as the “total luminous flux”, which is measured in lumens.

All of the Infra-Red emitted from an Infra-Red illuminator is called the “total radiant flux”. Typically this would be expressed using a power measurement such as watts.

2. Light Distribution

The term light distribution refers to the measurement of the amount of light at a number of specific points and helps to describe the quality of the beam pattern.

In White-Light terms, the light falling on a surface is called “illuminance” and is measured in either lux or foot candles:

For Infra-Red, the units used to measure the “irradiance” (the IR equivalent of “illuminance”) are $\mu\text{W}/\text{cm}^2$.

Light distribution measurements are taken through photometric testing by certified laboratories, where the light emitted from the fitting is measured at regular increments upto 360 degrees, creating a 3D plot to accurately profile the beam pattern (light distribution).

This photometric data can then be used by lighting designers to enable them to carry out comprehensive and highly accurate lighting designs using industry standard design software.

Reputable manufacturers will be able to provide, as a minimum, information regarding the total power output and light distribution readings at a number of points for all of their products. If they can’t, how did they establish the stated performance?

In addition to whether or not the product meets the performance specification – there are a number of hidden costs to be aware of.

- Good lighting design support from the manufacturer will mean that you can specify the required product quickly and with confidence.
- Good design support will also mean that you end up with the right lighting solution providing the correct level of illumination – and not over-specifying.
- Good system performance, supported by independent test data, will mean that you can deliver outstanding pictures and good illumination levels – ensuring you satisfy the requirements of your customers.
- Good product flexibility will reduce installation time and errors by ensuring the product delivers the level of functionality required to meet your installation requirements.
- Good system design offering a quick and easy set-up will mean that you can save time and use less labour for a low cost installation
- Good technical support will mean any issues can be quickly and professionally resolved.
- Good reliability, long product life and low/zero maintenance will mean a trouble-free and low touch installation, lower ongoing labour costs – and happier customers.
- Good product efficiency and low power consumption will mean that your customers enjoy low running costs.
- Good warranty package will mean that if there any product problems they can be resolved at minimum cost and hassle to you and your customer.

If you have considered and evaluated all of the above, it's likely that you're on your way to delivering a truly efficient lighting installation on all levels.

Pro-Tip “Lighting gives you an opportunity to engage with existing and new customers. Lighting issues are real - and happen every day (or more accurately every night)”. Tony Whiting, Joint MD

Has your customer installed CCTV lighting, but forgotten the impact of the exterior site lighting?

Increasing numbers of public and private sector organisations are saving tens of thousands of pounds a year and significantly reducing their energy bills and carbon footprint by upgrading their exterior lighting to the latest generation LED-based products for both CCTV and general area illumination.

Could your organisation or your customer's organisation do something similar?

If you have exterior lights but are not exactly sure how much energy they are consuming, then the answer to that question is probably 'yes'. That's because most exterior lighting is still the old-style, inefficient technology that costs a lot of money to run – ironically, although those lights shine out brightly, night after night, this wasted money is just not noticed.

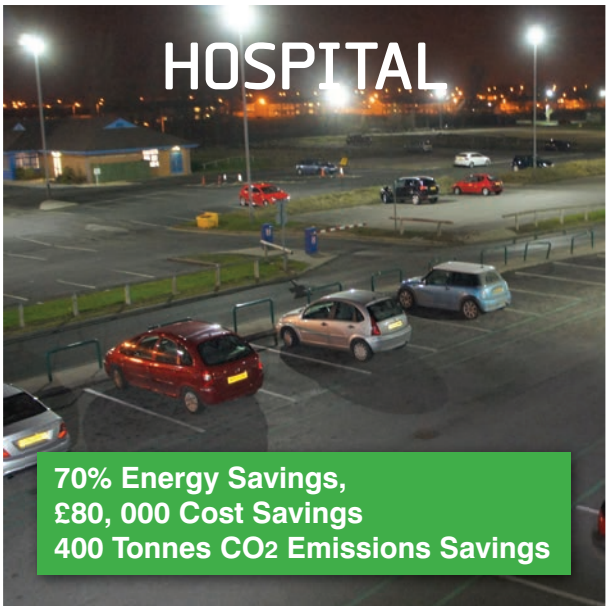
LED lighting can not only improve the performance of your CCTV system and general site lighting, but it can deliver significant energy and CO2 reductions, along with huge labour and running cost savings.

Good quality lighting not only delivers high quality images at night and energy and cost savings, but allows faster frame rates, enables video analytics to work to its full potential, provides safer environments, and delivers savings on bandwidth, and storage.

So there are lots of reasons to speak to your customer and deliver benefits on multiple levels with LED lighting!

Pro-Tip “Raytec can help you and your customers deliver truly green solutions to save money, save energy and reduce their carbon footprint”. Tony Whiting, Joint MD

The case studies below clearly highlight to end users, the energy and cost saving benefits made possible by adopting LED technology.



About the Authors

Tony Whiting

Tony Whiting is the Managing Director (Joint) of Raytec. He has over 20 years practical, hands-on experience within the CCTV lighting market developing innovative lighting solutions to improve the night-time capabilities of professional CCTV/surveillance systems.

An experienced business builder, Tony has a strong entrepreneurial background with over two decades of experience of directorship in the CCTV industry as a founding Director of both Raytec and before that at Derwent Systems (subsequently bought by Bosch).

Shaun Cutler

Shaun is the Managing Director (Joint) of Raytec. Over the last 15 years, Shaun has established an outstanding reputation for delivering cutting edge lighting solutions to the professional CCTV market and, together with the team at Raytec, developing a number of product world firsts.

Driven by passion, combined with technical flair and built on a solid understanding of customer requirements, Shaun is committed to ensuring Raytec continues to deliver the best illumination systems available to the market.

David Lambert

David is Raytec's Sales and Marketing Director. He has over 10 years practical experience in specifying lighting for surveillance cameras, and leads Raytec's sales and marketing teams, driving sales forward and expanding the company's global footprint into emerging markets. Recognised as a key leading industry figure in lighting, David also delivers CCTV seminars, interactive workshops and practical demonstrations at security events around the world.

Steve Devlin

Steve is Raytec's Field Sales Engineer and works closely with security professionals around the World to provide tailored lighting solutions for any application. With over 35 years practical experience in the security industry, Steve delivers the highest level of on site technical and installation support, providing detailed site surveys, testing sessions and a comprehensive lighting design service.

Derek Plummer

Derek is a Raytec White-Light Design specialist with over 40 years experience in the lighting industry. As a previous long standing technical committee member and Honorary Regional Secretary (North Eastern Region) for the Institute of Lighting Professionals, Derek is an expert in his field. Derek works closely with Raytec customers to provide a comprehensive lighting design and specification service. Using the latest software and top level expertise, Derek creates detailed design drawings, highlighting the optimum lighting solutions, best positions, minimum number of fittings and detailed lighting levels to meet the specific requirements of each project.

Peter Hulme

Peter is a Raytec White-Light Design specialist with over 25 years experience in the lighting industry. Peter has worked in almost every area of illumination, in applications such as internal lighting and decorative illumination, as well as street lighting and now lighting for both safety and security. He has vast expertise in multiple technologies from fluorescent through to discharge lighting, including hazardous area lighting and many LED solutions. Peter also provides a top level lighting design and specification service and provides an on-site service to customers requiring initial and ongoing surveys. Peter delivers detailed technology recommendations as well as energy and cost saving analysis.



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