

## IP Ratings What do they mean?

The first number of the IP code indicates the degree of protection against solid foreign bodies such as dust intruding into an enclosure. The second number indicates the degree of protection for the equipment inside the enclosure against the harmful entry of various forms of moisture (e.g. dripping, spraying, submersion, etc.) For general outdoor use, IP65 is sufficient to withstand the effects of wind and rain.

### First Number

- 0 No protection provided.
- 1 Protection against entry of objects larger than 50 square mm.
- 2 Protection against entry of objects larger than 12 square mm.
- 3 Protection against entry of objects larger than 2.5 square mm.
- 4 Protection against entry of objects larger than 1.0 square mm.
- 5 Protection against entry of dust in sufficient quantity to prevent satisfactory operation.
- 6 Complete protection against entry of dust.



### Second Number

- 0 No protection provided.
- 1 Protection against drops of water falling vertically.
- 2 Protection against drops of water falling vertically when the luminaire is tilted up to 15 degrees from its normal position.
- 3 Protection from entry of water spray from angle of up to 60 degrees from vertical.
- 4 Protection from entry of water splashes or spray from any direction.
- 5 Protection from a low pressure jet of water in any direction.
- 6 Protection against heavy seas or a strong jet of water in any direction.
- 7 Protection against immersion up to 1 metre.
- 8 Protection against submersion over 1 metre.
- 9 Protection against close-range high pressure, high temperature spray downs.

## CRI Colour Rendering Index

CRI or Colour Rendering Index refers to the ability of a light source to show the true colours of an object relative to their natural colour in daylight. CRI is measured on a scale from 0 to 100, with 100 representing true colour. High CRI ratings are incredibly important for industries that rely on true colour such as fruit plantations, vehicle painting and even the medical industry.

### CRI Example

As shown in these images, a higher CRI rating of 90 shows vibrant and clear colour compared to the image on the far left which has a rating of 30.

The amount of light shining on the objects is the same, but the difference in CRI rating means one image is dull and lacking in true colour and the other is vibrant and closer to daylight representation.



Lower CRI rating

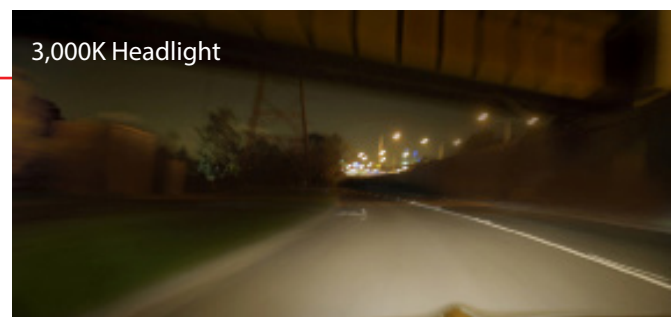
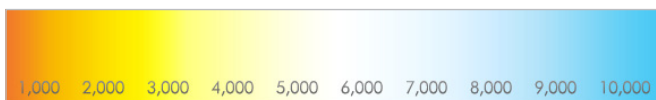


Higher CRI rating

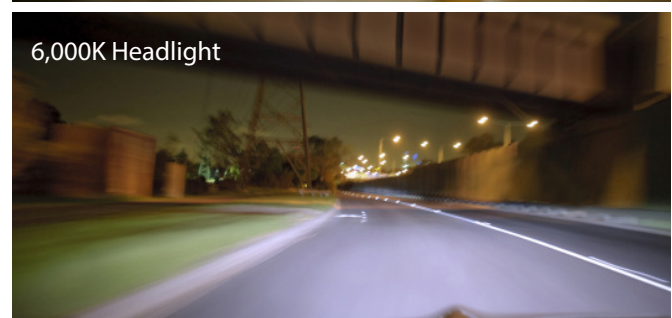
## Colour Temperature (K)

Colour Temperature or Kelvin (K) Rating refers to the colour of a light source in reference to the Kelvin scale. K Rating is often confused with a light's intensity but the two are very different. Commercial lighting often varies between 3,000K and 6,000K depending on the application. With 5000K considered daylight, many LED manufacturers aim for colour temperatures that offer a more natural looking light.

The difference between 3000K and 6000K is dramatic as highlighted in the images to the right. The 3000K product is much warmer looking compared to the cooler 6000K.



3,000K Headlight



6,000K Headlight

# African mine site lighting and the ever increasing need for change

Through years of experience and on-site audits and operational studies, Flo-Tec Limited understands the cost of poor lighting. Lack of, or poor-quality lighting directly affects three key areas of mine site operations both in plant & equipment applications.

- Safety
- Operational Productivity
- Maintenance Costs

The cost of running a mine site has never been higher, between increased power and fuel prices and the rise in local labour costs, businesses are looking to new technologies to help bring their costs down. With this need also comes the opportunity for cheap product to flood the market as we've seen in the last five years in the LED lighting industry. This need for the latest and greatest technology has sparked some incredible improvements in LED products but where do you start when it comes to picking the right products for your site?

From all the sites we've had dealings with, there are a few overwhelming similarities across them all. The most apparent issue from a product reliability point of view is that a very high percentage of machines, sites and workshops are using a mix of products and lighting technologies, from Halogen and Metal Halide to Xenon HID and more recently, LED. Let's break down why this can be a major issue for a mine site and what you can do to improve the situation with the range of JW Speaker LED lighting.

## *General lack of lighting*

During many site audits we found that in key areas such as workshops and maintenance bays, the average Lux levels (A measurement of usable light) were far below the required safe & productive levels. This was due to a mixture of not having enough lights but also the reliance of Halogen technology in key locations that would be better suited to something more powerful.

## *A mix of technology*

Eyes can take up to ten seconds to adjust from a bright, white light (LED) to a more dull, yellow light (Halogen) and it is all too common to see a mining vehicle/machine with two or three different colours coming from the lighting products fitted to the vehicle. This tends to happen over time as a product fails, the maintenance department will replace it with something completely different, without thinking about the overall lighting experience for the operator. This is a potentially severe safety hazard on mine sites where operators are not only experiencing a mix of these lights on their machine, but across the entire site. This strain on the operator can cause increased fatigue and loss of concentration, a known cause for accidents.

## *Maintenance, productivity and downtime*

Metal Halide technology is an issue both in general reliability and voltage fluctuations from generators. In recent years there has been a large push to remove generators and lighting towers completely due to cost cutting which in turn puts a lot of pressure on the vehicles to have adequate lighting to navigate the mine site on their own accord.

Halogen and cheap LED product suffers from even worse maintenance and downtime issues. These products are known to yield under high vibration and with its already low expected life, downtime and maintenance would never be greater.

So, what is the solution? Form an overall lighting strategy. Spending one or two hours navigating the site to all the key locations and documenting the current lighting situation will go a long way to establishing the next steps.

### *Planning and implementing your lighting upgrade*

We have never heard anybody say they had too much light, but there are recommended levels of lighting for certain activities. Speaking to and understanding the requirements of your staff is one of the quickest ways of establishing whether your light levels are adequate or not. Using a Lux/light meter is the most effective & accurate way of measuring the current lighting situation.

Once you've established how much light you need for certain areas and equipment, it's time to streamline your technologies. If the prospect of overhauling your entire site seems too costly, pick two key areas where you need to improve the lighting and begin there. By converting the are /machine to a more reliable LED product selection, you will improve the balance of colour, the amount of light you get per product and also decrease maintenance time and costs immediately.

The typical life expectancy of a good quality LED product is around 30,000 hours. That's almost 3 and a half years of constant use, all day every day. Don't be fooled by cheap products claiming life upwards of 50,000 hours. The reality is, while the LED chips may last that long in a perfect test bench scenario, once they are assembled into a light unit and put to test out in the field, they quite often fail within the first 6 months, typically due to overheating, vibration or circuit board failure.

Build quality is one thing JW Speaker pride themselves on. They understand that it's not about having the highest light output in the industry but that they know their products can be mounted once and not worried about for years. With incredibly high IP ratings (IP67) and (higher for most products), heavy duty mounting brackets, thermal management for the LED chips and low EMI, the JW Speaker LED lighting range has everything you need to fit out your site, workshops and machinery in a cost-effective way.

As an authorised reseller of the JW Speaker product range, Flo-Tec Limited and our technical representatives are on call to help you with this transition into the world of LED lighting. Whether it's on site consultation or product recommendations, our staff are ready and willing to assist however we can to take your mine site to the next level in productivity and safety.

## Light Vehicle

An often-neglected part of any mine site or workshop is the fleet of light vehicles being used to transport workers between locations. With so much activity going on, it's imperative that the vehicles are as safe as possible.

There are a few key changes that can be made easily to improve the safety of the light vehicles:

- 1) Install safety lights or 'Keep Out Zone' lights on both sides of the vehicle. These will emit a bright, vibrant red light in the areas next to the vehicle doors. This lighting will ensure that any passing vehicles will leave enough room for passengers to get out safely in the dark.
- 2) Class 1 strobes/beacons are essential for quick and high visibility. The JW Speaker Model 407 LED strobe lights also come in four different colours, meaning you can select a standard for your light vehicles that suit your needs.
- 3) Fog Lights are not only useful for cutting underneath low-lying fog but also dust, something that's not often considered when driving around a mine site.
- 4) Headlights and signalling bulbs, particularly on a mine site where vehicles are running around the clock, can quite often require replacing every couple of months, maybe less. Changing the old halogen and incandescent bulbs to LED will remove maintenance downtime for years while also improving the headlight performance by at least 150%.





## Model 791

### LED 6" x 2" Fog Light

Part No.	Pattern	Voltage	Colour	Mount Location
1603601	Fog	12V	White 4750K	Vehicle Front



## Model 793

### LED 6" x 2" Safety Light

Part No.	Pattern	Voltage	Colour	Mount Location
1603631	Keep Out Zone	12-110V	Red	Roof Racks



## Model 407

### LED 5" Round Strobe Light - Class 1

Part No.	Pattern	Voltage	Colour	Mount Location
0646491	Six Mode	12-80V	Amber	Roof Racks
0646551	"	"	Blue	"
0646561	"	"	Red	"
0646571	"	"	Green	"



## Headlights & Signalling

The JW Speaker range of LED headlight and signalling bulbs is comprehensive enough to cover almost every fitment application on any vehicle on the market.

For more detailed product information about this range, please consult either the A5 LED product brochure, the master JW Speaker catalogue or give us a call.



## Heavy Vehicle

When we take a look at heavy vehicles on a mine site, in particular dump trucks, quite often the forward lighting is no where near adequate enough for the amount of driving they are doing.

The 4" x 4" and 6" x 6" sized worklights have both been a standard on heavy vehicles for decades and many of the vehicles, like the Cat 777D pictured below, have lighting cavities built into the body of the vehicle to allow lights of these sizes. That's why JW Speaker have developed two incredibly powerful and tough worklights in these sizes to retrofit straight onto these vehicles.

- 1) The Model 526XL (6" x 6") fits perfectly on the front in the designated headlight zone and by using two different patterns, you can create a strong low beam/high beam combination. The benefit of us the 526XL Anti-Glare product as the low beam is that it replicates a traditional low beam pattern rather than the typical flood beam that sends light above the eye line. This is incredibly important for busy mine sites so dump truck drivers aren't being blinded as they pass each other.
- 2) Depending on the site, the addition of front fog lights mounted low on the vehicle can also add a real benefit to cut through low lying fog and dust. The Model 527 is powerful enough for any mine vehicle.
- 3) The final recommendation would be the rear of the vehicle. While perhaps not as necessary as the headlights, reverse lights are integral for overall site safety. The Model 832 packs a serious punch for its small 4" x 4" size. Alternatively, the 526XL Trap beam is a higher powered reverse option.



## Model 526XL

LED 6" x 6" Worklight

Part No.	Pattern	Voltage	Colour	Mount Location
1300191	Anti-Glare	12-24V	White 5700K	Vehicle Front - Low Beam
1300211	Trapezoid	"	"	Vehicle Front - High Beam



## Model 832

LED 4" x 4" Worklight

Part No.	Pattern	Voltage	Colour	Mount Location
1300171	Trapezoid	12-24V	White 5700K	Vehicle Rear - Reverse



## Model 527

LED 10" x 5" Fog Light

Part No.	Pattern	Voltage	Colour	Mount Location
0551261	Fog	12-24V	White	Vehicle Front - Fog Light
0551281	"	"	Amber	"





## Heavy Vehicle

The other major type of heavy vehicle on a mine site is typically a type of Excavator. These machines are large and often work in a 360° zone meaning that surrounding light is incredibly important to avoid hitting dump trucks and terrain as they turn. There are a number of key products and locations to minimise the risk of operating and loading vehicles.

- 1) The front area of the Excavator needs to be the most illuminated, particularly as that's where all the activity is taking place. We've found by using the Model 526XL's on the boom aiming down at the bucket and dump truck and Model 623's on the front of the Excavator, we're able to reach a perfect amount of light covering the entire working area.
- 2) Illuminating the sides and rear of the vehicle with the Model 523XL flood lights in combination with the Model 527 'Keep Out Zone' light will allow for a full 360° rotation without the risk of hitting anything that may be too close.
- 3) An often overlooked part of the larger machines is the walkways and maintenance areas. Using the Model 832 to illuminate important sections of these areas will reduce the need for torches to navigate and work on the vehicles.





## Model 526XL

LED 6" x 6" Worklight

Part No.	Pattern	Voltage	Colour	Mount Location
1300201	Flood	12-24V	White 5700K	Boom - Lighting the bucket
1300211	Trapezoid	"	"	Boom - Lighting the bucket



## Model 832

LED 4" x 4" Worklight

Part No.	Pattern	Voltage	Colour	Mount Location
1300181	Flood	12-24V	White 5700K	Walkway / Maintenance Areas



## Model 523XL

LED 9" x 8" Worklight

Part No.	Pattern	Voltage	Colour	Mount Location
0549631	Wide Flood	12-24V	White 5000K	Rear Corner / Sides



## Model 623

LED 20" x 9" Worklight

Part No.	Pattern	Voltage	Colour	Mount Location
0546691	Wide Flood	16-60V	White 5700K	Front Area Flood



## Model 527

LED 10" x 5" Safety Zone Light

Part No.	Pattern	Voltage	Colour	Mount Location
0549271	Keep Out Zone	12-24V	Red	Vehicle Sides & Rear



## Site / Workshop

Mine site buildings are often neglected in terms of lighting in favour of machinery but a lot of very important work gets done in and around these buildings/structures. Having high levels of lighting in workshops is incredibly important in making sure finer maintenance details don't get missed.

1) LED high bay interior workshop lights are very quickly replacing high pressure sodium lights as the standard for warehouse/workshop lighting. Not only do they produce a much higher Lux reading but they are much whiter which helps lower fatigue caused by yellow lighting. One of the biggest benefits of using LED instead of HPS is the drastically lower power consumption which can lead to serious electricity savings long term, particularly when these lights are often running 24/7.

2) Although the exterior lights may not run during the day, they are often the highest contributors to high electricity use on a mine site whether from mains power or from a generator. The low current draw and variable voltage range on the JW Speaker LED flood lights means they will work through the night and not suffer from voltage fluctuations that generators can often send out.

3) In the same way, lighting towers require the best quality lights possible to make sure they can handle the elements and conditions found on a mine site. The JW Speaker range of large scale flood lights is designed with an extremely high IP and IK rating to make sure they'll stand the test of time.

A service Flo-Tec Limited offers for free with all mine site consultations is a 3D lighting simulation machinery and buildings. This is to make sure you're getting the right amount of light where you need it before you even purchase a single light. We strongly believe in this process as it eliminates the need for product testing on site, which is costly for both parties.

If you would like to find out more about this process, please give us a call.



## Model HB

LED High Bay Lights - 120° Beam Angle

- Voltage: 90/305V
- Colour: White 5700K

Part No.	Wattage	Mount Location
990080	100W	Workshop Interior - 3-4m Height
990081	120W	Workshop Interior - 4-5m Height
990082	150W	Workshop Interior - 5-6m Height
990083	200W	Workshop Interior - 6+m Height



## Workshop Lighting

Mine site workshops and other important buildings vary in size quite a lot but rest assured, the JW Speaker range of 240V flood lighting has everything you will need to reach your lighting goals.

For more detailed product information about this range, please consult either the JW Speaker 240V lighting range catalogue or give us a call to discuss your requirements.



## Lighting Towers

The JW Speaker range of LED headlight and signalling bulbs is comprehensive enough to cover almost every fitment application on any vehicle on the market.

For more detailed product information about this range, please consult either the A5 LED product brochure, the master JW Speaker catalogue or give us a call.

