

# **The Essential Guide to Mining Lighting**





# PERFECT YOUR ILLUMINATION

Work lights from Nordic Lights change the operating experience completely. Operators will have a perfectly illuminated, unobstructed view of the area around and in front of the vehicle. You can trust our lights, as they are put through extreme tests to ensure functionality in harsh conditions. They will help you minimize downtime and avoid accidents on the mining site.

Over 30 years of product development and field tests with the largest mining vehicle manufacturers in the world is our proof of concept. Make working on your site easier, safer, and boost overall productivity with Nordic Lights expertly planned lighting solutions, specifically for mining.



**Save Money**



**Avoid Accidents**



**Increase Productivity**



## FEATURED TOPICS

### Optimize your lighting

- Mining excavator
- Mining truck
- Dozer
- Grader

### Tech talk

- Glass lens
- Color temperature
- CRI
- Glare-free lighting
- Light patterns

### Products



This symbol indicates that you can find related information, just click the link or find the corresponding page.

# Dig what you see

Mining excavator

SCORPIUS XTR N4401 QD >

SCORPIUS XTR N4601 QD >

SCORPIUS PRO 415 PH >

## PROFESSIONAL SETUP

Choose the professional setup\* for unbeatable productivity and safety – your bottom line will shine. **The XTR Series** lights feature excellent color rendering and optimal color temperature. Add service lights from the **PRO Series** for glare-free access to the vehicle.

For mining we designed energy efficient 24V versions of the hard-wearing Scorpius. Equipped with the Quake Dampening system, these work lights will withstand even the harshest vibrations. To eliminate melting lens issues caused by dust in the mine, go for the glass lens versions.

**With these work lights on your mining excavator you will:**

- Ensure safe and efficient operations
- Distinguish different materials with ease
- Load faster and minimize downtime

\*In this light optimization example we used a 260 tonne mining excavator.

# Seeing is believing

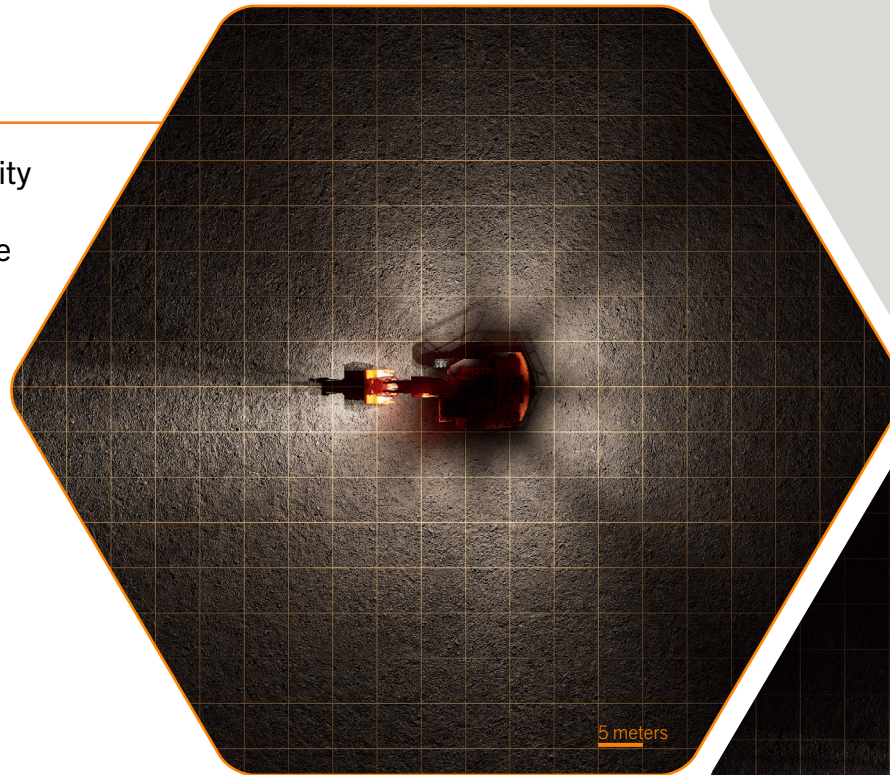
## PROFESSIONAL

The professional setup provides excellent visibility thanks to eleven powerful **Scorpius XTR N4601 QD** on the cabin and counterweight. At the same time, one **Scorpius XTR N4401 QD** on each side of the boom, and two on the body to the right of the boom casts light exactly where it's intended, with the targeted illumination minimizing reflections.

Meanwhile, three glare-free **Scorpius PRO 415 PH** illuminating stairs and walkways guarantee safe access to the vehicle.

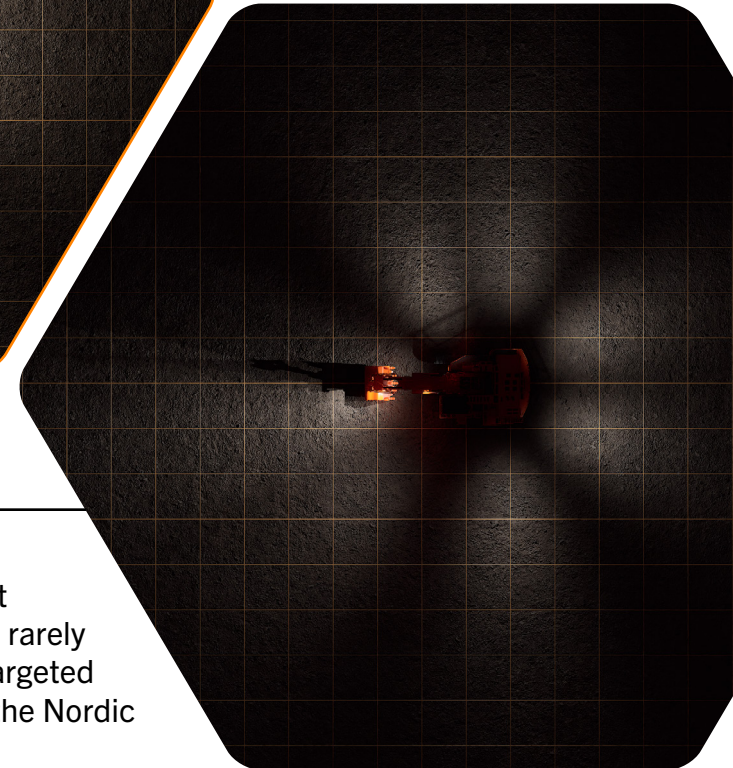


Excellent visibility and even illumination all around the vehicle with Nordic Lights' optimized solution.



## ORIGINAL

The original setup is what the vehicle comes equipped with when it rolls out of the factory. It provides you with general illumination which is rarely optimized. It does not feature our calculated targeted illumination nor the same optical solutions as the Nordic Lights professional setup.



# Keep on trucking

Mining truck



## PROFESSIONAL SETUP

Choose Nordic Lights' professional setup\* for unbeatable productivity and safety - your bottom line will shine. **The PRO Series** lights feature excellent color rendering, optimal color temperature and clever optical solutions to minimize reflections and glare.

Add strategically placed service lights for glare-free illumination of walkways and stairs.

**With these work lights on your mining truck you will:**

- Notice potential dangers and stop your truck in time
- Improve visibility to the sides
- Eliminate disturbing glare for oncoming traffic

\*In this light optimization example we used a 386 tonne (GVW) mining truck.

# Check this out

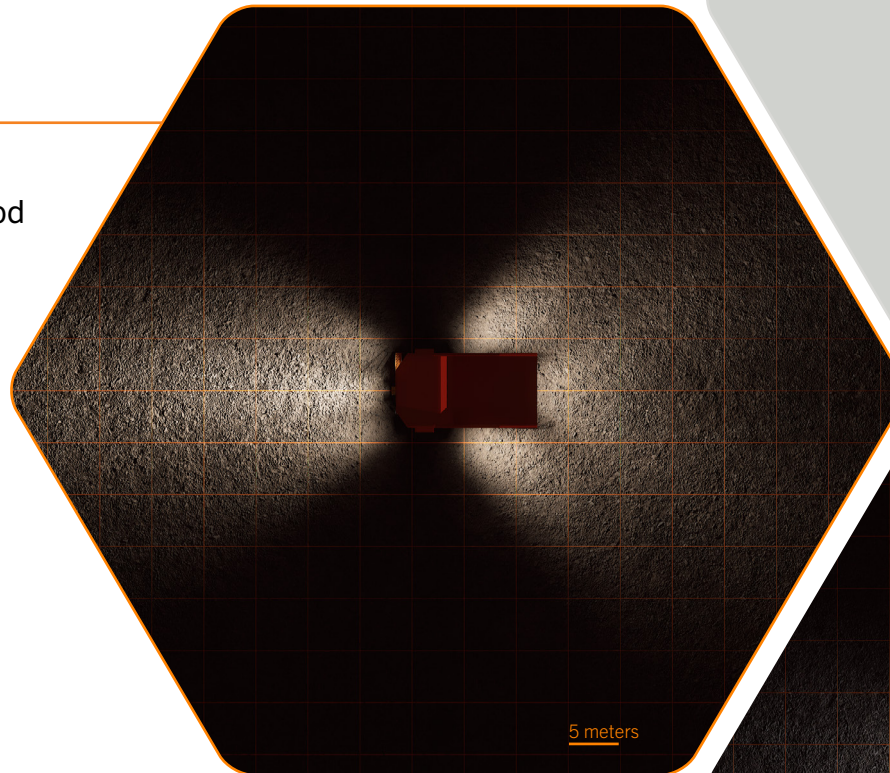
## PROFESSIONAL

This setup provides optimal illumination around the vehicle. Four **Scorpius PRO N4402** wide flood illuminating to the sides and backwards, and in the front four high beams for long distance illumination. In addition, four **Scorpius PRO N4408 Glare-Free** are used as low beams to eliminate disturbing glare for oncoming vehicles. Highly vibration resistant, these work lights last long. If your mining truck is exposed to the severest vibration, go for the QD versions.

Two strategically placed **Scorpius PRO 415 PH** make sure that operators can safely access the vehicle without being blinded by glare.

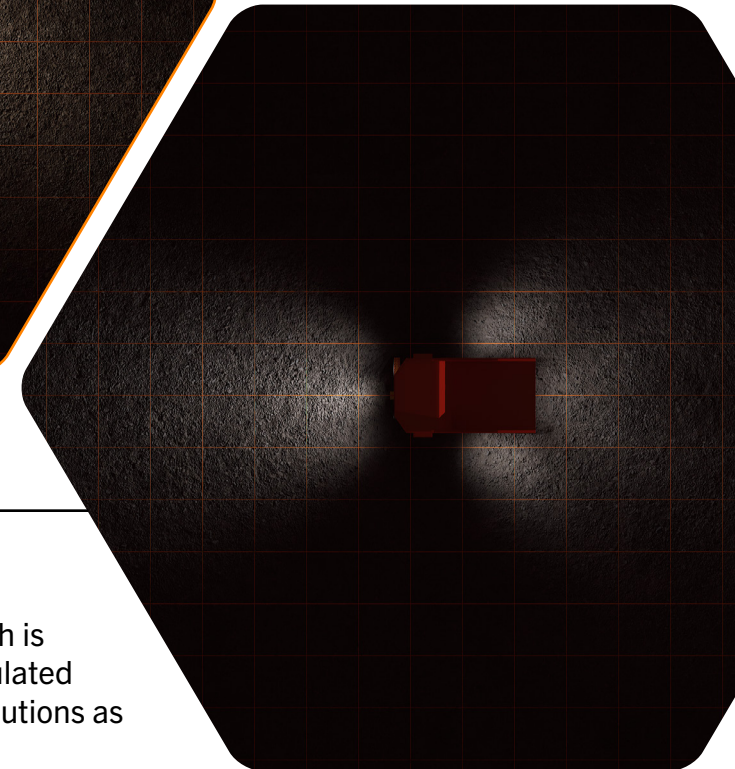


Having the best possible visibility is of the utmost importance to avoid accidents.



## ORIGINAL

The original setup is what the vehicle comes equipped with when it rolls out of the factory. It provides you with general illumination which is rarely optimized. It does not feature our calculated targeted illumination nor the same optical solutions as the Nordic Lights professional setup.



# The dozer is no doozy

Dozer

SCORPIUS XTR N4407 QD >

SCORPIUS XTR N4401 QD >

SCORPIUS XTR N4401 QD >

SCORPIUS PRO 415 PH >

## PROFESSIONAL SETUP

Choose Nordic Lights' professional setup\* for unbeatable productivity and safety - your bottom line will shine. **The XTR Series** lights feature excellent color rendering, optimal color temperature and clever optical solutions to minimize reflections and glare.

Add service lights from **the PRO Series** for glare-free access to the vehicle.

**With these work lights on your dozer you will:**

- Minimize downtime thanks to lights that endure extreme vibrations
- Reduce reflections from the blade
- Get even illumination exactly where you need it, with no sharp contrasts between light and dark

\*In this light optimization example we used a 105 tonne dozer.



# Lights that are spot-on

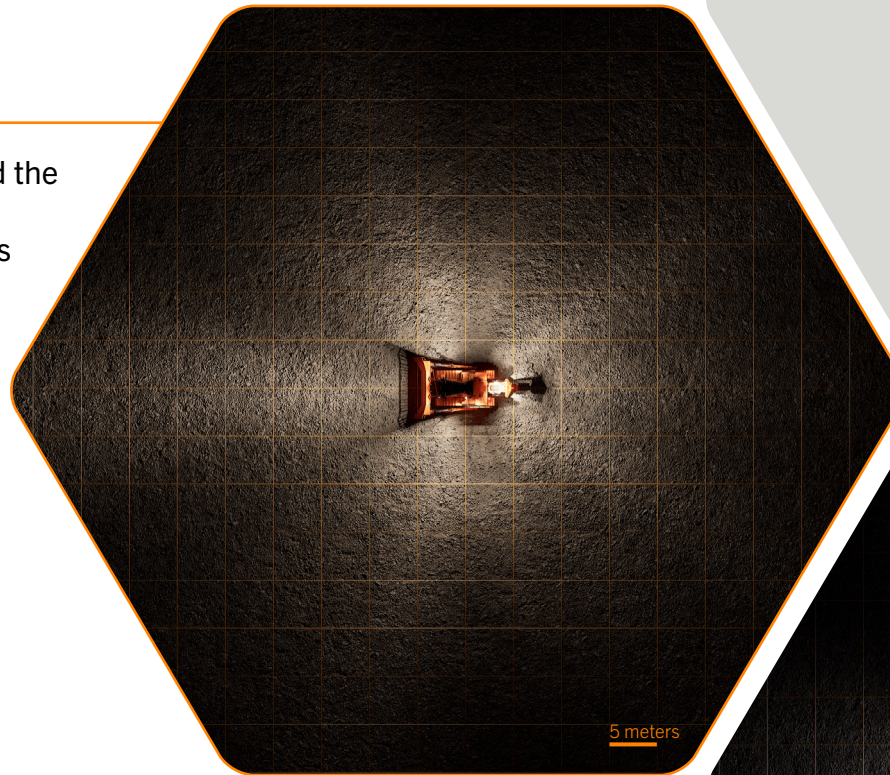
## PROFESSIONAL

This setup provides excellent visibility all around the vehicle. Thirteen powerful **Scorpius XTR N4401 QD** wide flood, and as driving lights two **Scorpius XTR N4401 QD High Beam** and two **N4407 QD Glare-Free**. All of these are equipped with ultra-resistant QD damping to make sure that they last long.

The strategically placed **Scorpius PRO 415 PH** make sure that operators and personnel can safely move about on the vehicle without being blinded by glare.

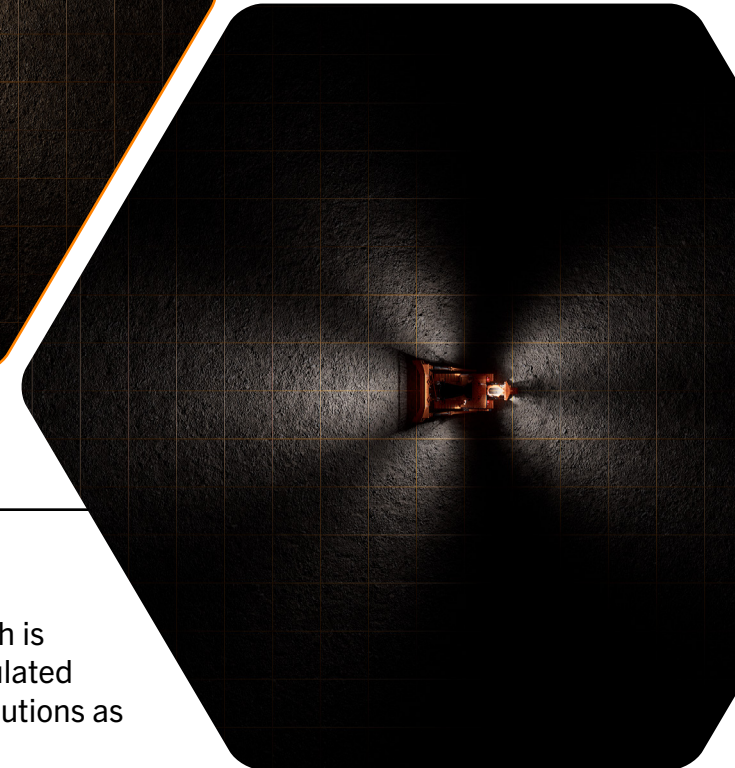


The illumination is even all around the vehicle, resulting in a safe and efficient work area.



## ORIGINAL

The original setup is what the vehicle comes equipped with when it rolls out of the factory. It provides you with general illumination which is rarely optimized. It does not feature our calculated targeted illumination nor the same optical solutions as the Nordic Lights professional setup.



# First-grade lighting

Grader



## PROFESSIONAL SETUP

Choose Nordic Lights' professional setup\* for unbeatable productivity and safety - your bottom line will shine. **The PRO Series** lights feature excellent color rendering, optimal color temperature and clever optical solutions to minimize reflections and glare.

Motor grader operators can work effectively when the area around the moldboard is well-illuminated. Both forward and backward visibility is excellent, and no glare or disturbing reflections are present. Paving the way for the rest of the mining vehicles will be a walk in the park.

**With these work lights on your grader you will:**

- Have excellent illumination around the moldboard
- Achieve a perfect finish
- Be visible to vehicles of any size

\*In this light optimization example we used a 75 tonne grader.

# Time for an upgrade

## PROFESSIONAL

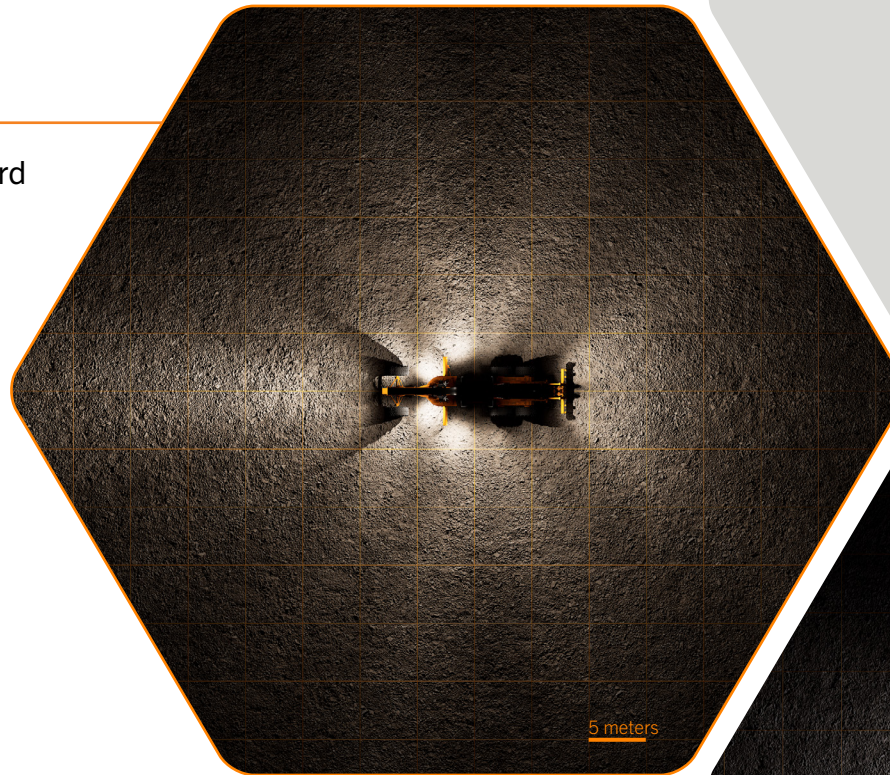
The professional setup provides excellent forward visibility thanks to four **Scorpius PRO N4402** mounted on the cabin. Functioning as driving lights, the Scorpius PRO **N4402 High Beam** and **N4408 Glare-Free** make sure that you see and are seen.

Four strategically placed and angled **Scorpius PRO N4402** on each side of the grader deliver excellent illumination of the work area around the moldboard.

Pick four **Scorpius PRO N4402** to illuminate backwards, and you're all set to go.



With a professional setup planned for the specific machine and purpose, the result is a perfectly illuminated work area.



## ORIGINAL

The original setup is what the vehicle comes equipped with when it rolls out of the factory. It provides you with general illumination which is rarely optimized. It does not feature our calculated targeted illumination nor the same optical solutions as the Nordic Lights professional setup.



## Glass lens to avoid downtime

Unplanned downtime is the most costly thing that can happen in a mine. For lights with a high lumen output, choose a glass lens to avoid downtime due to melting lens issues.

In mining, there is usually little to no time for washing work lights mounted on the vehicles, as they are constantly in use on sites operational 24/7. Over time, dirt accumulates on the lens of the work light, forming a layer. Sooner or later, the layer of dirt becomes so thick that no light or heat from the LED chips can escape through the plastic lens, and the lens itself melts.

The user usually notices the melted lens during maintenance checks, when they are servicing the vehicle and its equipment. If the lens is melted completely through, the light will also let in moisture, damaging the LED chips and circuit board, making the light unusable.

Our tempered glass lenses solve these problems by being extremely resistant to heat, chemicals, and UV light. When the time comes, they can also be cleaned with confidence.

**Tempered glass**



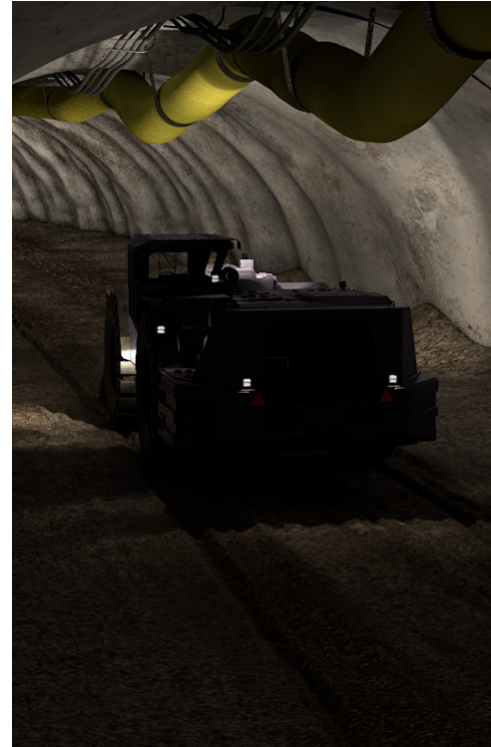
**Plastic**



# Glass lens to avoid downtime

## DO's

- + Utilize the heat resistance of glass.
- + Avoid downtime due to melting lenses.
- + Lower maintenance costs and ensure that operations run smoothly.



## DON'Ts

- Don't trust plastic lenses for powerful work lights used in a mine.
- Do not risk downtime due to insufficient lighting.
- Do not put your employees in danger by using lights with lenses that break easily.

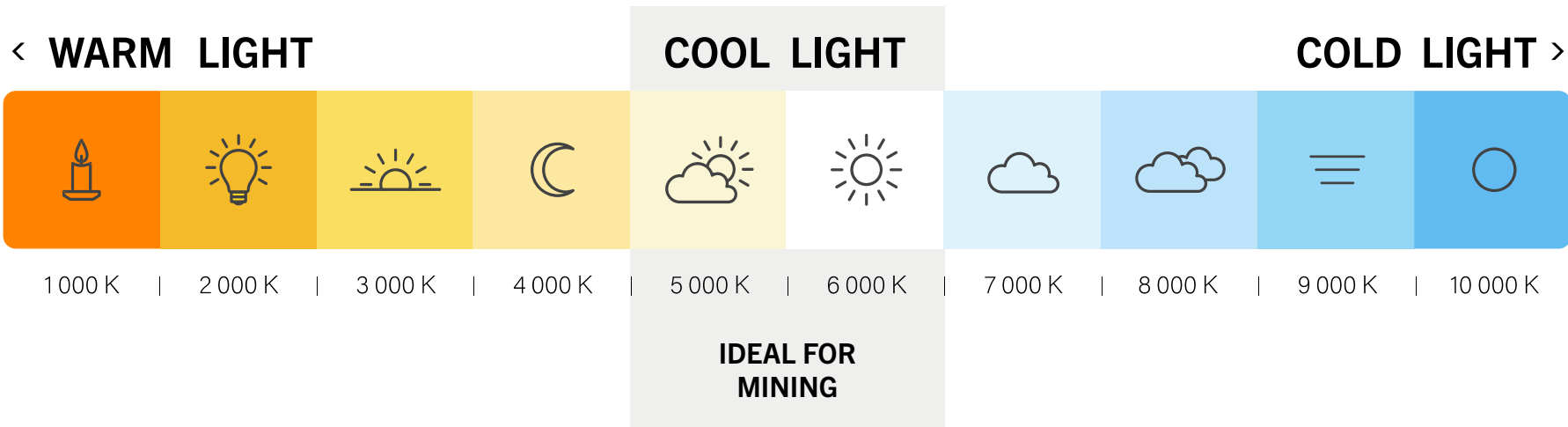
# Boost productivity with the right color

Color temperature, or CCT for short, defines the color appearance of light and is measured in Kelvin (K). It tells you whether the light is “warm” (yellow/red) or “cold” (blue). A burning candle has a color temperature of about 1800K (very warm), while a clear blue sky can be up to 10 000K (very cold). CCT impacts how bright a light is perceived when looked at straight on, but it is NOT a measurement of brightness.

Our lights for mining max out at 5700 Kelvin, making them an ideal “cool” CCT, like working in daylight. This color temperature energizes

operators, reduces eye strain and general fatigue, and keeps personnel alert for longer periods of time, increasing efficiency.

Overly cold light (blue light) strains the eyes while extremely warm light (red light) makes operators tired since it increases melatonin production in the central nervous system. Since both can lead to accidents, it is important to strike the right balance in color temperature.



# Boost productivity with the right color

## DO's

- + Use work lights in the 5000-5700 kelvin range to keep operators more alert and shorten reaction time.
- + Use cool color temperatures similar to daylight to boost the performance of the operators.
- + Minimize the operators' eye strain and general fatigue by choosing a color temperature similar to daylight.



## DON'Ts

- Do not use work lights over 5700K in visually challenging environments such as in rain, dust, snow, or fog. Instead, opt for a warmer color temperature.
- Avoid using lights with overly cold color temperatures. Such lights produce inaccurate colors with too much contrast between light and dark, which causes eye strain.
- Do not assume that an overly cold color temperature light is better, simply because it is perceived as brighter. From an operator's perspective, the illumination will not deliver optimal visibility.

# Apply the benefits of high CRI

CRI, or Color Rendering Index, measures a light's ability to reproduce colors of objects compared to sunlight. CRI is measured between 0 and 100, with higher values meaning more accurate color rendering. We make lights with a minimum CRI of 80. For comparison, the CRI of the sun is 100.

A high CRI light helps operators identify the correct materials and their respective colour differences on the mining site. Operators will avoid accidents caused by inconsistent CRI, and thus reduce downtime and redoing of the same tasks. A high CRI light setup helps operators make the right decisions at critical moments.

**Bad CRI**



**Good CRI**





# Apply the benefits of high CRI

## DO's

- + Aid operators in making critical decisions by accurately reproducing shades of colors. Move the correct materials and avoid digging into pipes and cables.
- + Utilize high CRI to maximize the workflow and safety of the mining site.
- + Use high CRI lights to increase the situational awareness of operators on busy sites.



## DON'Ts

- Do not think that brighter lights will result in more accurate colors.
- Do not choose colder temperature lights to get more vibrant colors – it doesn't work.
- Don't underestimate the importance of CRI – bad lighting slows down your business.

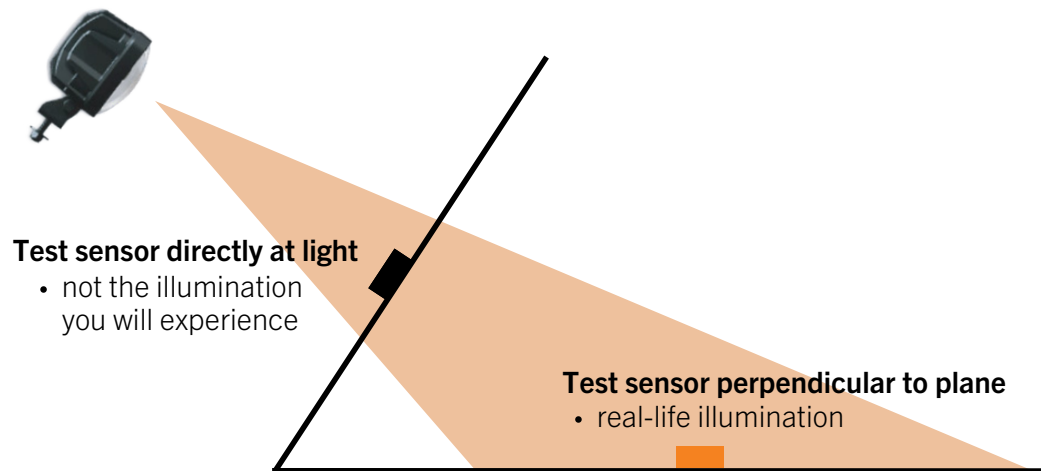
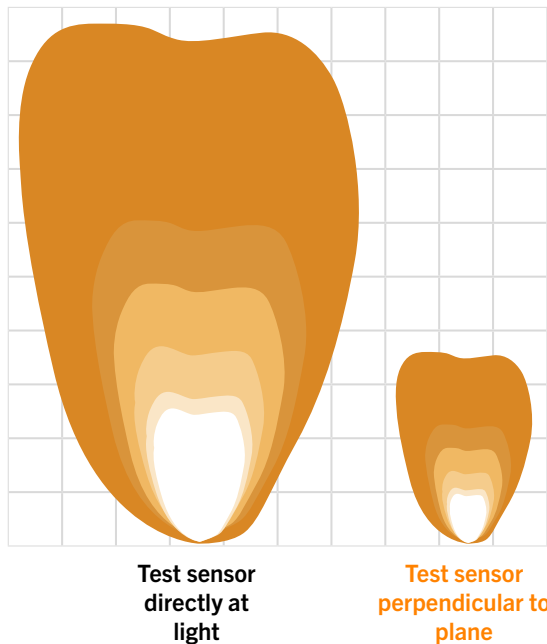
# Measuring and selecting light patterns

To determine the light pattern fit for your vehicle, it is important to consider the surrounding circumstances. Are you working in an underground mine, or paving the way for a large-scale mining project? Do you need to light up long distances, or are you looking for excellent near-field illumination? In any case, you will need to choose a suitable pattern for your light.

How a light pattern looks in the field depends on how and where you install the light. We present the light patterns of our work lights with the light tilted at a  $-17^\circ$  angle at 3 m height, and always with the test sensor

perpendicular to the test plane. We choose to present our light patterns using this method because, in our opinion, it is the more realistic of the two.

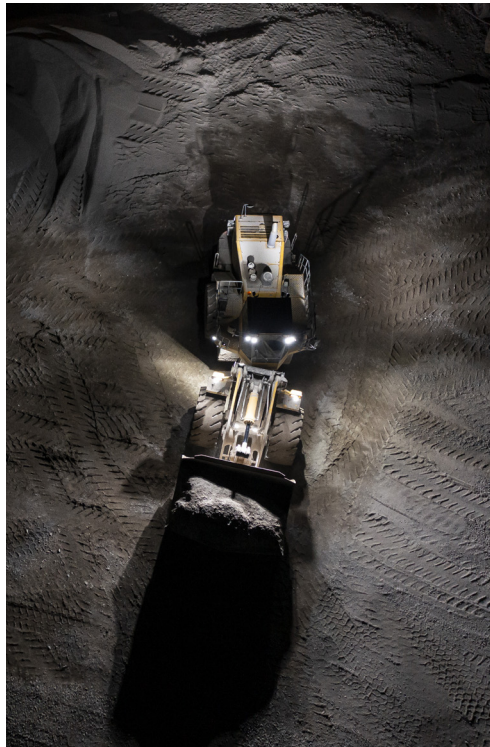
Many light manufacturers present their light patterns with the test sensor pointed directly at the light. This will result in better-looking presentation of the pattern (bigger areas illuminated). It will not depict how much light is actually hitting the work area.



# Measuring and selecting light patterns

## DO's

- + Pick the right light pattern for the task. Not all patterns are created equal.
- + Trust our experts – our professional upgrade package already ensures even illumination.
- + Compare correctly. Check how the manufacturer measures the illumination.



## DON'Ts

- Do not forget about the ways to measure. We show the illumination as you will experience it in the field.
- Don't look solely at theoretical data – our simulated comparisons illustrate the differences.
- Don't focus on the light pattern of a single product – look at the light distribution of the entire setup.

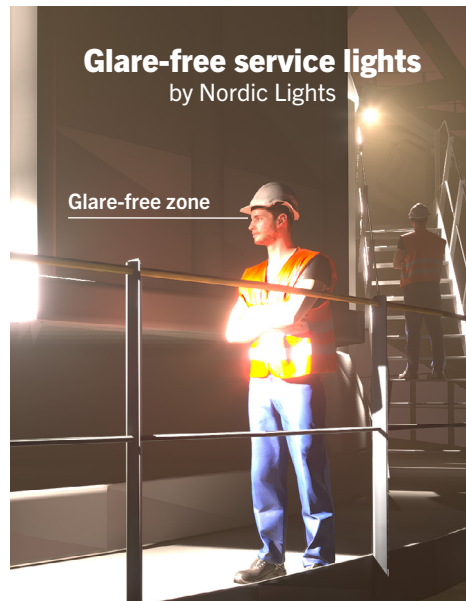
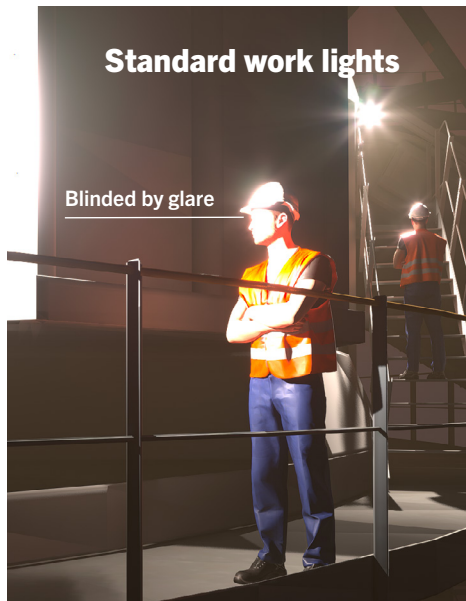
# A Glare-free work environment

Standard work lights can cause visibility issues and dangerous situations due to glare. Blinding lights lead to costly mistakes and delays, directly impacting the success of your mining operations. We offer you different ways to tackle glare on the mining site. The end-results are fewer accidents, less downtime, and a more efficient workflow.

To create a glare-free work environment, we recommend the Scorpius PRO 415 PH and the Scorpius PRO N4408 Glare-Free. Featuring a

clear cut-off-line, these lights eliminate glare on eye-level and provide excellent illumination of the work area with no stray light, meaning that the illumination is focused on the work area, optimizing lumen output and power consumption.

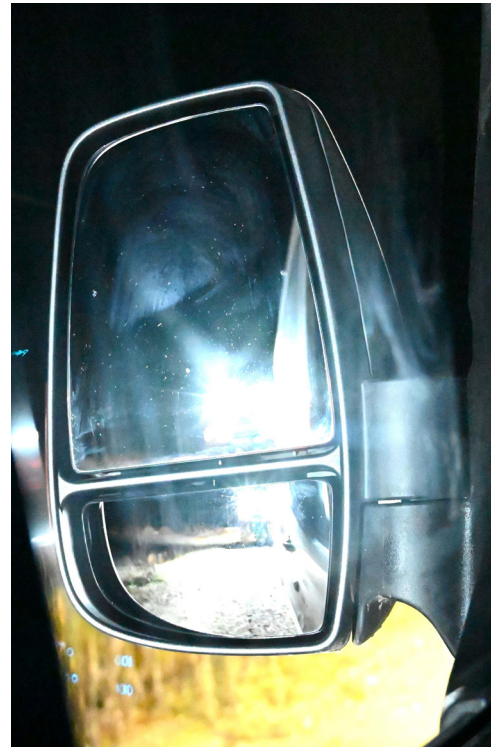
When mounted as service lights to illuminate walkways and stairs, the Scorpius PRO 415 PH make sure that operators and personnel can safely move about on the vehicle without being blinded by glare.



# A Glare-free work environment

## DO's

- + Ensure safety and efficiency with a glare-free work site.
- + Notice the boost in productivity and decrease in accidents.
- + Trust the recommended positioning of the lights. The professional setups feature efficient forward illumination with glare-free lighting in the proper positions.



## DON'Ts

- Don't cover or tilt your standard work light. Instead look for a work light with built-in technology and a well designed cut-off line.
- Do not underestimate the negative impact of glare – it affects people on and around the construction site.
- Avoid thinking that more lumens equals better illumination of the work area. What matters is the amount of light on the desired area.

PROFESSIONAL SELECTION

Scorpius XTR N4601 QD >

Scorpius XTR N4401 QD

Scorpius PRO N4402 >

Scorpius N4402 WARM >

Scorpius XTR N4407 QD >

Scorpius PRO N4408 >

Scorpius PRO 415 PH >

Pictor 620 >

Taurus N7201 >

Bumblebee >

Sculptor 2 >

Corona 400 >

Work lights for mining need to be tough, long-lasting and provide excellent illumination. For ultimate productivity and safety, we recommend a professional setup that includes lights suitable for harsh conditions.

All of our work lights for mining have the following specifications in common:

CCT 5700

CISPR 25  
CLASS 5

IP68,  
IP6K9K

Glass lens  
&  
Aluminum  
housing

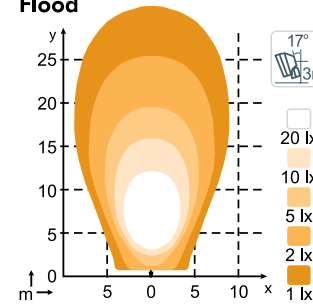
CRI ≥ 80

For more specifications, check the product pages.

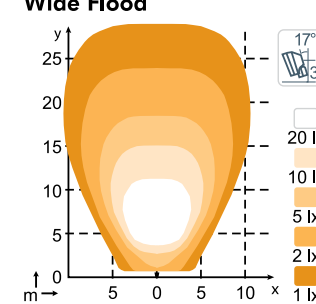


**LIGHT PATTERNS**

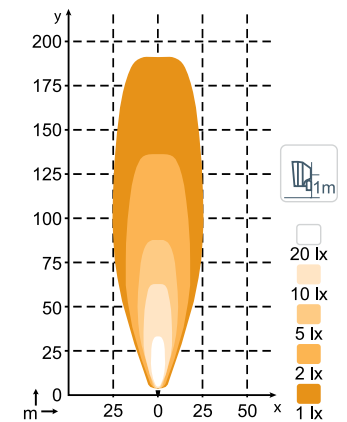
**N4601 QD 7200lm Flood**



**N4601 QD 7200lm Wide Flood**



**N4601 QD 7200lm High Beam**

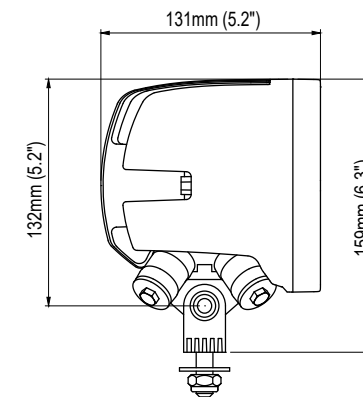
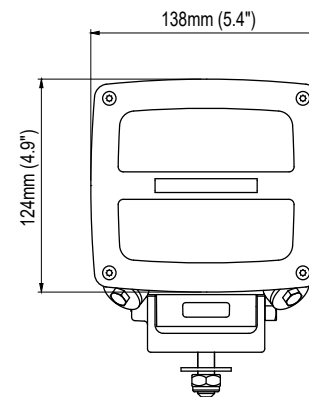


Also available in **Low Beam**, find the details on our website [nordiclights.com/products](http://nordiclights.com/products)

# Scorpius XTR N4601 QD

TECHNICAL SPECIFICATIONS	SCORPIUS XTR N4601 QD
Theoretical / Operational Lumens	11500lm / 7200lm
Power Consumption	85W
Vibration	15,3Grms 24-2000Hz, 4.65Grms 12-2000Hz
Nominal Current	24V=3.5A

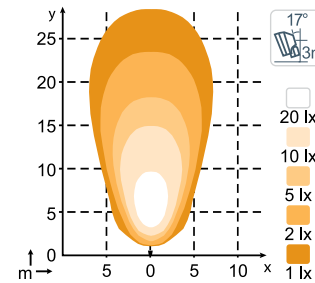
**DRAWINGS**



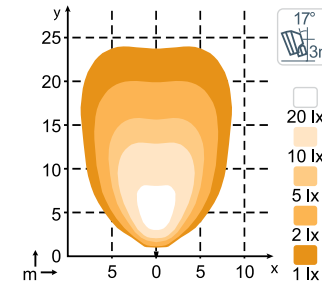


### LIGHT PATTERNS

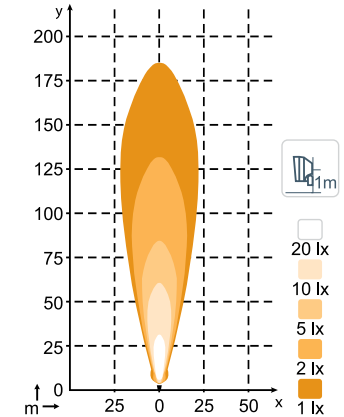
N4401 QD, N4402 4200lm Flood



N4401 QD, N4402 4200lm Wide Flood

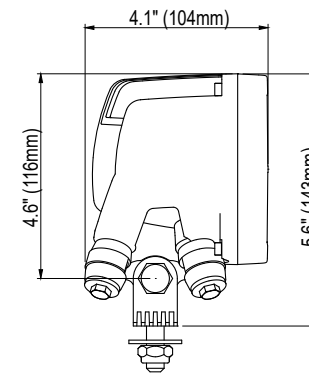
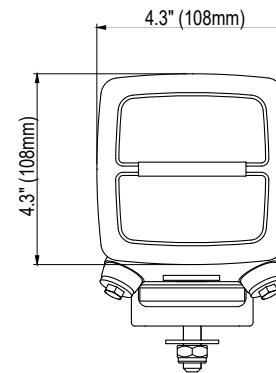


N4401 QD, N4402 4200lm High Beam



Also available in **Low Beam**, find the details on our website [nordiclights.com/products](http://nordiclights.com/products)

### DRAWINGS



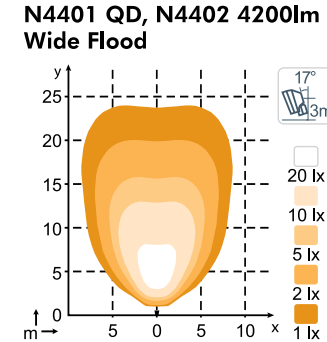
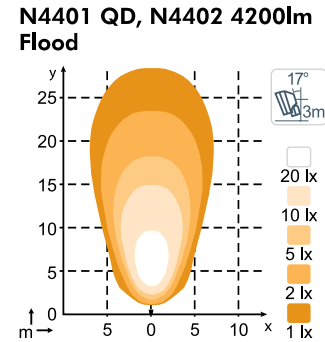
# Scorpius XTR N4401 QD

TECHNICAL SPECIFICATIONS	SCORPIUS XTR N4401 QD
Theoretical / Operational Lumens	6700lm / 4200lm
Power Consumption	41W
Vibration	20Grms 24-2000Hz, 4.65Grms 12-2000Hz
Nominal Current	24V=1.65A

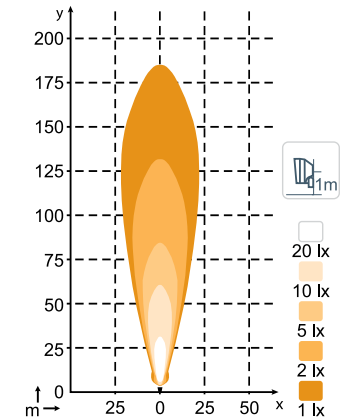




### LIGHT PATTERNS

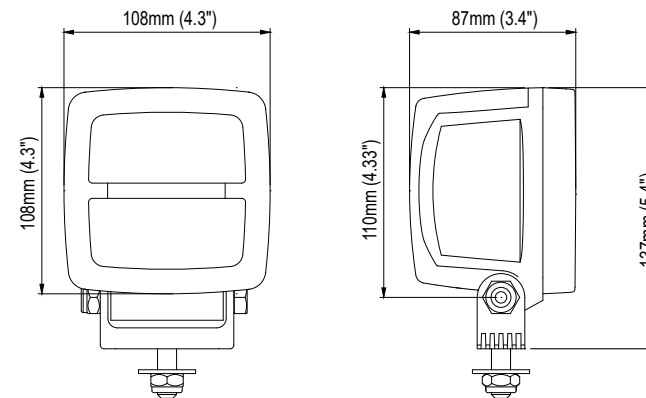


**N4401 QD, N4402 4200lm High Beam**



Also available in **Low Beam**, find the details on our website [nordiclights.com/products](http://nordiclights.com/products)

### DRAWINGS



# Scorpius PRO N4402

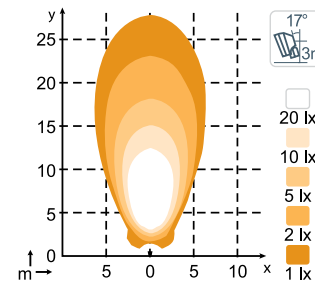
TECHNICAL SPECIFICATIONS	SCORPIUS PRO N4402
Theoretical / Operational Lumens	6700lm / 4200lm
Power Consumption	41W
Vibration	15.3Grms 24-2000Hz
Nominal Current	24V=1.65A

Color temperature 2700K,  
ideal for environments with  
dust and fog

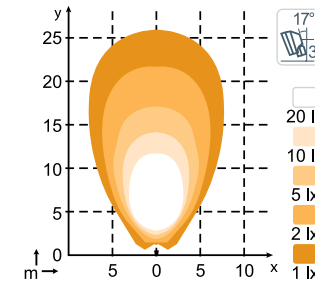


### LIGHT PATTERNS

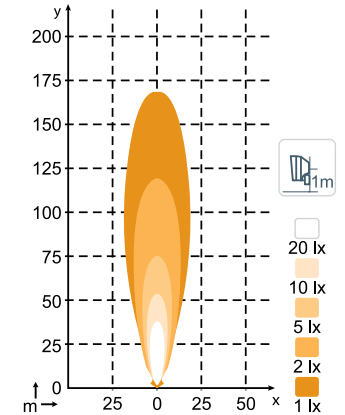
**N4402 WARM, 3600lm  
Flood**



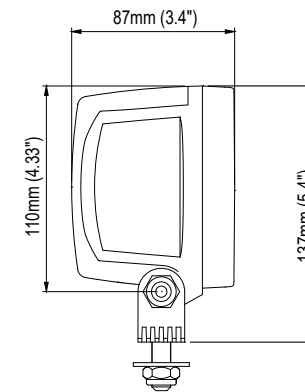
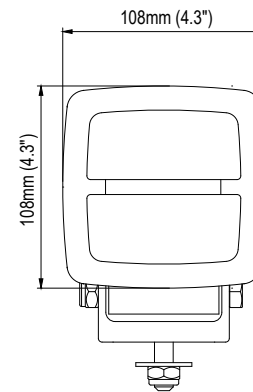
**N4402 WARM, 3600lm  
Wide Flood**



**N4402 WARM, 3600lm  
High Beam**



### DRAWINGS



# Scorpius N4402 WARM

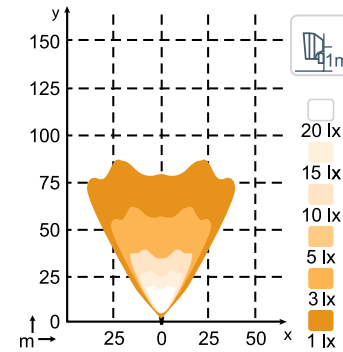
TECHNICAL SPECIFICATIONS	SCORPIUS N4402 WARM
Theoretical / Operational Lumens	5700lm / 3600lm
Power Consumption	50W
Vibration	15.3Grms 24-2000Hz
Nominal Current	24V=2.0A, 12V=3.9A

Superb driving light for mining vehicles, clear cut-off line and no glare.

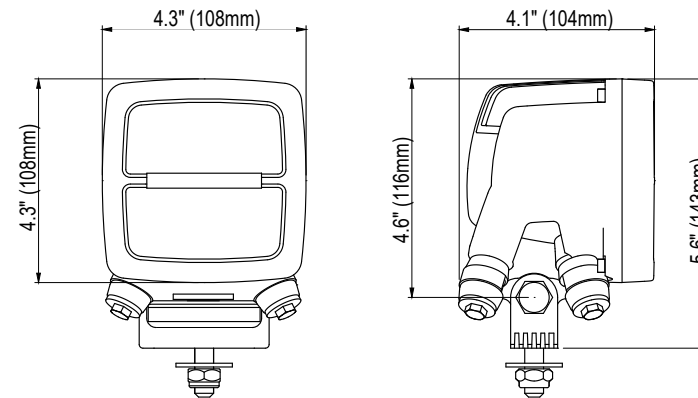


### LIGHT PATTERNS

**N4407 QD, N4408, 3500lm  
Glare-Free**



### DRAWINGS



# Scorpius XTR N4407 QD

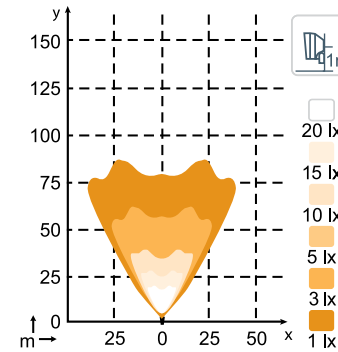
TECHNICAL SPECIFICATIONS	SCORPIUS XTR N4407 QD
Theoretical / Operational Lumens	5600lm / 3500lm
Power Consumption	55W
Vibration	20Grms 24-2000Hz, 4.65Grms 12-2000Hz
Nominal Current	24V=2.2A, 12V=4.6A

Superb driving light for mining vehicles, clear cut-off line and no glare.



### LIGHT PATTERNS

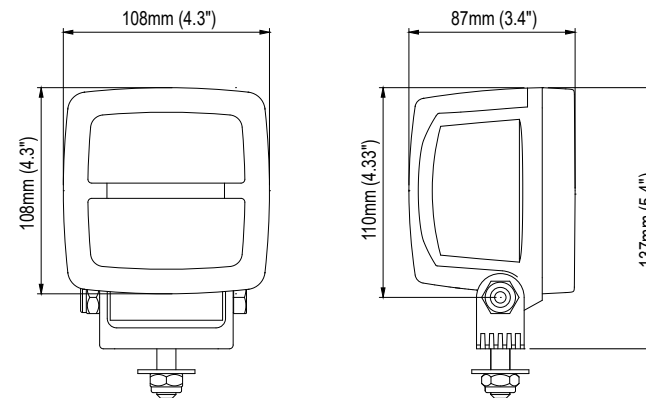
**N4407 QD, N4408, 3500lm  
Glare-Free**



# Scorpius PRO N4408

TECHNICAL SPECIFICATIONS	SCORPIUS PRO N4408
Theoretical / Operational Lumens	5600lm / 3500lm
Power Consumption	55W
Vibration	15.3Grms 24-2000Hz
Nominal Current	24V=2.2A, 12V=4.6A

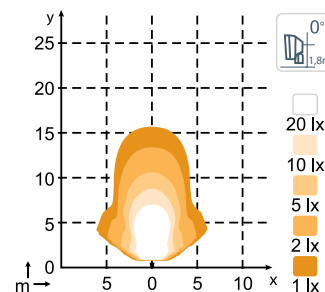
### DRAWINGS





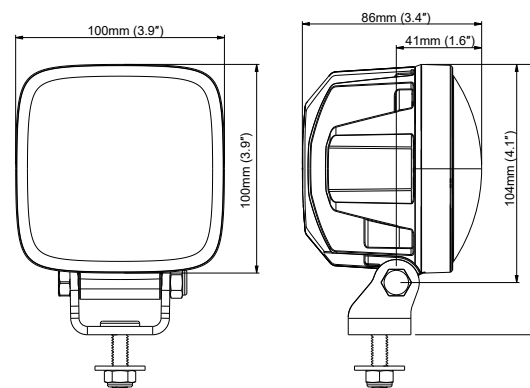
### LIGHT PATTERNS

Scorpius PRO 415 PH, 1500lm  
Glare-Free



Also available in a [top-down version](#), find the details on our website [nordiclights.com/products](http://nordiclights.com/products)

### DRAWINGS

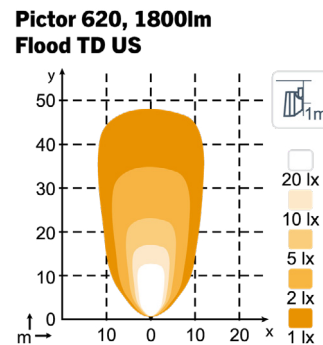


# Scorpius PRO 415 PH

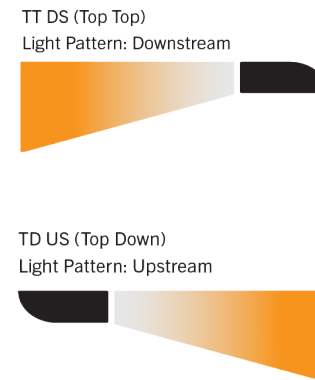
TECHNICAL SPECIFICATIONS	SCORPIUS PRO 415 PH
Theoretical / Operational Lumens	1950lm / 1500lm
Power Consumption	28W
Vibration	8Grms 24-2000Hz
Nominal Current	24V=1.2A, 12V=2.4A



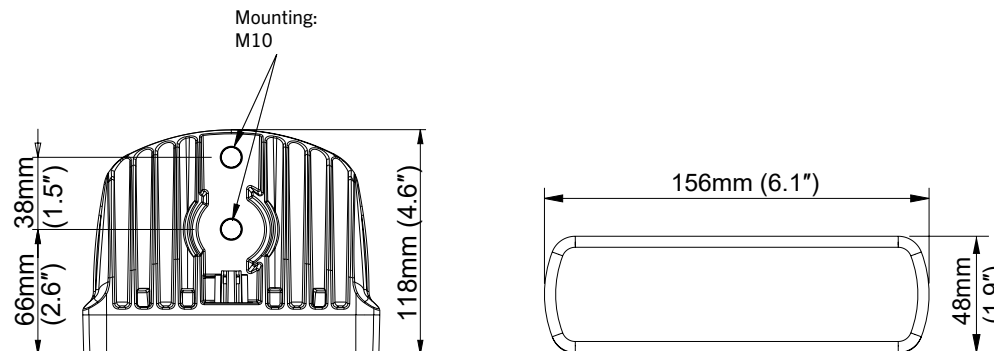
### LIGHT PATTERNS



### PROJECTION ANGLE



### DRAWINGS



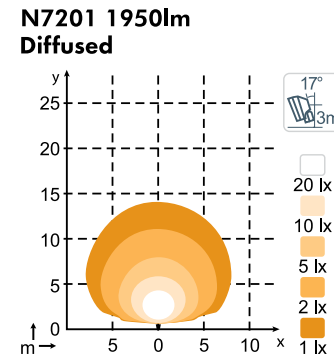
# Pictor 620

TECHNICAL SPECIFICATIONS	PICTOR 620
Theoretical / Operational Lumens	2700lm / 1800lm
Power Consumption	28W
Vibration	15.3Grms 24-2000Hz
Nominal Current	24V=1.0A, 12V=2.0A

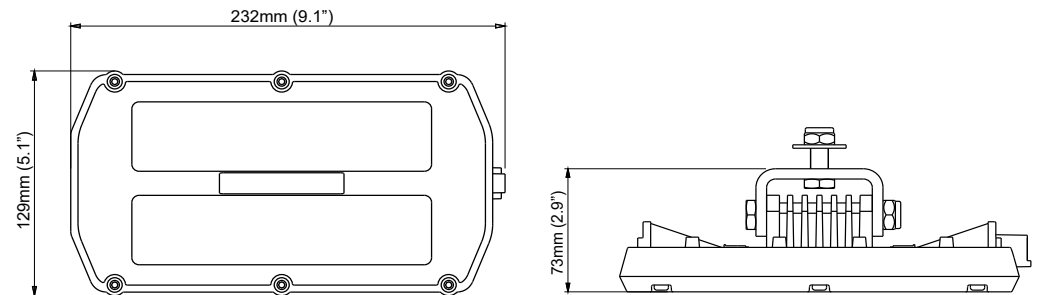
Light designed to minimize shadows, perfect for engine rooms



### LIGHT PATTERNS



### DRAWINGS

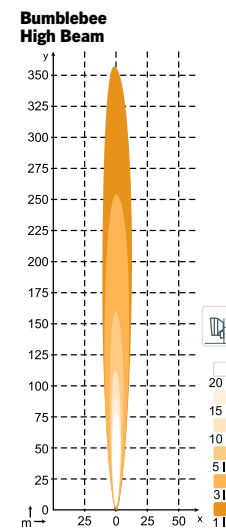
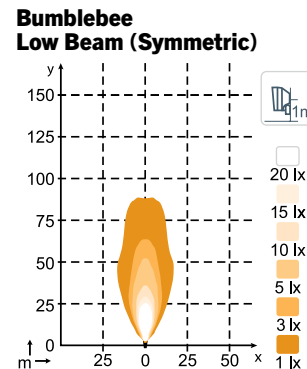


# Taurus N7201

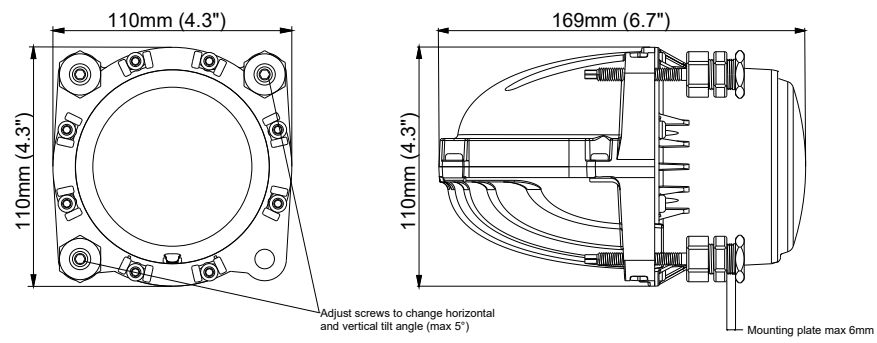
TECHNICAL SPECIFICATIONS	TAURUS N7201
Theoretical / Operational Lumens	3100lm / 1950lm
Power Consumption	30W
Vibration	15.3Grms 24-2000Hz
Nominal Current	24V=1.25A, 12V=2.5A



### LIGHT PATTERNS



### DRAWINGS



# Bumblebee

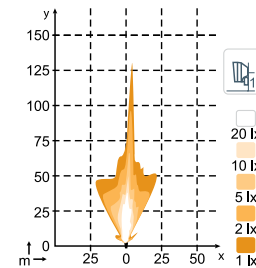
TECHNICAL SPECIFICATIONS	BUMBLEBEE
Color Temperature	5800K
Power Consumption	High Beam 18W, Low Beam 18W
ECE Approvals	High Beam: ECE R149 Low Beam Symmetric: ECE R149
Material Housing / Lens	Aluminum / Glass



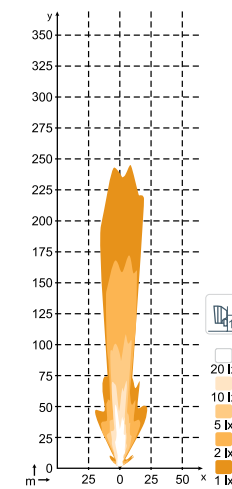


### LIGHT PATTERNS

**Sculptor 2 Low Beam RHT**

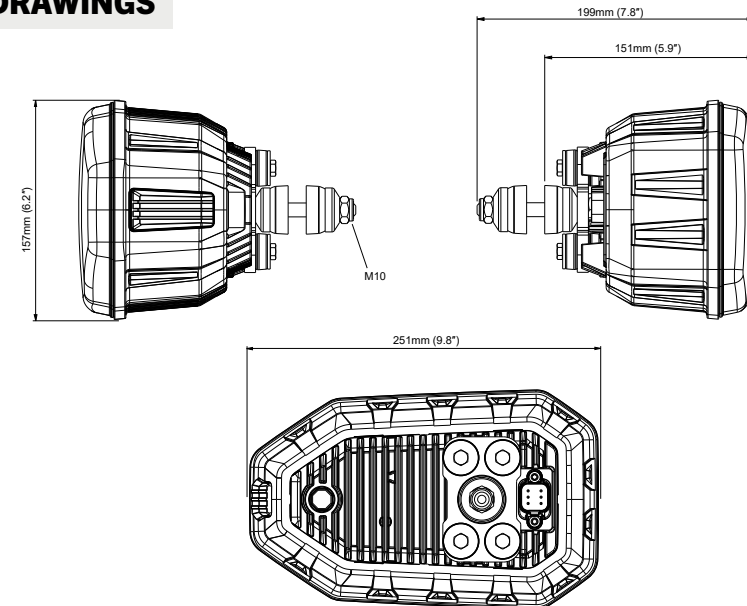


**Sculptor 2 High Beam RHT**



Also available in [LHT](#) and [pedestal mount versions](#), find the details on our website [nordiclights.com/products](http://nordiclights.com/products)

### DRAWINGS

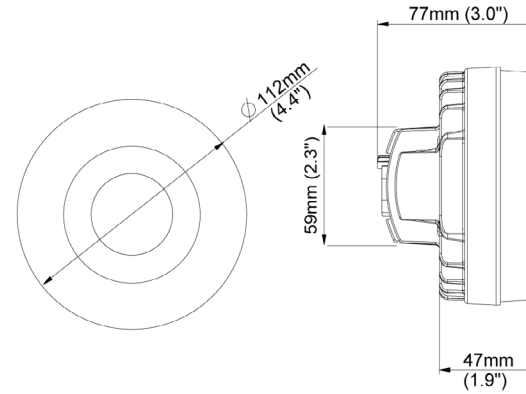


## Sculptor 2

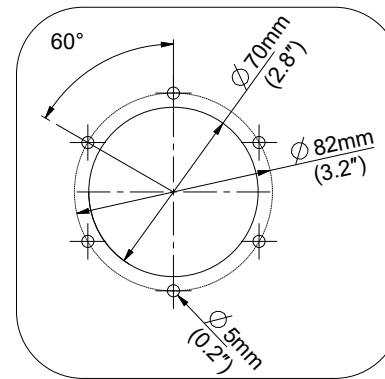
TECHNICAL SPECIFICATIONS	SCULPTOR 2
Functions	Daytime Running Light (DRL), Position Light, Direction Indicator, Low Beam, High Beam.
Power Consumption	High Beam 57.5W, Low Beam 38.5W, Position 4.0W, DRL 17.5W, Direction Indicator 21W
ECE Approvals	Passing beam: ECE R149 (Class B) Driving beam: ECE R149 (Class B) Position light: ECE R148 (Symbol A) DRL: ECE R148 (Symbol RL) Direction indicator: ECE R148 [Symbol 1B (front) & symbol 5 (side)]
Material Housing / Lens	Plastic / Glass



**DRAWINGS**



**CUT-OUT DRAWING**



# Corona 400

TECHNICAL SPECIFICATIONS	CORONA 400
Functions	Direction Indicator, Position Light, Stop Light, Reverse Light
Power Consumption 12 / 24V	Direction indicator 21W, Position light 0.2 / 0.5 W, Stop light 1.5 / 3.0 W, Reverse light 2.0 / 4.0 W
ECE Approvals	Direction Indicator: ECE R6 Cat 2a, Position Light: ECE R7 Cat R1, Stop Light: ECE R7 Cat S1, Reverse Light: ECE R2
Material Housing / Lens	Aluminum / Plastic

Also available with **retroreflector (ECE R23-approved)**, find the details on our website [nordiclights.com/products](http://nordiclights.com/products).





## We create optimal visibility

Nordic Lights was born in the darkness of the harsh Finnish landscape, where the need for illumination came out of pure necessity. During the years, we have learned just what it takes to develop the perfect work lights for mining. No need to worry about which lights fit your specific type of vehicle, we already did the planning for you. We produce world-class simulations to exactly determine which lights are optimal for the specific task and conditions. Our planning is meticulous, and we execute by the same standards. Our knowledge is extensive, yet we learn more with each new case.

For safe and easy maneuvering in demanding conditions, choose Nordic Lights.

 **NORDICLIGHTS**  
nordiclights.com

**Nordic Lights HQ**  
Jakobstad, Finland

