



LIGHT OPTIMIZATION GUIDE

FOR MEDIUM-SIZED EXCAVATORS

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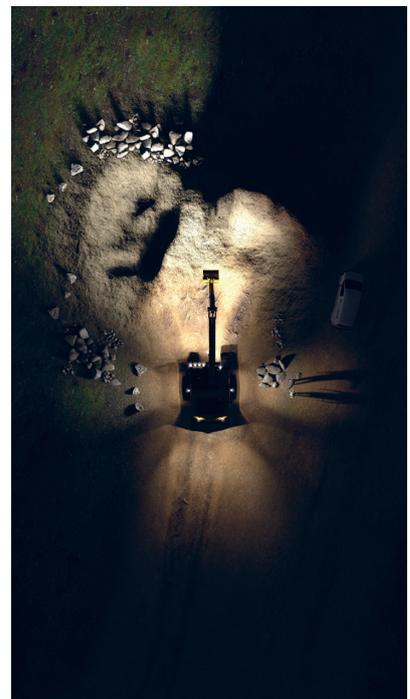
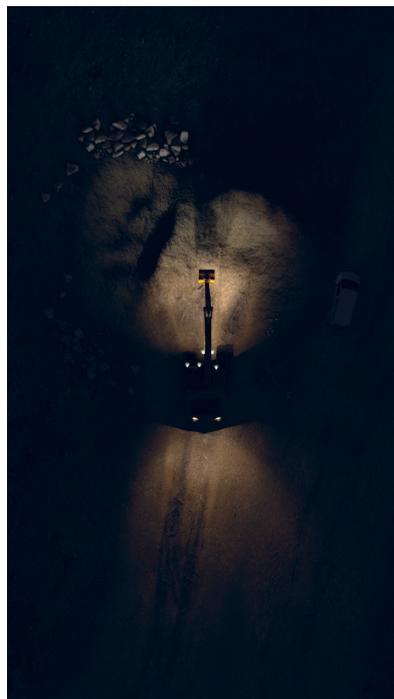
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SIMULATION

What does simulation mean? We use the term when talking about our representations of illumination in a simulated environment. While the images in front of you were produced with the help of a computer, the emitted light itself is in no way an approximation, interpretation, or wild guess. On the contrary, NORDIC LIGHTS® simulations are always based on the light measurements of our actual work lights, carried out in our in-house light laboratory. These values are then fed back into the simulation software, which in turn produces an accurate image of how the light would look and behave in the chosen surrounding.

Three simulation set ups:

1. Original set up: halogen lights
2. NORDIC LIGHTS upgrade package 1: basic
3. NORDIC LIGHTS upgrade package 2: professional



NORDIC LIGHTS

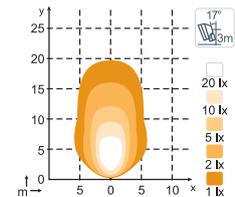
Upgrade package 1 - basic

7 PCS SCORPIUS GO 420 (SG420)

FLOOD



Scorpilus GO 420, 1800lm Flood



NORDIC LIGHTS

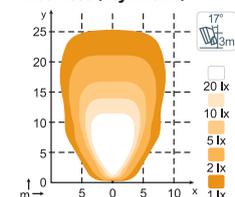
Upgrade package 2 - professional

5 PCS SCORPIUS PRO 445 (SP445)

WIDE FLOOD ASYMMETRIC



Scorpilus PRO 445, 4400lm Wide Flood (Asymmetric)

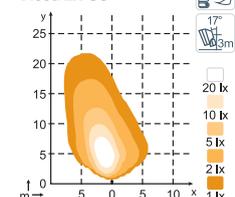


2 PCS PICTOR 620 (P620)

FLOOD LH US



Pictor 620, 1800lm Flood LH US

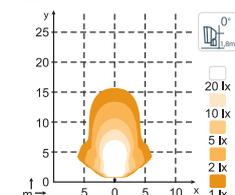


4 PCS SCORPIUS PRO 415 PH (SP415PH)

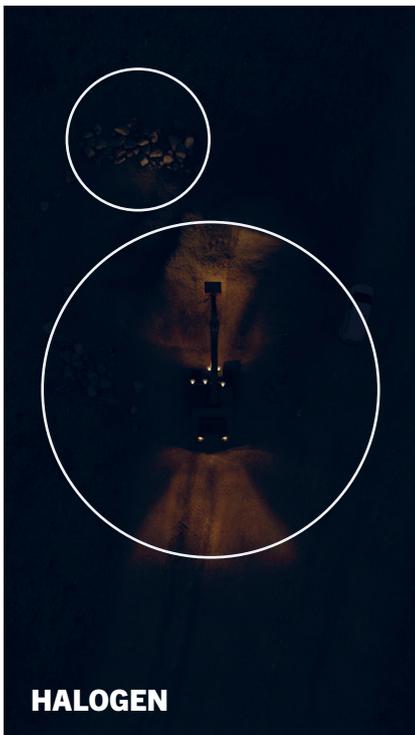
PHENOM OPTICS, WIDE FLOOD



Scorpilus PRO 415 PH, 1500lm Wide Flood

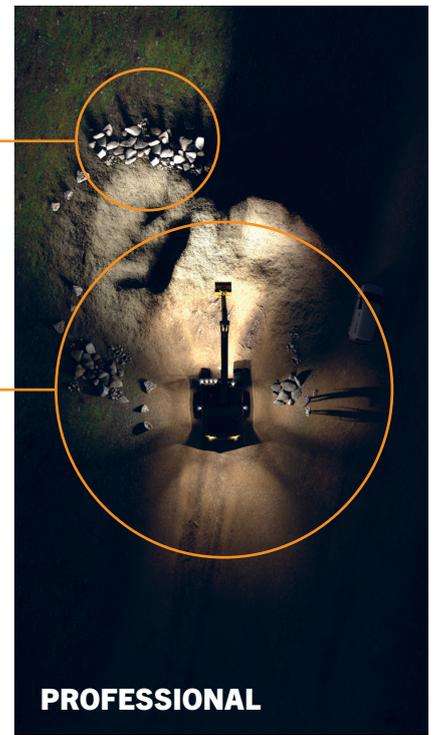


YOU GAIN safety and visibility improvements

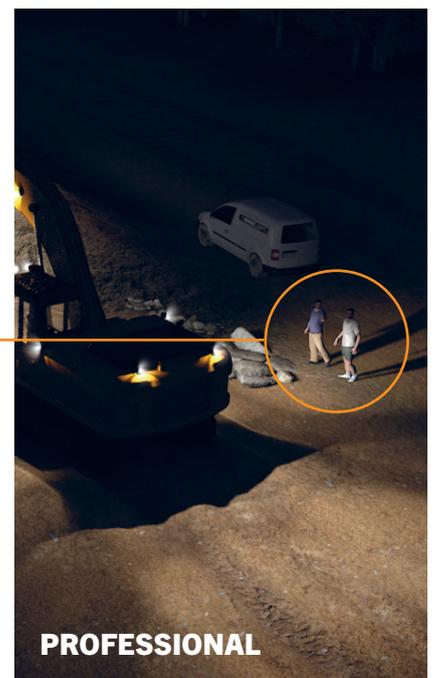


Safety
Obstacles can be seen clearly.

Increased productivity
Optimal light level, even light distribution and natural color rendering (CRI ≥80) enables the operator to work effectively and clearly see the work area, also via camera, and distinguish different materials.



No glare with Phenom Optics - the three-in-one optical solution
The Phenom Optics-equipped Scorpius PRO 415 PH provides efficient task lighting without blinding people and vehicles nearby, not directly in the eyes nor through mirrors. The result is a safe and comfortable work environment.



EQUIPMENT INFO

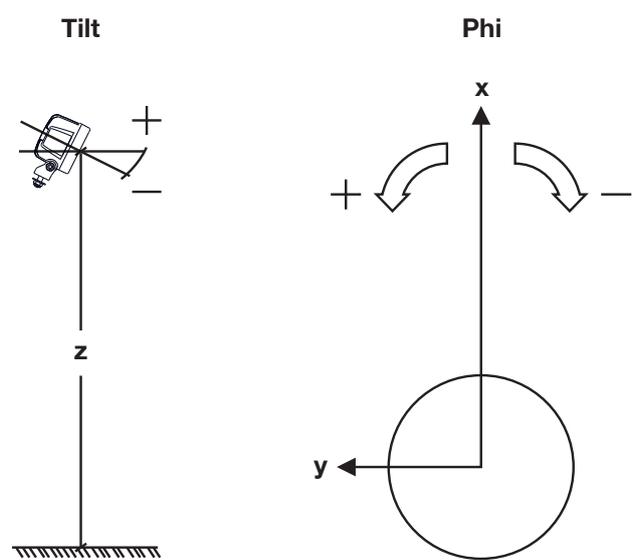
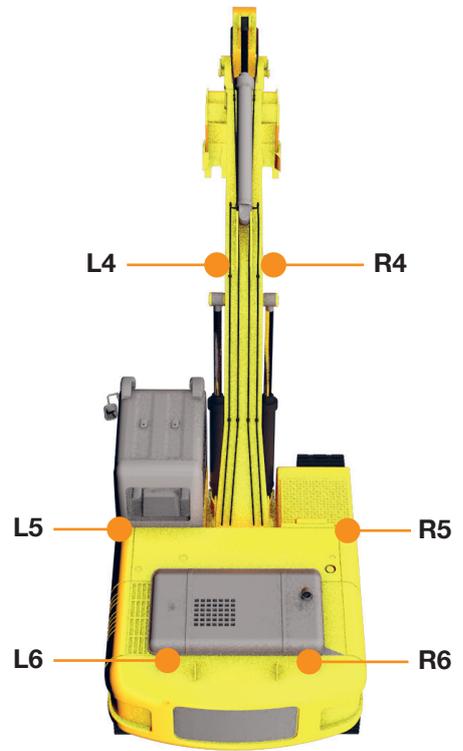
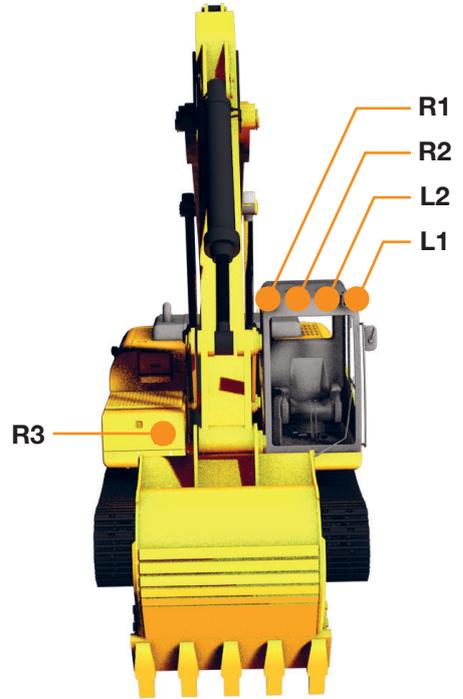
This simulation can be used as a guideline for medium-sized excavators around the size of:

Weight	20 000 to 35 000 kg
Height to the top of cab	2500-3500 mm
Height to the top of the counterweight	1800-2400 mm

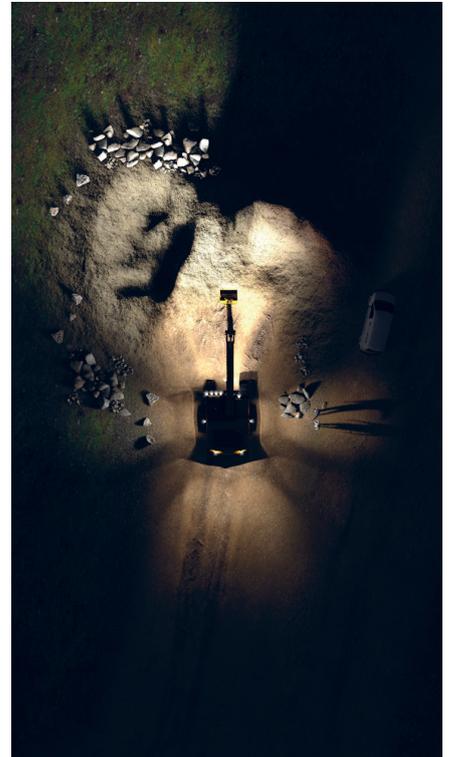
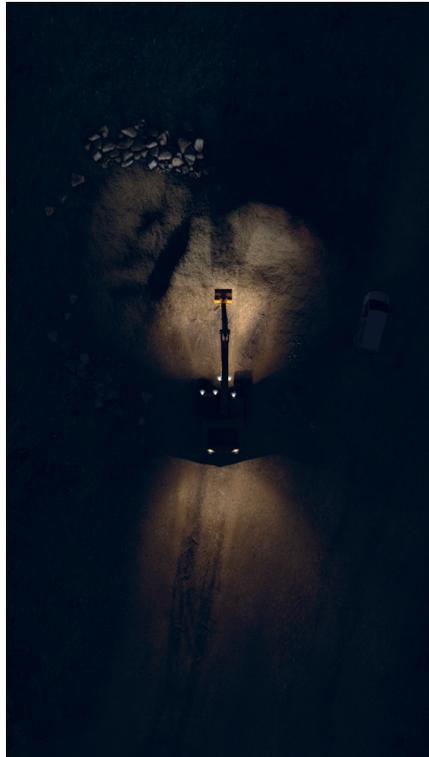


LIGHT POSITIONS

	Basic	Professional	Tilt	Phi	z
L1	SG420	SP445	-10°	+30°	3.10 m
L2	-	SP445	-10°	+15°	3.10 m
L4	SG420	P620	-35°	0°	4.00 m
L5	-	SP415PH	-7°	+90°	2.30 m
L6	SG420	SP415PH	-5°	170°	2.30 m
R1	SG420	SP445	-10°	0°	3.10 m
R2	-	SP445	-10°	+5°	3.10 m
R3	SG420	SP445	-2°	0°	1.50 m
R4	SG420	P620	-35°	0°	4.00 m
R5	-	SP415PH	-7°	-90°	2.30 m
R6	SG420	SP415PH	-5°	-170°	2.30 m



COMPARISON



Halogen

Basic

Professional

Scorpius GO 420

Scorpius PRO 445
Pictor 620
Scorpius PRO 415 PH

ORIGINAL SETUP

7 pcs halogen lights



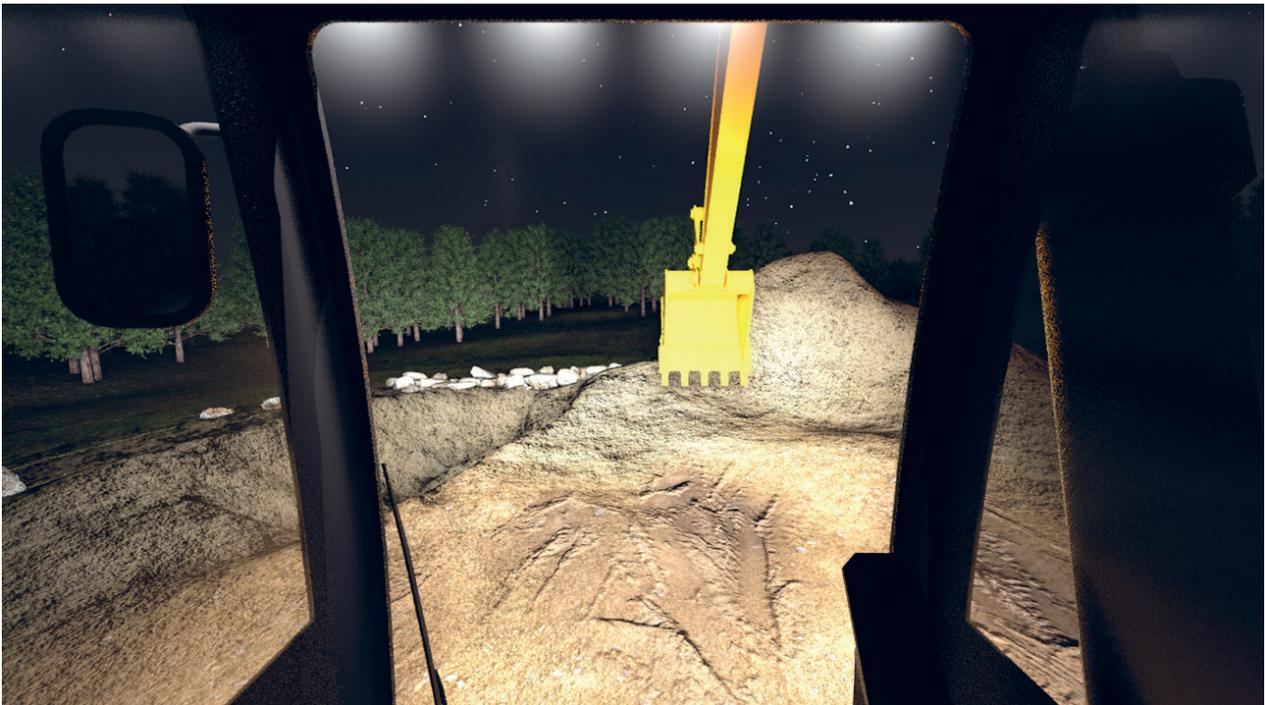
NORDIC LIGHTS

Upgrade package 1 - basic



NORDIC LIGHTS

Upgrade package 2 - professional



BENEFITS OF THE UPGRADE PACKAGES

		HALOGEN	BASIC	PROFESSIONAL
Mechanical	Lifetime of the light source	500 h	30000-50000 h	30000-50000 h
	Durability	Very low	High	Extremely high
Cost related	Maintenance free	No	Yes	Yes
	Lifetime maintenance cost	Very high	No cost	No cost
	Energy efficiency	Very low	Very high	Very high
Light related	Physical effect of colour temperature	Relaxing	Productive	Productive
	Even light distribution without high contrasts	No	Yes	Yes
	Light distribution according to general recommendation on work area	No	Yes	Yes
Workers safety & well being	Operators visual ergonomics	Fair	Good	Maximum
	Ability to work effectively	Fair	Good	Maximum
	Safety for operator & workers nearby the vehicle	Fair	Good	Maximum

BENEFITS OF THE UPGRADE PACKAGES

	EXPLANATION
Lifetime of the light	The lifetime of the light source is measured in hours and indicates how long the light will last.
Durability	The shock and vibration resistance of a halogen lamp is very poor. For LEDs on the other hand, it is very high.
Maintenance free	A LED light source is maintenance free, while a halogen light source needs to be changed approx. every 500 hours.
Lifetime maintenance cost	Long service intervals and less downtime means savings. No loss of revenue due to equipment not in productive work because of maintenance.
Energy efficiency	The light output/watt ratio for a halogen light is around 20-30 lm/W. For LEDs it's up to 100 lm/W. Less watts used for lighting means lower power consumption for the equipment.
Physical effect of colour temperature	A higher colour temperature is more bluish, which helps the operator stay alert. The colour temperature of halogen lights is 3200K and of LEDs 5000-5700K.
Even light distribution without high contrasts	With LEDs the optics can be designed optimally to make exactly the wanted light pattern. The light pattern of a halogen work light is narrow with sharp edges between the dark and the illuminated areas.
Light distribution according to general recommendation on work area	Light level for the work area is around 10-20 lux up to 20 meters. The operator of the vehicle can see clearly all over the work ground.
Operators visual ergonomics	Even and sufficient light level provides optimal visual ergonomics for the operator. This includes no glare, no eye irritation and no eyestrain which can cause headache.
Ability to work effectively	Light intensity is high enough to see clearly, work faster and avoid mistakes.
Safety for operator & workers nearby the vehicle	The operator of the vehicle can see all obstacles clearly.