

*SLOPE LIGHTING SOLUTIONS*

THE  
**LED LIGHTING  
CHOICE**  
FOR SKI RESORTS



# CHARACTERISTICS & BENEFITS OF **THE ARCTIC BEAM**

## ENERGY SAVINGS

The Arctic Beam produces 31.000 lumens at a power consumption of 280 Watt. With more than 110 lumen per Watt the Arctic Beam is more efficient than gas discharge lamps such as high pressure sodium and metal halide lamps. Depending on the slope characteristics and desired light levels, the Arctic Beam reduces energy costs by at least 50%.

## REMOTELY DIMMABLE

The Arctic Beam Remote Lighting Control System enables ski operators to monitor, switch and dim Arctic Beams individually or in groups. The control system is easy to install, deploy, operate and maintain. The system was specifically tested in misty conditions and hilly surroundings.

The Arctic Beam Remote Lighting Control System software can be accessed through a web browser that supports Microsoft Silverlight on a Windows or Mac computer, and through any tablet, iPad or smartphone with the use of the Slope Lighting Solutions app. With the remote Lighting Control System and a smart phone at their disposal ski slope operators can create a lighting experience that is unprecedented on ski slopes.





**BETTER LIGHT QUALITY**

Higher brightness,  
better contrast view,  
reduces white out,  
instant light,  
high efficiency Led's



**REMOTE CONTROL**

Wireless dimmable  
& light scheduling,  
real time energy monitoring  
Mac/iOS/Windows/Android



**SUSTAINABLE DESIGN**

Consumes up to 50% less energy,  
very little light pollution,  
no toxic materials, very long lifetime,  
compact size and low weight



**FLEXIBLE DESIGN**

Different beam angles,  
easy installation,  
yaw & pitch



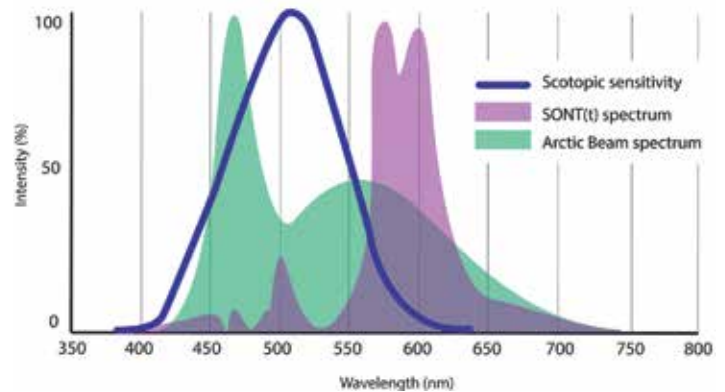
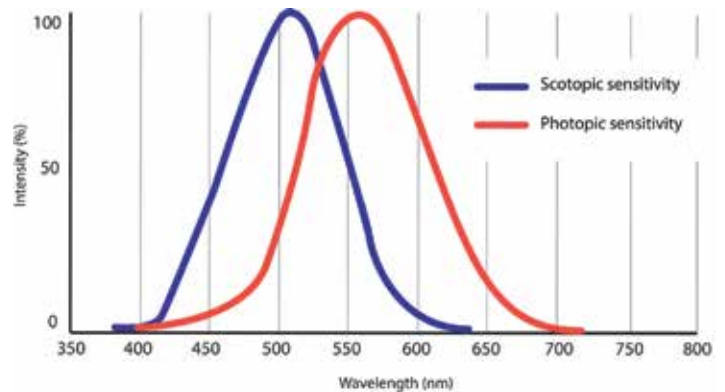
# CHARACTERISTICS & BENEFITS OF *THE ARCTIC BEAM*

## HIGHER EFFECTIVE ILLUMINATION

The Arctic Beam generates more useful lumens to the eye than other lamps. The reason is that the human eye is more sensitive to the wavelengths emitted by the Arctic Beam than to the wavelengths emitted by gas discharge lamps.

There are two light sensitive components in the retina of the eye, rods and cones. Rods give us our night vision capability (scotopic) vision, while cones give us our daylight (photopic) vision. The chart shows clearly that the light emitted by the Arctic Beam falls within the scotopic sensitivity of the eye – most of the light emitted by gas discharge lamps (SONT(t) spectrum) falls outside of the scotopic sensitivity.

The ratio of scotopic luminance (or lumens) versus photopic luminance in a lamp is called the S/P ratio, which is a multiplier that determines the apparent visual brightness of a light source as well as how much light a lamp emits that is useful to the human eye, referred to as visually effective lumens (VELs). So to get the visually effective lumens of a light source we need to multiply its specified lumens with the multiplier for that light source. The S/P ratio for LED is 2,1, for low pressure sodium 0,38, for high pressure sodium 0,58 and for HID metal halide 1,49. A higher S/P ratio provides higher visual brightness and sharper vision.



## LONG LIFETIME

The calculated lifetime of the LED's used in the Arctic Beam is very long: after 50.000 hours of usage the Arctic Beam still emits 80% of its original light output and 70% of its original light output after 68.000 hours. If the Arctic Beam is operated at lower power and/or frequently dimmed its lifetime increases even further while maintaining 70% of original light output. As such, replacement costs are considerably lower when compared to gas discharge Lamps that generally last less than 15.000 hours and at which time they have lost at least 50% of their initial light output.

### REDUCED LIGHT POLLUTION

The Arctic Beam contributes significantly towards reducing light pollution. In contrast with gas discharge lamps that emit their light in a broad angle and that shine 360° round, leaving light trapped within the armature, LED's are a directional light source that always emit forward in a 120° angle. This allows us to focus the light where it is really needed, hence making more efficient use of the light output and thereby reducing light pollution. By employing reflectors with beam angles of 36°, 46° and 60° the Arctic Beam is capable of concentrating the light even further.

### REDUCED WHITEOUT EFFECT

Whiteout is a weather condition in which visibility and contrast are severely reduced during snowfall. The horizon disappears completely and there are no reference points at all, leaving the skier with a distorted orientation. The Arctic Beam, through its directional beam, penetrates through whiteout much better than the diffuse light of gas discharge lamps, and so contributes to better visibility and safer skiing.

### CONVENTIONAL VERSUS ARCTIC BEAM LED

Left: Conventional lighting.

Note the spill light on the left of the slope.

Right: Slope illuminated with Arctic beams.

Note the absence of spill light and the high brightness of the Arctic Beams.



# CHARACTERISTICS & BENEFITS OF ***THE ARCTIC BEAM***

## **NO TOXIC ELEMENTS**

The Arctic Beam contains no hazardous chemicals as opposed to Gas discharge lamps that contain mercury which is toxic when released into the environment. To dispose of mercury requires special care and precautions.

## **BETTER COLOUR APPEARANCE**

With a minimum colour rendering index (CRI) of 70, the Arctic Beam makes colourful ski outfits and gear appear natural on the slope. Gas discharge lamps - with the exception of metal halide lamps – have a very poor CRI which causes objects to lose their natural colour and brightness.

## **DIFFERENT COLOUR TEMPERATURES**

The Arctic Beam has two standard Colour Temperatures: 4000K and 6000K. 6000K is preferred because of higher efficiency and higher brightness and visibility. However there is scientific evidence that bright light with a colour temperature well above 4000K can have negative effects on animal nightlife, such as disturbed rest periods, disorientation and a restricted radius of action. This is why in some countries and areas guidelines and laws have been formulated that restrict the colour temperature of luminaires for nighttime illumination to 4000K or lower.



### INSTANT ON-OFF

Warm-up and restrike times are absent with the Arctic Beam. Gas discharge lamps require a period of 1 to 15 minutes to reach 90% of their full light output. Additionally, when shut down these lamps need a cool down period before they can restart. This period of time is called the restrike time and can take 20 minutes or even longer.

### OPTICAL FLEXIBILITY

Depending on light level requirements the Arctic Beam is available with different beam angles (36°, 46°, 60°).

### EASY & FLEXIBLE INSTALLATION

Slope Lighting Solutions offers a flexible support system to fix one, two or three Arctic Beams to a wooden pole. For steel and concrete poles, ski resorts usually have their own securing methods, but we can be of help in developing a customised solution if so required.

An advantage of the low weight of the Arctic Beam units is that there is no need to install heavy support masts. This feature is especially attractive for slopes where no other support infrastructure is present. Slope Lighting Solutions can deliver steel tipping masts that can be operated by a single person during installation of the Arctic Beam.

Once mounted, the Arctic Beam can still be repositioned by hand (pitch & yaw) and focused by using the optional laser pointer tool.

### FORM FACTOR

The Arctic Beam is easy to handle because of its low weight and compact size compared to traditional luminaires. Transport and installation are cost effective.



## TURN KEY SOLUTION

As a standard we offer the Arctic Beam as a turnkey solution: prewired, preinstalled electric boxes, a configured Remote Lighting Control system and software as well as suspension material is all included in the solution.

## BEAUTIFUL AND INNOVATIVE DESIGN

Form follows function is a very appropriate term for the Arctic Beam. Its uncompromising design reflects its characteristic light: bright and forward emitting. The streamlined shape, curved fins and sleek holes give the armature a robust and striking, futuristic look.

The round body warms up and melts the snow.

The holes between the fins prevent any build up of snow and allow debris to fall through.

The design takes a leap into the future and really stands out in comparison with most conventional luminaires.

The Arctic Beam reflects the crowd on the slopes: sportive, elegant, and willing to contribute towards a sustainable winter sports environment.

***The Arctic Beam is winter sports 2.0!***







## SUSTAINABILITY: THE CALL FOR SUSTAINABLE SKIING

Ski resort operations tend to consume significant amounts of energy. It is estimated that ski resorts could save hundreds of megawatt hours just by changing over to newer, greener technologies. For a single ski resort this would not only mean immediate savings of tens of thousands of Euros per year, but also a reduction of carbon dioxide emissions by millions of tons.

Although lighting consumes far less energy than snow machines and ski lifts, current lamp technologies are inefficient, cause light pollution, contain toxic elements and because of their short lifetime, require replacement. The Arctic Beam will last a skiers lifetime!

In the last decade various sustainability programs were set up in and across ski resorts in Europe and North America. Their aim is to raise interest among the skiing public in combatting climate change and promote sustainably managed mountain tourism.

Slope Lighting Solutions supports these efforts with the Arctic Beam.

[www.nsaa.org/environment/sustainable-slopes](http://www.nsaa.org/environment/sustainable-slopes)  
[www.mountainridersalliance.com](http://www.mountainridersalliance.com)  
[www.protectourwinters.org](http://www.protectourwinters.org)



*SLOPE LIGHTING SOLUTIONS*

# LIGHT PLAN



Ascertaining the number of luminaires required for the optimal illumination of a ski slope is a challenging task. Slope Lighting Solutions uses top-of-the-range simulation software to create light plans for slopes and tracks. Our light plans are based on your requirements as well as on guidelines established by the national Ski Areas Association (NSAA) in association with the Illumination Society of North America (IESNA) and the European standard for outdoor sports lighting NEN-EN 12193.

# ABOUT SLOPE LIGHTING SOLUTIONS

Slope Lighting Solutions is the only company in the global sports lighting arena that has dedicated itself exclusively to the illumination of ski slopes and tracks. The illumination requirements of ski slopes, as well as the challenging and inspiring mountainous surroundings, have so far never led to the development of a luminaire that fits in with the surroundings both technically and visually.

Slope Lighting Solutions has done just that with the introduction of the Arctic Beam. The Arctic Beam is a LED technology based luminaire that clearly stands out from the gas discharge lamps that can be commonly found on ski slopes.

Slope Lighting Solutions is part of the Seaborough group of companies ([www.seaborough.com](http://www.seaborough.com)). It focuses on materials and electronics research as well as photometric testing and in the process invents, develops and commercializes groundbreaking innovations and applications for the lighting industry.

# PRODUCT DATA

## LIGHT TECHNICAL DATA 4000K

Luminous flux	31.000
Luminous efficacy	110 lumen/Watt at full power
Correlated colour temperature (CCT)	4000K
Colour Rendering Index (CRI)	70, 80, 90
Beam angle (FWHM)	36°, 46°, 60°

## LIGHT TECHNICAL DATA 6000K

Luminous flux	31.000
Luminous efficacy	110 lumen/Watt at full power
Correlated colour temperature (CCT)	6000K
Colour Rendering Index (CRI)	70, 80, 90
Beam angle (FWHM)	36°, 46°, 60°

## GENERAL INFORMATION

Product name	Arctic Beam
Led source	Cree XHP50 custom COB
IP rating	65
Optics	Reflector system
Colour armature	Snow white
Material	Powder coated aluminium
Operating temperature	-40C / +25C
Lifetime	50.000 hours <sup>1</sup> (L80)
Weight	5,6kg
Dimensions (l x w x h)	470mm x 188mm x 190mm

## ELECTRICAL DATA

Power consumption	280W
Input voltage	110-277 V
Output voltage	42 V
Output current	6,7 A
Power factor	0,99
Dimmable	yes (1-10v)

<sup>1</sup> Source: Cree Xlamp XHP50 White Long Term Testing Summary, March 5, 2015.  
L80 50.000 means the Arctic Beam still emits 80% of its initial lumens after 50.000 hours.

# SLOPE LIGHTING SOLUTIONS

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