carecaled

FORNITORE UFFICIALE

FIT FEDERAZIONE ITALIANA TENNIS

carecaled SPORT

LED lighting for **sport facilities**

Carecaled has a licensing agreement with Philips about the patents available in the program Philips LED Luminaires and Retrofit Bulbs

www.carecaled.com/philips-license.html

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Carecaled is the division of Careca Group which has been dealing with LED lighting technology for over 10 years. Specialized in lighting of sport facilities both indoors and outdoors, in 2009 Carecaled was the first in the world to implement LED to illuminate a tennis court. The expertise accrued in the field thanks to the number of installations built in Europe, **has allowed Carecaled to be listed in the unique register of the suppliers of the FIGC - LND National Amateur League and to be the only official supplier of the Italian Tennis Federation**, because of its ability to provide the appropriate care to the overall playability of the installation, for the regulatory compliance of all sports and for the outstanding glare control. The goal of Carecaled is to improve the usability of the sports facilities by reducing energy consumption thanks to the use of the most advanced green technologies. The use of the most efficient technical solutions and their continuous improvement for applications related to the sports world, guarantee Carecaled a leading position at European level to your target market also thanks to the experience deriving from the implementation of hundreds of projects in multiple disciplines.

Careca group was founded in 1992 and has three different operating areas:

- production of consumer electronics products conveyed through specialized distribution - www.hamletcom.com
- design and manufacturing of software integrated hardware solutions for scientific and industrial environments www.e4company.com
- production of energy efficient lighting systems for sports and the industry - www.carecaled.com

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Careca

SUPERTENNIS

LND ITALIA FIGC

Hamlet

E4 COMPUTER ENGINEERING

Led Technology

The discovery of blue light emission with diodes (white light is a consequence) was completed in 1993 and the scientist who made the discovery, Professor Shuji Nakamura, was awarded in 2014 with the Nobel Prize in Physics in addition to a myriad of other awards around the world.

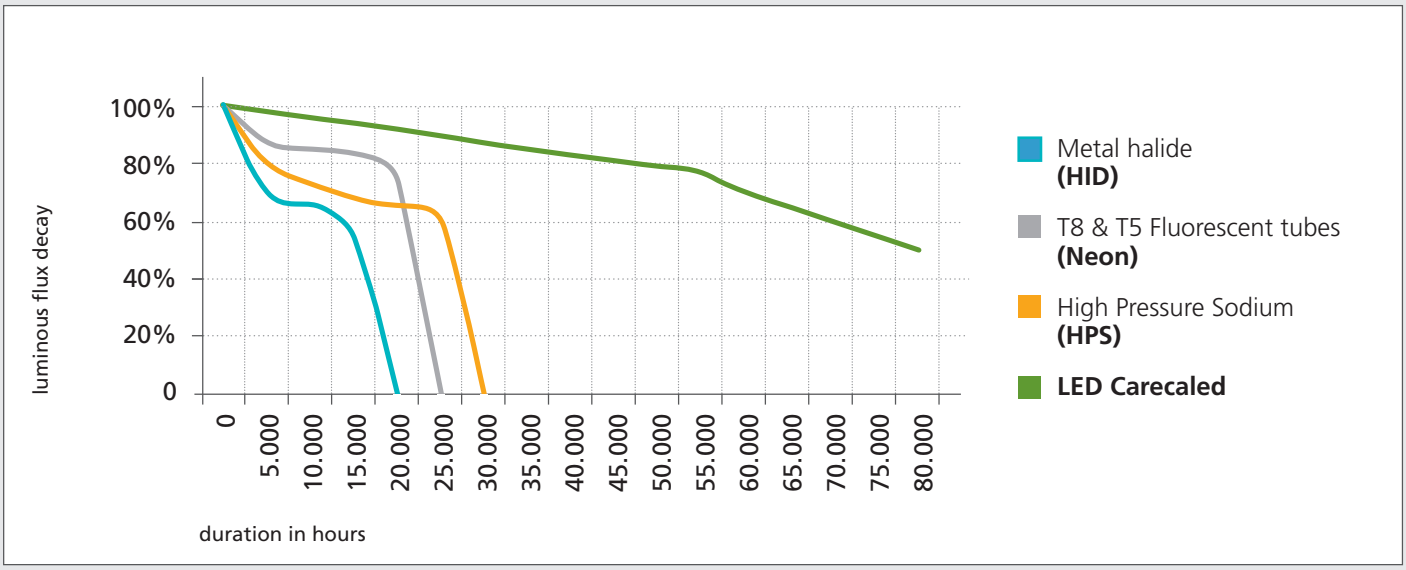
LEDs, however, are not all quite the same, just as in any other industry sector, there are premium quality products as well as products which differ in performance, efficiency and durability. Carecaled prefers the use of Nichia LED emitters, the Japanese Society behind the "white LED", owner of the largest amount of patents related to the production of this technology.

The advantages of LED Technology

Energy savings: in many cases today, you can save up to 90% of energy consumption with equal light output. It is of course important to consider the correct comparison between the light sources, a halogen lamp is for example less efficient than a Compact Fluorescent (CFL). In sports facilities Metal Halide lamps (HID) are the main light source, in this case, if compared to **Carecaled LED products the energy saving is around 75-80%**.

Long lifecycle system: a well-built LED product has a life cycle of 60,000 hours, with a typical illuminating capacity L70. It means that if all parameters are properly respected **after 60,000 hours**, the LED will have an illuminating capacity **equal to or greater than 70% of the initial capacity.**

Resetting of maintenance costs: given the duration in time of a professionally designed and built LED system, we will have a substantial reduction in the costs of routine maintenance. In this graph we have compared the typical life cycle of different light sources.



Immediate ignition even on hot (ON/OFF): LED technology benefits from immediate ignition even hot. Other technologies (halide and HPS) have very long reaction times. With LED technology, the start is always immediate even after a blackout.
(To see a short video example, frame the QRCode)

Better glare control: this factor is mainly determined by the precision of the light design and the optics used for the lighting system. Carecaled has developed a range of optical specifications especially designed for sporting activities and is able to offer multiple solutions both for indoor sports and for the large outdoor sports.

Total uniformity: normally the large outdoor sports uses 2,000W high performing headlights, often located on towers of almost 20 meters heigh, it's natural to think how complicated it is to have the same amount of light both under the towers and in the center of the pitch. Again, Carecaled, with the correct use of specific optics and the greatest accuracy in light design and fixture positioning guarantees a total uniformity of the lighting system for all type of sports facility.

Light where you need it: thanks to the quality of Carecaled optics you will have the light where you need it and the typical dispersions of traditional light sources will be a thing of the past.
This leads to maximize your investment and to obtain the best possible illuminance efficiency. Today, we are able to illuminate **tennis courts with less than 1,500W**, ensuring compliance with Federtennis basic policy (300 lux) and to provide **standard football pitch with 13,500W** for an average illuminance of 150 lux (<90W of consumption per lux guaranteed on a 100x60m plant).

High Color Rendering: Carecaled light fixture uses mainly **5,000K color temperature with a color rendering index >70**. This results in greater efficiency, in a spectacolarization of technical actions for the audience and thanks to the higher colour saturation, typical of LED technology, a more accurate perception of the gameplay for the players (speeds and distances in ball games). Carecaled technology is also **ready for TV in HDTV**.

Absence of UV emission: LED technology does not emit UV-A and UV-B rays.

Eco-friendly product: compliant to RoHS, all Carecaled products are completely **free from lead and other dangerous heavy metals** and, in spite of all previous technologies, they **DO NOT contain mercury**.

Reduced heat emission: traditional light sources turn into light a very small amount of the consumed energy, generating extremely high operating temperatures. Besides the lower efficiency, they contribute to heat up the room temperature requiring a subsequent climate conditioning, increasing, consequently, power consumption. LEDs are semiconductors that convert directly into "light" electrical energy in a much more efficient way than traditional sources which transform into "heat" 90% of the energy used.

Electricity supply contract downsizing: a lower demand of energy power lead to an immediate cost reduction. Ten 500 lux tennis courts, illuminated by metal halide, require 100kW of power availability provided by the energy supplier. This availability has a monthly cost (power share) that is obviously reduced if the demand decreases by 75%.

Reduction of wiring costs: in case of new lighting systems, it will be sufficient to provide a less expensive lower flow rate cabling. Lower power consumption correspond to more economic, lightweight and efficient systems.

Extreme resistance to accidental impacts and bad weather: the building technology is totally watertight **(IP67)** while offering a great protection against accidental impacts **(IK08)**. Rain, hail and saltiness are not an issue.

Ample and positive marketing visibility: an ecological and efficient lighting system differentiates and qualifies the sport facility making it stand out over others. A better usability of facilities will increase the technical level of athletes giving the company greater prestige.

No cost facility: the **75% energy savings** and the total absence of routine maintenance produce a **much higher time saving than initial investment**, producing significant profits in the life cycle of each facility.

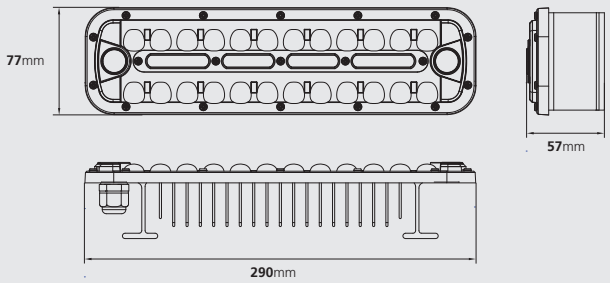
Modular solution ZeligHT-24

ZeligHT-24 is the newest modular lighting Fixture to be used for countless applications. Thanks to its various optics, specifically designed for sporting applications, the system allows you to achieve maximum energy savings and greatest flexibility with extreme ease of installation. The dissipation system guarantees a life cycle of more than 60,000 hours even with operating temperatures above 50 °C.
The wide range of technical solutions optimizes the design of lighting systems for different uses, even extreme, such as lighting from great heights for all sports facilities. IP67 degree means that ZelighHT-24 is totally protected against dust and against the effects of temporary immersion even up to 1 meter depth.
The test to salt spray makes ZeligHT-24 also perfectly suitable to be used in seaside areas. Each ZeligHT-24 module has a maximum wind exposure area of 0.0223 m2, making it the most compact light source in the world (lm/m2), a very relevant info in the replacement of lighting systems placed on limited payload towers.

Technical specifications

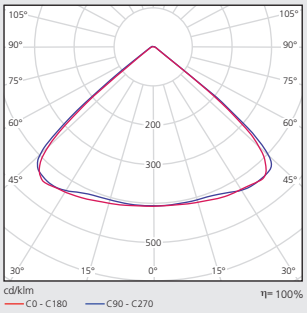
ZeligHT-24 - vers.V

Number of LED	24
LED Emitter	Nichia (Jp) – Class N183
Consumption (W/DC)	37,5 - 51,5 - 60W
mA (DC)	600-700-800
Flux (lm)	> 5100-5920-6500
Colour temp (K)	3000-5000
Weight - dimensions (LxWxH)	0,56 Kg - 290x77x57 mm
Salin Spray Test (IEC68-2-11)	test 720 h
IP	67
Security	Class III
Life cycle (L70)	60.000 h
Shock resistance	IK08
Certifications	CE-RoHS



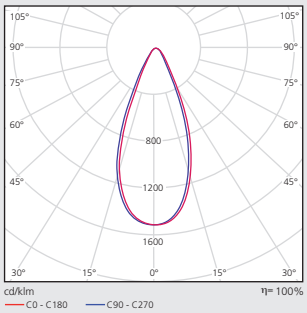
Main ZeligHT optics used in sports:

Optics 5B



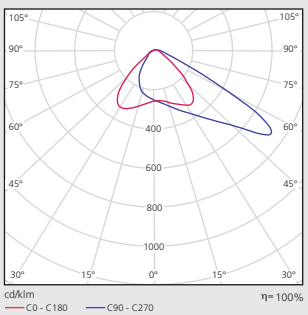
Optics used for heights above 4 meters, both indoor and outdoor
Applications: tennis, football, rugby, gym, indoor sport courts.

Optics 4T



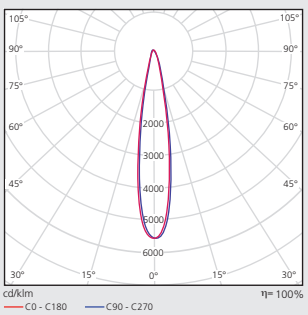
Intermediate aperture optics used for average heights 8-15 meters both indoor and outdoor.
Applications: tennis, football, rugby, gym, indoor sport courts.

Optics T3



Highly asymmetric optics can be positioned parallel to the ground as it is able to project the light to one side. Applications: mid-sized indoor sports, tennis, gyms, five-a-side football

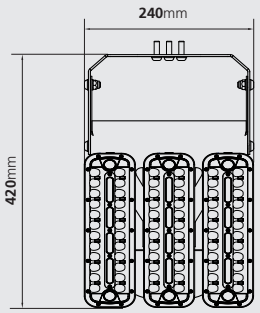
Optics 2T

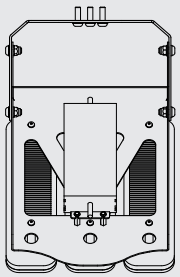


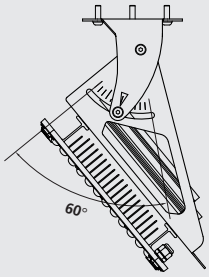
Very narrow high performance optics used primarily on towers higher than 18 meters. Application: football, rugby, great outdoor sports, ports, airports, parking lots.

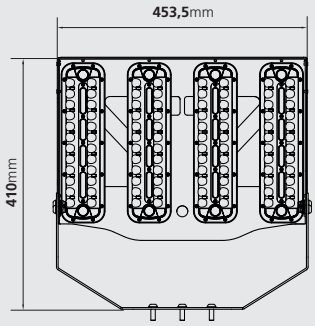
Forty-All: modular system with mounting bracket and light targeting

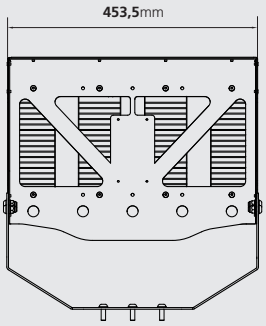
Forty-All is a pole-top system designed for indoor and outdoor sport structures.
It is constituted of a main body and High powers ZeligHT-24 modules which can be assembled in multiple ways in order to meet customer lighting requirement and extreme light uniformity.
Forty-All system is made of stainless steel and aluminum; with a virtually unlimited life span it is particularly suitable to be positioned on high towers.
By placing the electrical panels (wiring) at the base of the pole we eliminate the need to climb to the pole top for routine maintenance reducing costs almost completely.

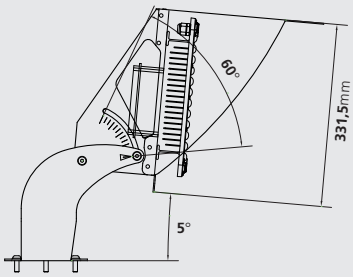


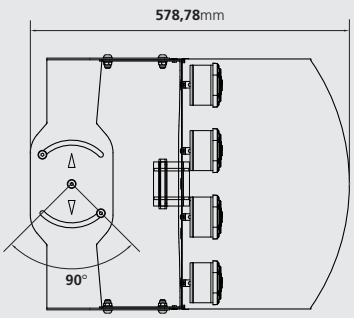


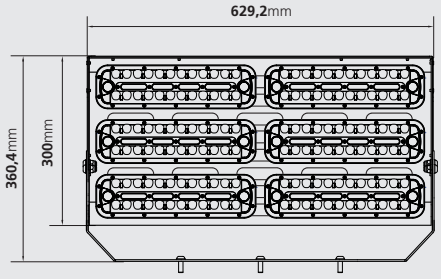


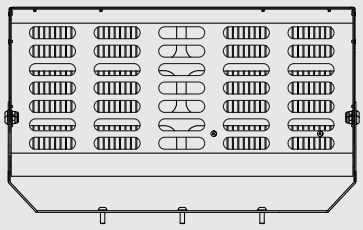


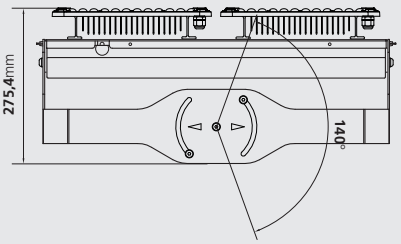


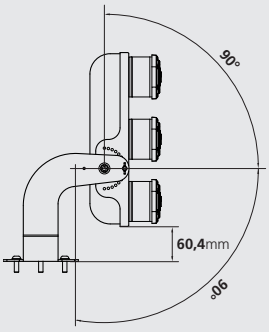


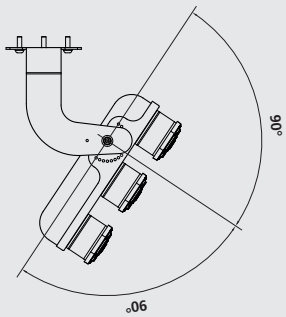










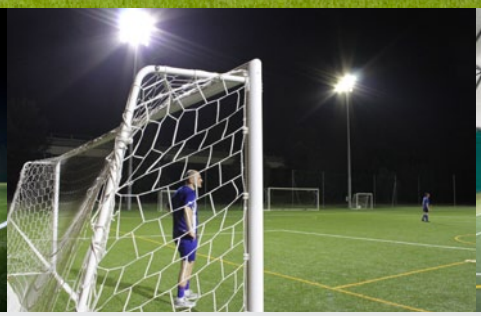


Light weight and small dimension make Forty-all extremely handy and easy to install reducing also the “sail” effect at the pole-head.
16 ZeligHT-24 modules emitting over 100,000 lm.

Lighting for sport facilities

In order to design and implement a proper lighting infrastructure for a sports facilities, it is necessary to assess the level of the competitions that are going to be held in the infrastructure.
If the events hosted will be of amateur type, compliance with the regulations of the relevant federation is sufficient (in Italy, CONI)
If the competitions hosted are of professional level appropriate considerations will have to made.
The correct design of a system of this type tends to ensure the necessary illumination for the reference activity; to have less light will mean a worst usability of the system, to have in abundance will mean an unnecessary waste, both during the purchase of the plant and in daily management.
Carecaled has developed a completely modular solution that allows, among other prerogatives, to realize amateur installations and "upda-te" them, in a quick, simple and economical way in a second phase or when the needs of the client change.
The addition of modules is literally accomplished in minutes with the help of two screws and a quick-type spring connector.

HDTV Broadcasting: the ZeligHT-24 system is designed by correlating color temperature and color rendering index (CRI) in order to achieve the perfect lighting for television sooting in HD.
ZeligHT-24 optics are specifically designed for sports applications offering a light distribution and uniformity levels comply with the specifications of the different sport federations but also superior to the television standards for HD shooting.



Tennis Solutions
Carecaled is Federtennis Official Provider

F.I.T. regulations

When a competition is played under artificial lighting it is very important that light is uniformly distributed on the court. The minimum intensity, resulting as an average of 18 measurements evenly distributed on the field must be of:

1000 lux in plants for international matches with television filming.

400 lux in plants for competitive top-class matches such as tournaments and league affiliate of the national divisions of A1 series, male and female. (In many cases it is possible to integrate the existing lighting with LED technology equipment to achieve the desired level).

300 lux for any other type of plant.

The referee has the authority not to start or pause the game if the light intensity, in his opinion, is insufficient.

Carecaled has produced hundreds of lighting plants in Italy and in several EU countries, for both outdoor and indoor areas, in fixed structures, tensile structures and pressure switch balls, providing both direct and indirect lighting.

Carecaled designs each plant specifically to the needs of the club. Carecaled has lit facilities for ATP events (> 750 lux), ITF (> 500 lux), A Series (Italy, France and Denmark) and for amateur category.
Regulations, and above all habits are quite different from one country to another and, for a sport with a great precision in the regulatory requirements such as Tennis, a special attention must be paid on the specific needs of the client.
For example, the measuring points for plants approval, are differ depending on the country where you are located.
International regulations ATP / ITF are still different from local Federations.
Our modular solution allows us to use different optics, depending on the height of the structures (poles or indoor facilities), and to calibrate the number of modules to reach the necessary level of illumination.

Carecaled is able to issue certifications of conformity to federal specifications.

Applications

Some application cases of Carecaled systems.

Antico Tiro a volo (Rome)

photo: courtesy of Mondoace

ITF - 500 lux - Uniformity > 0,85 - Surveyed 21 July 2016
consumption 4.160 W - measuring points: 15 ATP

CT-RE Canali (RE)

Serie B - > 350 lux - Uniformity > 0,90 - Surveyed 23 September 2016
consumption 1.560 W - measuring points: 15 FIT

ASD BERIV Multisport (RE)

Serie A - 480 lux - Uniformity > 0,80 - 2 courts - Surveyed 30 January 2015
consumption 2.600 W - measuring points: 15 FIT

Stade Toulousain (FRANCIA)

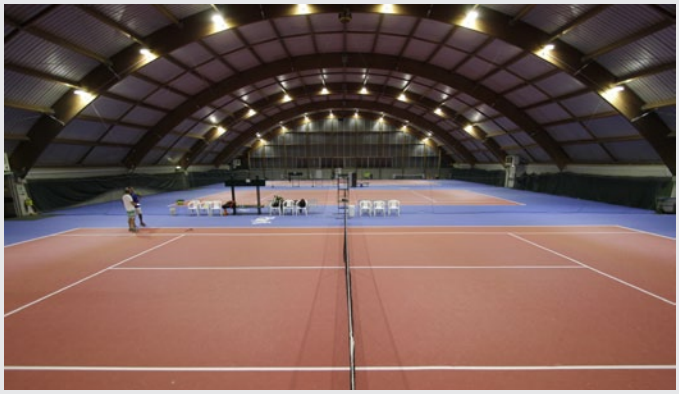
Serie A (FR) - 525 lux - Uniformity > 0,80 - 10 courts . Surveyed 30 October 2015 - consumption 3.090 W - measuring points: 15 FFT

Tennis Club Albinea (RE)

Serie A - 480 lux - Uniformity > 0,80 - 2 courts - Surveyed 30 January 2015
consumption 2.600 W - measuring points: 15 FIT

Sporting Club Sassuolo (MO)

Serie A - 400 lux - Uniformity > 0,80 - Surveyed 30 June 2014
consumption 2.400 W - measuring points: 15 FIT



TC President (PR)

Serie A - 300 lux - Uniformity > 0,80 - Surveyed 14 September 2016
consumption 6.240 W - measuring points: 15 FIT

Merano (BZ)

Serie A - 400 lux - Uniformity > 0,80 - Surveyed 30 June 2014
consumption 2.400 W - measuring points: 15 FIT

Club Zetadue (MO)

Serie A2 - 300 lux - Uniformity > 0,80 - Surveyed 14 October 2014
consumption 1.550 W - measuring points: 15 FIT

TC Fanano (MO)

Serie A - 400 lux - Uniformity > 0,75 - Surveyed 30 June 2014
consumption 2.400 W - measuring points: 15 FIT

San Benedetto del Tronto (AP)

ATP - 754 lux - Uniformity > 0,78 - Surveyed 30 June 2016
consumption 5.150 W - measuring points: 15 ITF/ATP/WTA

Antico Tiro a volo (Rome)

ITF - 500 lux - Uniformity > 0,85 - Surveyed 21 July 2016
consumption 4.160 W - measuring points: 15 ATP

Sporting Club Sassuolo (MO)

ITF - 614 lux - Uniformity > 0,83 - Surveyed 30 June 2015
consumption 4.100 W - measuring points: 15 ITF/ATP/WTA

How to request a customized proposal (outdoor)

Excluding large arenas for international competitions, outdoor sport is generally practiced in conditions of this type:

- **Two poles on each side,** symmetrically arranged with respect to the field
- **Three poles per side,** symmetrically arranged with respect to the field
- **Two adjacent fields with only external poles** (without poles between a country and the other)

In order to offer a proper technical solution you must provide the following information:

- Number of available poles and their height above ground
- Poles position relative to the field
  - Poles spacing distance from the "twin-aisle"
  - Poles distance from the central field
  - Lighting level required (see requirements on page 9)
  - Special requirements
  - Some photographic image could be useful
  - Ground surface (clay, synthetic or other)

How to request a customized proposal (indoor)

One of the specific characteristics of lighting with LED technology is the extreme directionality of the light. With this technology it is possible to obtain uniformity levels difficult to achieve with traditional lighting, providing proper attention is put to the fixture placements and the accuracy of light pointing.
The pressure-static structures are often dismantled in the summer season; in this case we tend to favor the adoption of wider to ensure proper lighting in both circumstances.
This choice solves, among other things, the instability typical of this kind of structures which are sensitive to wind and atmospheric pressure.

Excluding large arenas for international competitions this sport is practiced under cover, in conditions generally of this type:

- **fixed masonry structures** or different materials (ex. laminated wood)
- **Tensile structures** of different shape
- **Pressure-static structures**

In order to offer a proper technical solution you must provide the following information:

- Structure dimensions (volumes)
- Number of fields within the structure
- The number of ceiling lights currently present (typically halide 400W)
- The position of the current ceiling lights relative to the fields (in order to to simplify the replacement works we tend to position our LED lamps in the same place of previous light fixture)
  - Lamps spacing distance from the "twin-aisle"
  - Installation heights
  - Distance between each ceiling lamps
  - Lighting level required (see requisite page 9)
  - Special requirements
  - Some photographic image could be useful
  - Ground surface (clay, synthetic or other)

Carecaled offers the possibility to require the Operating Leasing Formula (subject to credit approval). This way, the intervention of improvement will be offset by the lower cost in electricity bills. We also have agreements with specialized credit institutions in offering financial solutions to no-profit organizations.

Info request form for sport facilities (Tennis)

Indoor structure

Structure type:

- ☐ Pressure-static cover
- ☐ Fixed structure
- ☐ Tensile structure
- ☐ Geodesic

(some image would be useful)

How many tennis courts are located under the structure n. ___

Structure dimensions (LxWxH) _____

(if possible, please provide a .dwg file (CAD) of the plan)

Ground surface:

- ☐ Clay
- ☐ Play It
- ☐ Carpet
- ☐ Other Synthetic
- ☐ Concrete
- ☐ Other

Lighting system:

- ☐ New (to be built)
- ☐ Existing

Current lighting system:

Average light on the field (lux) _____
Which type of lamps are currently used _____
Number of lamps _____
Watt for each lamps _____
Lamps placement relative to the field _____
Positioning height _____
Total power used _____
Is the current lighting enough? _____

Annual Hours of Use: _____

Notes: _____

Outdoor tennis courts

Tennis courts in the club n. _____

How are the tennis court positioned: _____

(single courts, side by side or other- a drawing would be useful)

Ground surface:

- ☐ Clay
- ☐ Play It
- ☐ Carpet
- ☐ Other Synthetic
- ☐ Concrete
- ☐ Other

Lighting system:

- ☐ New (to be built)
- ☐ Existing

Current lighting system:

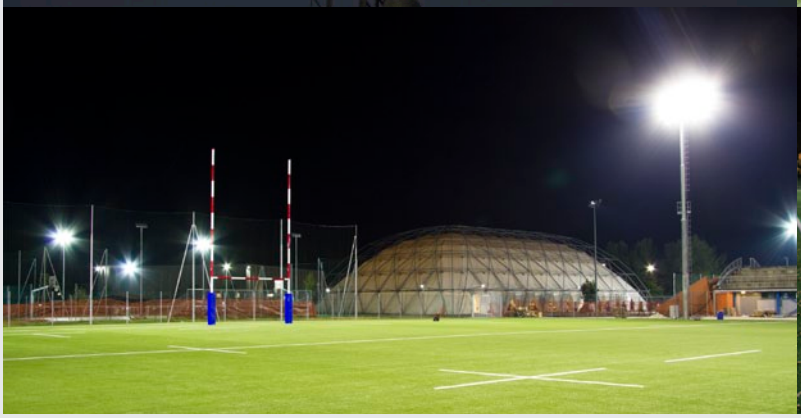
Average light on the field (lux) _____
Which type of lamps are currently used _____
Number of lamps _____
Watt for each lamps _____
Lamps placement relative to the field _____
Positioning height _____
Total power used _____
Is the current lighting enough? _____

Annual Hours of Use: _____

Notes: _____

Football solutions

Carecaled is registered as a sole supplier of the FIGC-LND National Amateur League.



Lighting systems requirements to house FIGC-LND National Amateur League Championships, are as follows:

- for stadiums with spectators capacity lower than 3,000, minimum 100 lux; uniformity > 0.60
- for stadiums with spectators capacity between 3,000 and 5,000, minimum 150 lux; uniformity > 0.60
- for stadiums with spectators capacity up to 10,000, minimum 150 lux; uniformity > 0.70
- for stadiums with spectators capacity up to 20,000, minimum 300 lux; uniformity > 0.70
- for stadiums with spectators capacity above 20,000, minimum 500 lux; uniformity > 0.70

Source: FIGC-LND National Amateur League

CONI has different regulations:

- for stadiums intended for non-competitive activities 75 lux; uniformity 0.50
- for stadiums intended for agonistic activities at local level 200 lux; uniformity 0.70
- for stadiums intended for agonistic activities at national or international level 500 lux; uniformity 0.70

Source: CONI

Efficiency: Carecaled is able to implement lighting systems using only 90W of power for each lux (eM) distributed on a 100x60m field, meaning that **100 lux average** are obtained on a regulatory surface **with less than 9.000W** (over 75% savings if compared to a similar performance metal halide lighting plant). The modular structure allows to obtain levels of uniformity that are difficult to reach with different solutions.

Compactness: Carecaled solution has the highest ratio of emitted lumen per surface exposed to the wind (lm / m2> 200,000) making it a solution simple to install, extremely handy and lightweight. Its small size reduces the "sail" effect un the pole-head.

Expertise: The first world's football field entirely lit with High-Power LED technology was realized in 2010 in Reggio Emilia (ASD Galileo) by Carecaled. Since then, given the extreme reliability of LED technology, it was decided to build 20m heigh towers (18,5m FT) without access ladders to the terraces located at its top. The power supply is now placed at the base of the towers to make ordinary maintenance very simple and economic to implement.

Carecaled offers the possibility to require the Operating Leasing Formula (subject to credit approval). This way, the intervention of improvement will be offset by the lower cost in electricity bills. We also have agreements with specialized credit institutions in offering financial solutions to no-profit organizations.

Info request form for sport facilities (Football-Rugby)

Structure dimensions (LxWxH)
(if possible, please provide a .dwg file (CAD) of the plan)

Ground surface:

- ☐ Natural grass
- ☐ Synthetic grass
- ☐ Clay
- ☐ Concrete
- ☐ Other

Lighting system:

- ☐ New (to be built)
- ☐ Existing

Current lighting system:

Average light on the field (lux) _____
Which type of lamps are currently used _____
Number of lamps _____
Watt for each lamps _____
Towers placement relative to the field _____
(distance from field edges and from center field – long field)
Towers height _____
Total power used _____
Is the current lighting enough? _____

Annual Hours of Use: _____

Note: _____

FAQ

Why is LED technology so special?
In a nutshell, this is digital technology (SSL - Solid State Lighting): the difference between LED and traditional lighting is the same as between an old VHS and a DVD, or between a 1970' telephone and a smartphone. The immediate power, the stability of light supply, the energy efficiency and the absence of maintenance guarantee a quality investment.

Can I replace my 400W or 2000W headlights with the same number of LED lamps?
Yes and no, Carecaled must evaluate ca se by case but it may be convenient to modify, where possible, the number of ceiling lights to be installed with the aim of maximizing the result both in terms of amount of light and uniformity in its distribution.

How do I know how many lamps I will need?
Carecaled designs a lighting project specifically for your structure, considering the type of sport activity that takes place there and its related needs.
On the basis of the technical project, Caracaled will indicate the specific number of lamps you will need for your sport facility. Caracaled will take into consideration any structure i.e. on a Pressure-static cover the number of lamps hooks are not easily changed). To ensure the best possible outcome Carecaled uses highly efficient optics, able to distribute the light precisely where it is needed.

It seems expensive…
The access cost can be disheartening but the truth is that sports club are used to paying very expensive electricity and maintenance bills and often don't consider all aspect properly. LED technology is a good investment, which, in the medium term, saves more than double of its value besides improving the usability of the sport facility.
Carecaled can help you to evaluate the investment return considering energy savings, lack of maintenance and other related costs.
Carecaled is also able to support you to find financial structures to support the investment (Revolving Fund FIT at zero rate, Operating leasing, Loans at subsidized rates).

What's a lumen (lm), what's a lux (lx)?
Lux and lumen are two different system units. Lux is the system units of illuminance, while lumens is the system units of the luminous flux, that is the amount of light emitted by a source.
A flow of 1000 lumen, on a surface of one square meter, lights up that square meter per 1000 lux. However, the same 1000 lumens, distributed on a screen of ten square meters, produces illumination of only 100 lux. The illuminance measured in lux refers, therefore, to the illuminated surface and not to the source. This is important because it determines how much a light source is able to illuminate a body or a surface

What they say about us

"We halved the consumption doubling the previous lighting with full satisfaction of all associates. Once you've experienced it, the 100% instant switch-on is a habit that you can't do without".
Andrea Sarti, Sporting Sassuolo Director (MO)

"The playing comfort has definitely improved. I spend many hours a day teaching tennis and a well-lit court makes me work better and get less tired. Even students have benefited from better lighting which helps to shorten the reaction time and to have a better perception of distances".
Vittorio Zanni, Tennis FIT Instructor

"It feels really good, the perfect uniformity and the almost non-existing glare, make me feel at ease during both phases of the game and in everyday teaching".
Jacopo Marchegiani, ATP Player

"We are extremely satisfied with the results; increased playability due to better illumination and reduced energy consumption, with all the associated benefits".
Ivan Bertocchi, Beriv Multisport President (RE)

Stade Toulousain choose Carecaled to improve the lighting conditions and drastically reduce energy consumption in its 10 indoor courts. "Design, delivery and installation were performed by Carecaled respecting deadlines, technical constraints and agreed performance. We are really happy with the choice and professionalism, so much to recommend it to others".
Hubert Faure, Stade Toulousain Tennis President- Tolouse (France)

"As part of the research activities of the Laboratory of Lighting and Acoustics (LIA) of the School of Engineering (Department of Energy Engineering of Systems of Land and Construction) of the University of Pisa, we've had many occasions to analyze the photometric characteristics and lighting performance of Carecaled products
The products installed have presented excellent distribution characteristics of the light output, high color rendering and the necessary photo-biological safety and made it possible to ensure, during verification/testing, the full compliance with the regulations laid down requirements for artificial lighting of sports facilities in the various levels competitive".
Francesco Leccese, PhD, MSc in Building Engineer, Assistant Professor University of Pisa, School of Engineering
Dept. of Energy Engineering, Systems, Territory and Constructions (DESTeC), Lighting and Acoustics Laboratory (LIA)

"We are very satisfied with the system and the support that has been provided by the Carecaled. One of our future goals is to continue improving our structure because we believe that, to a significant reduction in operating costs, corresponds a very clear improvement of the system, much to our satisfaction, the players of the tournament and all members".
Dr. Giuseppe Centro; Counsellor of the Old Skeet Shooting Club (Rome)

Carecaled is on:

NEW TECHNOLOGY

**New technologies are revolutionizing the lighting systems, improving performance and reducing fuel consumption.
Just choose the right partner.**

LED

by Lorenzo Cazzaniga

The "FY" triggers almost automatically, to give credit to Nanni Moretti when he said that Italian tennis players are always ready to find an excuse for everything. And when you smash on the decisive break point ends inexorably on the baseline tarp, the error will never be due to the usual, bad position of the feet, the small excursion of the arm, not exactly to Swiss timing, but always and only in the damn, poor lighting that made you lose sight of the ball at the crucial moment of the match. But now they have to look for better excuses.

WHAT ARE THE ADVANTAGES OF LED LIGHTING

SAVINGS

For many circles it's the main aspect and the savings that we have verified is certainly significant. You get to spend more than 2,000 euro less per field, with a significantly better lighting quality. On average, if the hourly consumption of a traditional system is of 5600-5700 watts to 300 lux, with the LED technology it drops to 1,500 watts, with a saving of at least 75%

FUNDING

The cost of a good system LEDs is about 6000-6500€€that will pay for itself in 3 years, if a court works 8 hours a day for 280 days a year. However, you can opt for a loan that allows you to pay the plant continuing to pay the same amount of the bill for the previous five years (in part to the energy supplier, in part to finance), before the club becomes the actual owner of ' plant

The solution for an ideal illumination has also landed on the tennis courts and it is called LED. Wikipedia informs us that it is Acronym for Light Emitting Diode or light emitting diode and that is an optoelectronic device that uses the optical properties of some semiconductor materials to produce photons through a spontaneous emission phenomenon. That way, you may find it hard to grasp at first but we are talking about half a revolution, even of the sports facilities. In essence, the result promised is to obtain a significantly better quality of illumination than the traditional system (and which is determined from the calculation of the much celebrated lux available), with a much lower expenditure, which can reach 75-80% of a imaginary-scale discounts. With a small detail: the illumination of a tennis court is quite different compared to that of an office, which is different compared to that of a shop, which is different compared to that of a car park. For this reason, it is essential to anticipate the work with a study on the architecture of the system and rely, of course, on someone who specializes in plants led but also in tennis. We have it: it is called Carecaled.

We therefore stuck on the A1, direction Reggio Emilia, to reach the small town of Scandiano. Waiting for us was Francesco Morsiani, a good club player and owner of the leading companies in this field (just to clarify, they manage the entire data center of the Vatican library, essentially all human knowledge, from Dante to Galileo). So let us clear just what it is, giving you numbers and technical data that would convince even the least attentive of the Club Directors: "A field with traditional halide lighting, to obtain 300 lux lamps, the proportion required for an area is approved by the Fit up to A2 Series, consumes up to 5600-5700 watts - explains Morsiani -. We succeed with 1,500 watts, with a minimal annual percentage of loss efficiency, about 1%, while the halide lamps performance falls in a very rapid and very noticeable way". All this translates into a savings easy to calculate: an indoor court in northern Italy who works eight hours a day for 280 days per year and a total of 2240 hours, with a traditional lighting system would have a consumption of 5,600 watts to ' and now, as an average cost per thousand k / watts per hour of 0.25 euro, a charge of EUR 1.40 for each hour of lighting and a total annual cost of 3,136 Euros. With a LED lit plant, it drops down to a consumption of 1,500 watts for a total hourly cost of 0.36 becomes of 806 hours a year. A saving of 2,330 Euros in the field that allows you to write off the investment in just three years, whereas the cost of construction of a mint plant Led is between 6,000 and 6,500 euro.

However, confining the LED issue to only financial savings would be wrong. It should be considered that the technical quality and efficiency

for this implant selection is not trivial matter. "In Emilia Romagna there were only two fields with 300 lux as required by Fit, the CT Bologna and Parma Castellazzo - continues Morsiani -. The circle of Albinea, in the field where they played the second less important match of the Series A1, had decreased to 50 lux, stuff that strives to read a book, let alone argue a ball that reaches 200 km / h. But above all you need a field study on the architecture to guarantee the necessary uniformity." Uniformity is the magic word because if it creates gray areas it would be a disaster. Therefore, the norm Fit speaks of 300 lux of average but with a maximum deviation of 0.65 with the minimum value. Basically, if the average should be 300 lux, the minimum value must not be less than 200. "Generally we get to 0.80 - guarantees Morsiani - but at Scandiano circle we touched 0.92 share. To put it clearly, if outdoor play at noon on a beautiful sunny day, a tree with a couple of branches it's enough to have a lower uniformity. And beware, this calculation should be verified even where the Fit does not require it, that is at least a couple of meters beyond the bottom line, because often you find yourself hitting from there". Indeed, the French federation, always very attentive to detail, requires a check up to three meters over the line, while the ATP stops at one meter. And if a club wanted to then increase the lux available, perhaps because the promotion in A1, or the organization of a professional tournament undertakes to reach 400 lux? No problem: you add a module, and you're done. At Sassuolo Sporting, where in summer you play a high-level Challenger, it has come at an altitude of 500 lux "because we underestimate the issue 10% and we keep "large", because it is better to abound" adds Morsiani. Another significant factor is represented by the substantially zero maintenance costs. Just trestles in the field to replace burnt out bulbs: a plant to professionally-built LEDs performs at a high level for about 60,000 hours, ten times longer than a conventional one, and there is no record of malfunctions. ("We estimate that a lamp may burn out every ten years" says cautiously Morsiani)

EFFICIENCY AND 75% SAVINGS...

EFFICIENCY

LED technology it is also preferable for its great efficiency, since you can easily reach the 300 lux with only 1,500 watts of power consumption. Our only warning is to contact companies specialized in LED lighting for tennis which carry out studies on lamps positioning, to avoid creating annoying shadows on the field.

DURATION

A good LED system can safely last up to 60,000 hours. The maintenance costs are essentially zero (do not burn ever!) And the phase of switching on and off is immediate, without the typical expectations of a system iodide which force to wait several minutes for the lamps to warm up.

And the benefits do not end there. Do you remember the five-minutes wait before the lamps warm and then give light to the court? Prehistory. The on-off game of LEDs is surprising, it's the same of turning the light on in your living room. A system that is profitable especially in covered courts, where the lighting is a necessity for many hours per day and for many months per year. LED technology works exactly the same way in open courts, where consumption is much lower, as well as savings. In this case, it is better to offer our members a more powerful system, rather than chasing a reduction in costs. Anyhow, it is undeniable that this is what many circles tempt, more and more pressured by costs, more and more obliged to a spending review which at the same time must not affect the quality of service. For this reason, an interesting aspect is linked to the possibility of funding, which results in a five-year rental. This means that the club will benefit immediately of a LED plant that improves the quality of service, continuing for five years to pay the same amount as before, but it will pay two different utilities, because the bill will be reduced by approximately 80%. This saving will be pocketed by the financial company that anticipated money. After this period, the club will become the owner of the plant, while the financial company will have gained about the 20% (not bad ...). It is therefore clear that, if a circle owned sufficient resources, would do better to solder directly to the account and write off the costs over three years rather than five; but there is a win-win alternative. In this case, however, it's important to be very very careful when choosing the financial company. Since sports clubs are not obliged to the balance as a joint stock company, they are not bankable, that's why a typical financial company does not want to bear the risk. So what happens often? It happens that a LED lamps retailer trim a poor quality product (not all LEDs are the same) at a very low cost (1500-2000 euro) to be paid in advance, financing the rest. Basically, you pay immediately the material (poor) and smear profits in five years. Everything nice, everything easy, except that if a product is not performing, it becomes totally useless.

The choice of a Led plant seems thus logical and also obvious, because this technology progresses constantly: "In one year we have ascertain an improved performance, of about the 10%, of the component, with a reduction in consumption of a further 6%" confirms Morsiani, who gloats when imagines that LEDs are intended to enlighten the world, not only the tennis courts: "Imagine that the University of Pisa called me to teach a course of lighting for sports facilities to the engineers of the Tuscany region. Me, an accountant graduated with the minimum score..."

LED lighting has many advantages and technology is an on-going progress : since last year, the performance of the component has improved by about 10%, with a reduction in consumption by a further 6%

carecaled

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