C·LUCE
lighting forward

SPORT LIGHTING



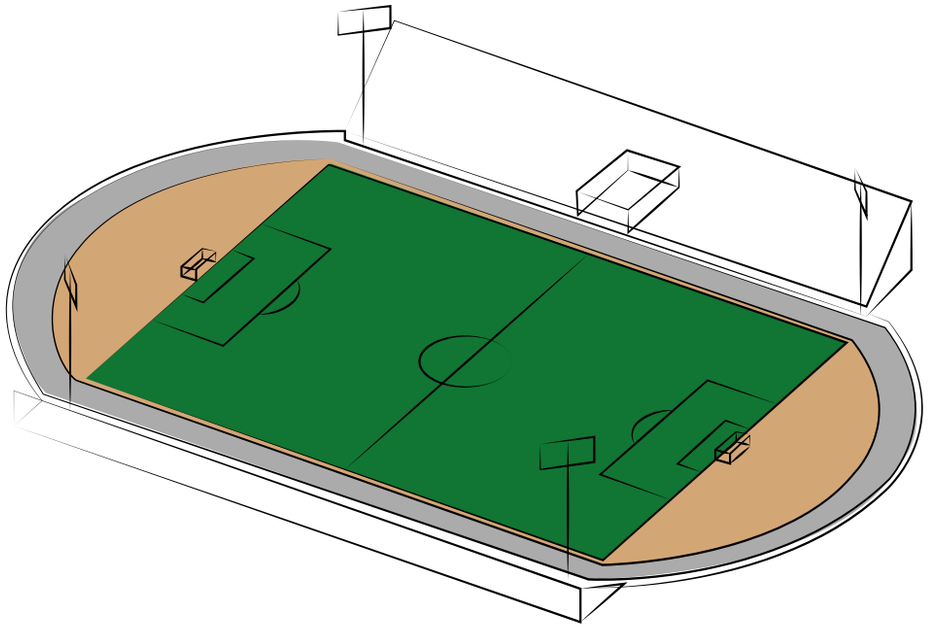
CASE STUDY ANALYSIS

NORME E RACCOMANDAZIONI
Standards and recommendations

EN 12193 per l'illuminazione sportiva / EN 12193 for sports lighting

Il comitato europeo per la standardizzazione ha stabilito una norma per le applicazioni di illuminazione negli impianti sportivi: la norma europea EN 12193.Il suo scopo è quello di definire raccomandazioni e i requisiti per ottenere una illuminazione di alta qualità. Per ciascun'applicazione, la norma definisce:
For each sport The European committee for standardisation has established a norm for sports lighting applications: the European Standard EN 12193.
Its purpose is to enable a good quality sports lighting through recommendations and requirements. For each application, the norm defines:

- **Il livello minimo-medio di illuminamento** / The minimum-average level of illuminance (**lux**)
- **Il livello minimo-medio di uniformità** / The minimum-average level of light uniformity (**U0**)



Definizione delle aree / Area definition
- Area principale (area di gioco necessaria per lo svolgimento di un determinato sport) / Principal area (playing area needed for the performance of a certain sport)
- Area totale (area di sicurezza aggiuntiva al di fuori dell'area principale) / Total area (additional safety area outside the principal area)

Definizione dei punti della griglia / Grid points definition
- Per misurazioni e calcoli / For measurements and calculations
- Per garantire che le prestazioni della luce siano rispettate / To ensure that light performances are respected

Class definition / Grid points definition
- Class I = top-level competition (international, national, top level training)
- Class II = mid-level competition (regional, local, high level training)
- Class III = low-level competition

NORME E RACCOMANDAZIONI
Standards and recommendations

Caratteristiche illuminotecniche consigliate per alcune attività sportive (per specifiche più dettagliate, si faccia riferimento alla Norma UNI EN 12193)
Lighting features recommended for some sports activities (for more detailed specifications, please refer to UNI-Italian national standardization EN 12193)
Informazione estratta da doc CONI / Information extracted from CONI doc

			ALL'APERTO | OUTDOOR (b)		AL COPERTO | INDOOR (b)	
	Spazi-Impianti Sport Facilities	**Livello Attività (a)** Class (a)	**Illuminamento medio (lux)** Average illuminance (lux)	**Uniformità media** Average uniformity	**Illuminamento medio (lux)** Average illuminance (lux)	**Uniformità media** Average illuminance
	**Atletica leggera** Athletics	3 2 1	500 200 100	0.7 0.5 0.5	500 300 200	0.7 0.6 0.5
	**Attività natatorie** Water sports (piscine / swimming pool)	3 2 1	500 300 100	0.7 0.7 0.5	500 300 200	0.7 0.7 0.5
	**Baseball**	3 2 1	750 500 300	0.7 0.5 0,5	750	0.7
	**Calcio** Football	3 2 1	500 200 75	0.7 0.6 0.5		
	Calcio a 5 Football	3 2 1	500 200 100	0.7 0.7 0.5	750 500 200	0.7 0.7 0.5
	**Ciclismo** Ciclismo	3 2 1	500 300 100	0.7 0.7 0.5	750 500 200	0.7 0.7 0.5
	**Ginnastica** Gymnastic	3 2 1			500 300 200	0.7 0.6 0.5



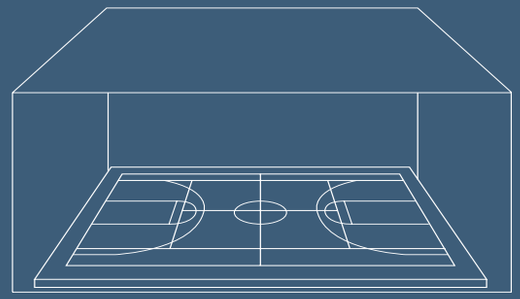


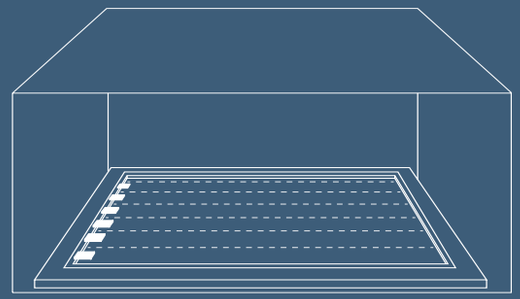
NORME E RACCOMANDAZIONI
Standards and recommendations

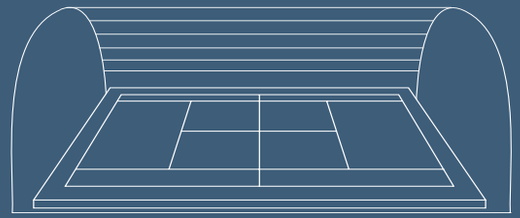
Caratteristiche illuminotecniche consigliate per alcune attività sportive (per specifiche più dettagliate, si faccia riferimento alla Norma UNI EN 12193)
Lighting features recommended for some sports activities (for more detailed specifications, please refer to UNI-Italian national standardization EN 12193)
Informazione estratta da doc CONI / Information extracted from CONI doc

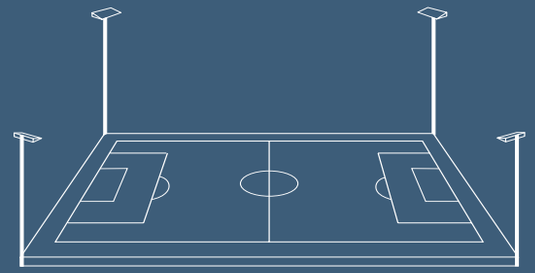
			ALL'APERTO | OUTDOOR (b)		AL COPERTO | INDOOR (b)	
	Spazi-Impianti Sport Facilities	**Livello Attività (a)** Class (a)	**Illuminamento medio (lux)** Average illuminance (lux)	**Uniformità media** Average uniformity	**Illuminamento medio (lux)** Average illuminance (lux)	**Uniformità media** Average illuminance
	**Hockey**	3 2 1	500 200 200	0.7 0.7 0.7	750 500 300	0.7 0.7 0.7
	**Pallacanestro /** **Pallavolo / Pallamano** **Basketball /** **Volleyball / Paddle**	3 2 1	500 200 100	0.7 0.6 0.5	750 500 200	0.7 0.7 0.5
	**Rugby**	3 2 1	500 200 75	0.7 0.6 0.5		
	**Sport equestri** **Equestrian sports**	3 2 1	500 300 200	0.7 0.6 0.5	500 200 100	0.7 0.5 0.5
	**Tennis**	3 2 1	500 300 200	0.7 0.7 0.6	750 500 300	0.7 0.7 0.5
	**Sport sul ghiaccio** **Snow sports**	3 2 1	750 500 200	0.7 0.7 0.5	750 500 300	0.7 0.7 0.7

SPORT FACILITIES
Standards and recommendations









Palazzetti e arene coperte / Indoor stadium

- **Pallavolo agonistico** / Competition level Volleyball
- **Pallacanestro agonistico** / Competition level Basketball
- **Pattinaggio su rotelle** / Roller skating
- **Pattinaggio su ghiaccio** / Ice skating
- **Hockey**
- **Velocità individuale** / Sprint Cycling
- **Ginnastica ritmica e artistica** / Artistic and Rhythmic gymnastics
- **Nuoto** / Swimming

Palestre e coperture pressostatiche / Gyms and airdomes

- **Pallavolo dilettantistico** / Amateur level Volleyball
- **Pallacanestro dilettantistico** / Amateur level Basketball
- **Indoor Tennis**
- **Paddle Tennis** / Indoor Paddle Tennis
- **Pallamano** / Handball

Campi da gioco all'aperto / Fields and greens

- **Tennis outdoor** / Outdoor tennis
- **Hockey su prato** / Field hockey
- **Calcetto a 5 e a 7** / 5 or 7-a-side Football
- **Calcio a 11** / 11-a-side Football
- **Golf**
- **Beach Volleyball**
- **Football e Rugby**
- **Atletica leggera** / Athletics

TENNIS INDOOR

Studio illuminotecnico / Lighting calculation

Palestre e coperture pressostatiche / Gyms and airdomes

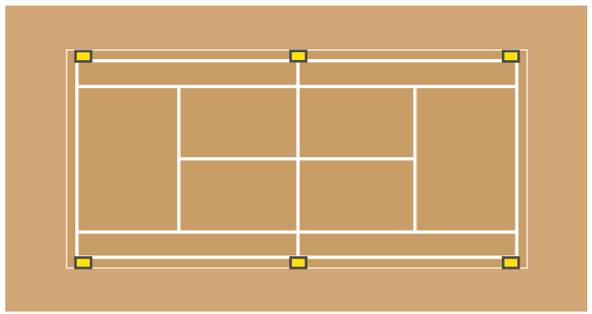
Prodotti / Products:
228643.048 Replay 90° 184W 950mA CRI80 4000K



Dimensioni / Dimensions**:**
36x18mt

Quantità prodotti / Product quantity:
6pcs

Layout:

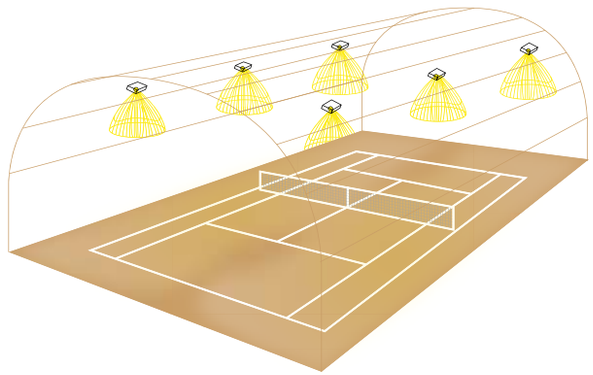


Altezza di installazione / Height of installation:
8mt

Livello Attività / Class:
(According to UNI-Italian national standardization **EN 12193**)
1

Risultati / Results:

Illuminamento medio Emed Average illuminance Emed	**200lx**
Uniformità min/med Uniformity min/med	**0.5**





SPORT LIGHTING

TENNIS INDOOR

Studio illuminotecnico / Lighting calculation

Palestre e coperture pressostatiche / Gyms and airdomes

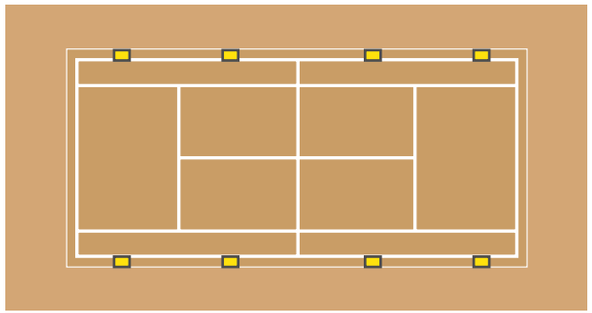
Prodotti / Products:
228643.048 Replay 90° 184W 950mA CRI80 4000K



Dimensioni / Dimensions**:**
36x18mt

Quantità prodotti / Product quantity:
8pcs

Layout:

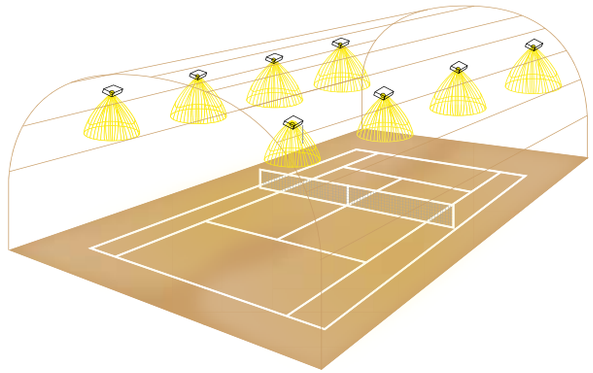


Altezza di installazione / Height of installation:
8mt

Livello Attività / Class:
(According to UNI-Italian national standardization **EN 12193**)
2

Risultati / Results:

Illuminamento medio Emed Average illuminance Emed	**300lx**
Uniformità min/med Uniformity min/med	**0.6**





TENNIS INDOOR

Studio illuminotecnico / Lighting calculation

Palestre e coperture pressostatiche / Gyms and airdomes

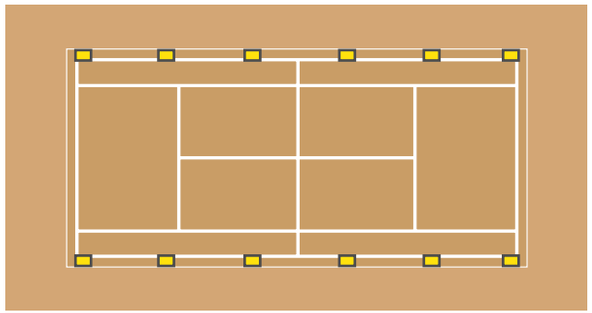
Prodotti / Products:
228643.048 Replay 90° 184W 950mA CRI80 4000K



Dimensioni / Dimensions**:**
36x18mt

Quantità prodotti / Product quantity:
12pcs

Layout:

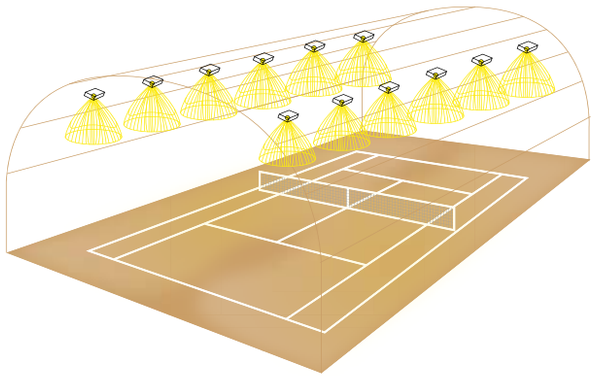


Altezza di installazione / Height of installation:
8mt

Livello Attività / Class:
(According to UNI-Italian national standardization **EN 12193**)
3

Risultati / Results:

Illuminamento medio Emed Average illuminance Emed	**500lx**
Uniformità min/med Uniformity min/med	**0.7**





TENNIS INDOOR

Studio illuminotecnico / Lighting calculation

Palestre e coperture pressostatiche / Gyms and airdomes

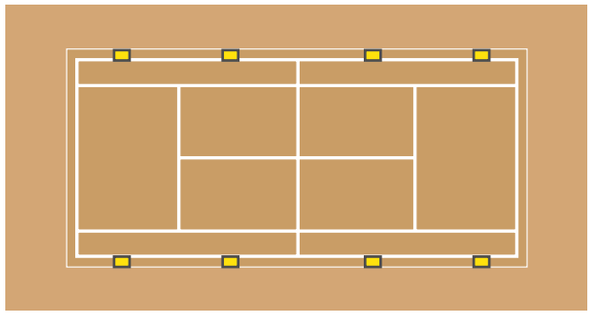
Prodotti / Products:
250543.192 Match AS 450W 830mA
CRI70 4000K



Dimensioni / Dimensions**:**
36x18mt

Quantità prodotti / Product quantity:
8pcs

Layout:

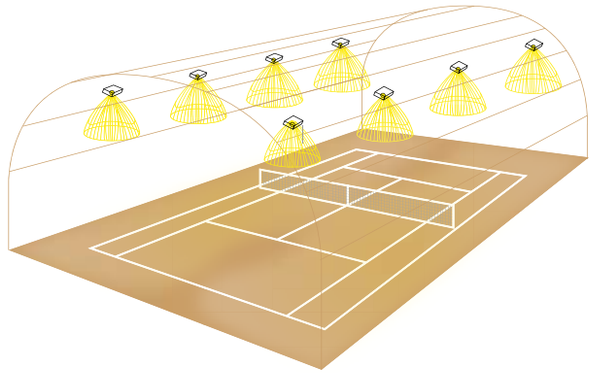


Altezza di installazione / Height of installation:
10mt

Livello Attività / Class:
(According to UNI-Italian national standardization **EN 12193**)
3

Risultati / Results:

Illuminamento medio Emed Average illuminance Emed	**750lx**
Uniformità min/med Uniformity min/med	**0.7**





TENNIS OUTDOOR

Studio illuminotecnico / Lighting calculation

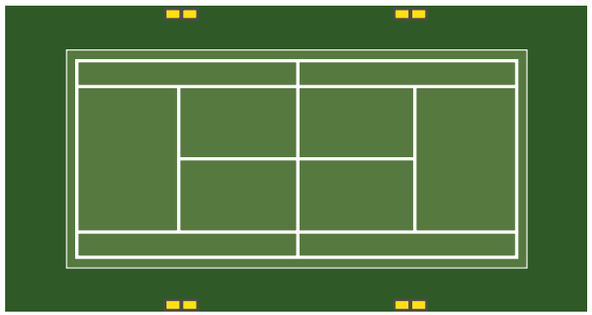
Prodotti / Products:
274543.682 Gemini MAX Pro AS Sport 192W 700mA CRI70 4000K



Dimensioni / Dimensions**:**
36x18mt

Quantità prodotti / Product quantity:
8pcs

Layout:

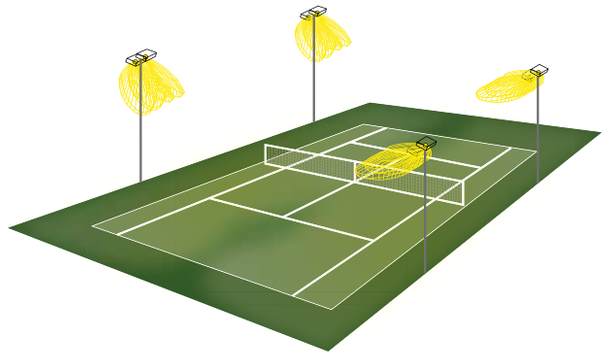


Altezza di installazione / Height of installation:
8mt

Livello Attività / Class:
(According to UNI-Italian national standardization **EN 12193**)
1

Risultati / Results:

Illuminamento medio Emed Average illuminance Emed	**200lx**
Uniformità min/med Uniformity min/med	**0.5**





TENNIS OUTDOOR

Studio illuminotecnico / Lighting calculation

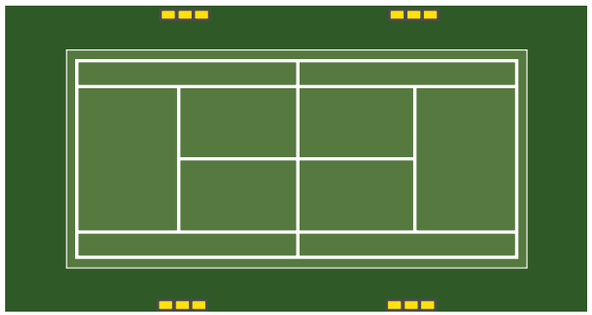
Prodotti / Products:
273543.682 Gemini MAX Pro AS Sport 192W 700mA CRI70 4000K



Dimensioni / Dimensions**:**
36x18mt

Quantità prodotti / Product quantity:
12pcs

Layout:

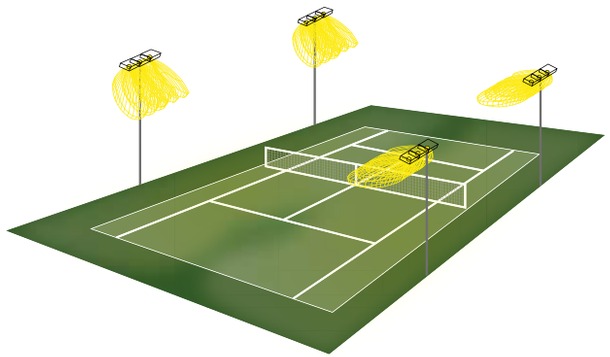


Altezza di installazione / Height of installation:
8mt

Livello Attività / Class:
(According to UNI-Italian national standardization **EN 12193**)
2

Risultati / Results:

Illuminamento medio Emed Average illuminance Emed	**300lx**
Uniformità min/med Uniformity min/med	**0.6**





TENNIS OUTDOOR

Studio illuminotecnico / Lighting calculation

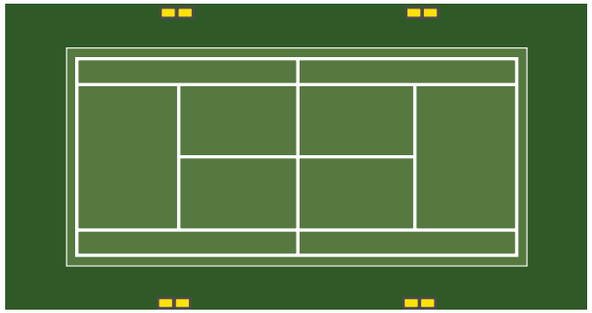
Prodotti / Products:
250543.192 Match AS 450W 830mA
CRI70 4000K



Dimensioni / Dimensions**:**
36x18mt

Quantità prodotti / Product quantity:
8pcs

Layout:

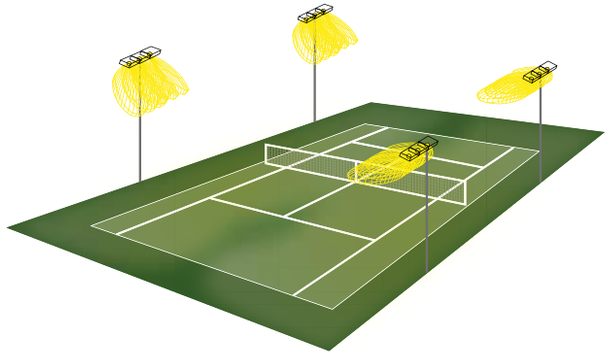


Altezza di installazione / Height of installation:
8mt

Livello Attività / Class:
(According to UNI-Italian national standardization **EN 12193**)
3

Risultati / Results:

Illuminamento medio Emed Average illuminance Emed	**500lx**
Uniformità min/med Uniformity min/med	**0.7**





CALCIO / FOOTBALL

Studio illuminotecnico / Lighting calculation

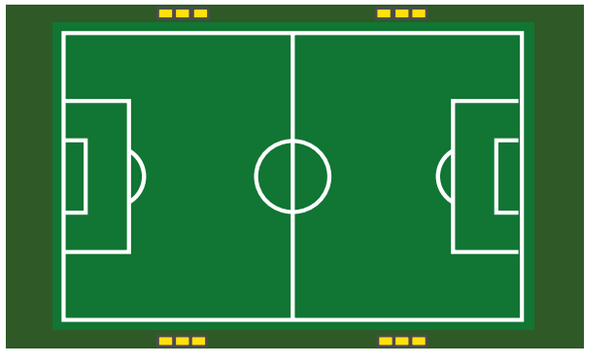
Prodotti / Products:
250543.384 Match AS 900W 830mA
CRI70 4000K



Dimensioni / Dimensions**:**
105x65mt

Quantità prodotti / Product quantity:
12pcs

Layout:



Altezza di installazione / Height of installation:
18mt

Livello Attività / Class:
(According to UNI-Italian national standardization **EN 12193**)
1

Risultati / Results:

Illuminamento medio Emed Average illuminance Emed	**75lx**
Uniformità min/med Uniformity min/med	**0.5**





CALCIO / FOOTBALL

Studio illuminotecnico / Lighting calculation

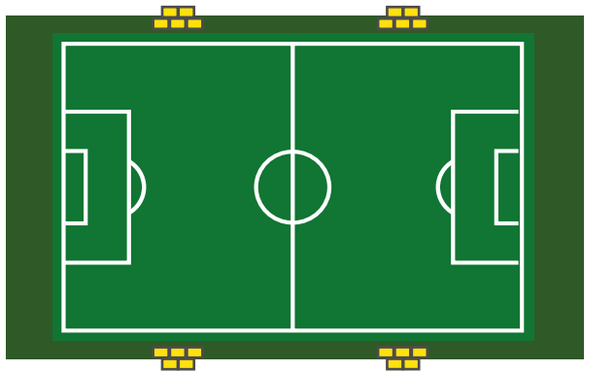
Prodotti / Products:
Match AS / 40° 900W 830mA CRI70 4000K



Dimensioni / Dimensions**:**
105x65mt

Quantità prodotti / Product quantity:
20pcs

Layout:



Altezza di installazione / Height of installation:
18mt

Livello Attività / Class:
(According to UNI-Italian national standardization **EN 12193**)
2

Risultati / Results:

Illuminamento medio Emed Average illuminance Emed	**200lx**
Uniformità min/med Uniformity min/med	**0.6**





CALCIO / FOOTBALL

Studio illuminotecnico / Lighting calculation

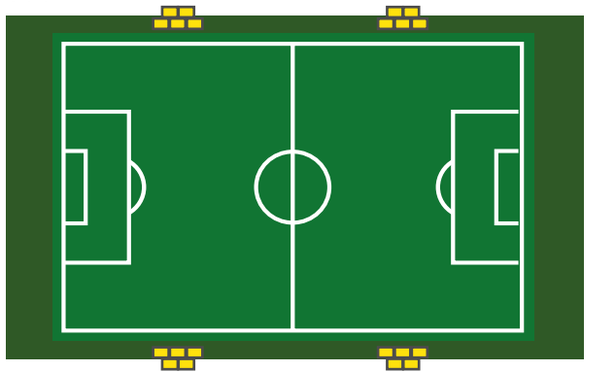
Prodotti / Products:
Match 24° / 15° 900W 830mA CRI70 4000K



Dimensioni / Dimensions:
105x65mt

Quantità prodotti / Product quantity:
44pcs

Layout:



Altezza di installazione / Height of installation:
25mt

Livello Attività / Class:
(According to UNI-Italian national standardization **EN 12193**)
3

Risultati / Results:

Illuminamento medio Emed Average illuminance Emed	**500lx**
Uniformità min/med Uniformity min/med	**0.7**





CALCIO / FOOTBALL

Studio illuminotecnico / Lighting calculation

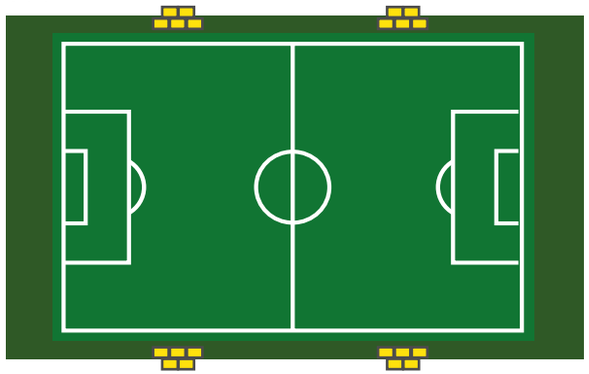
Prodotti / Products:
Match 15° 900W 830mA CRI90 5000K



Dimensioni / Dimensions:
105x65mt

Quantità prodotti / Product quantity:
64pcs

Layout:



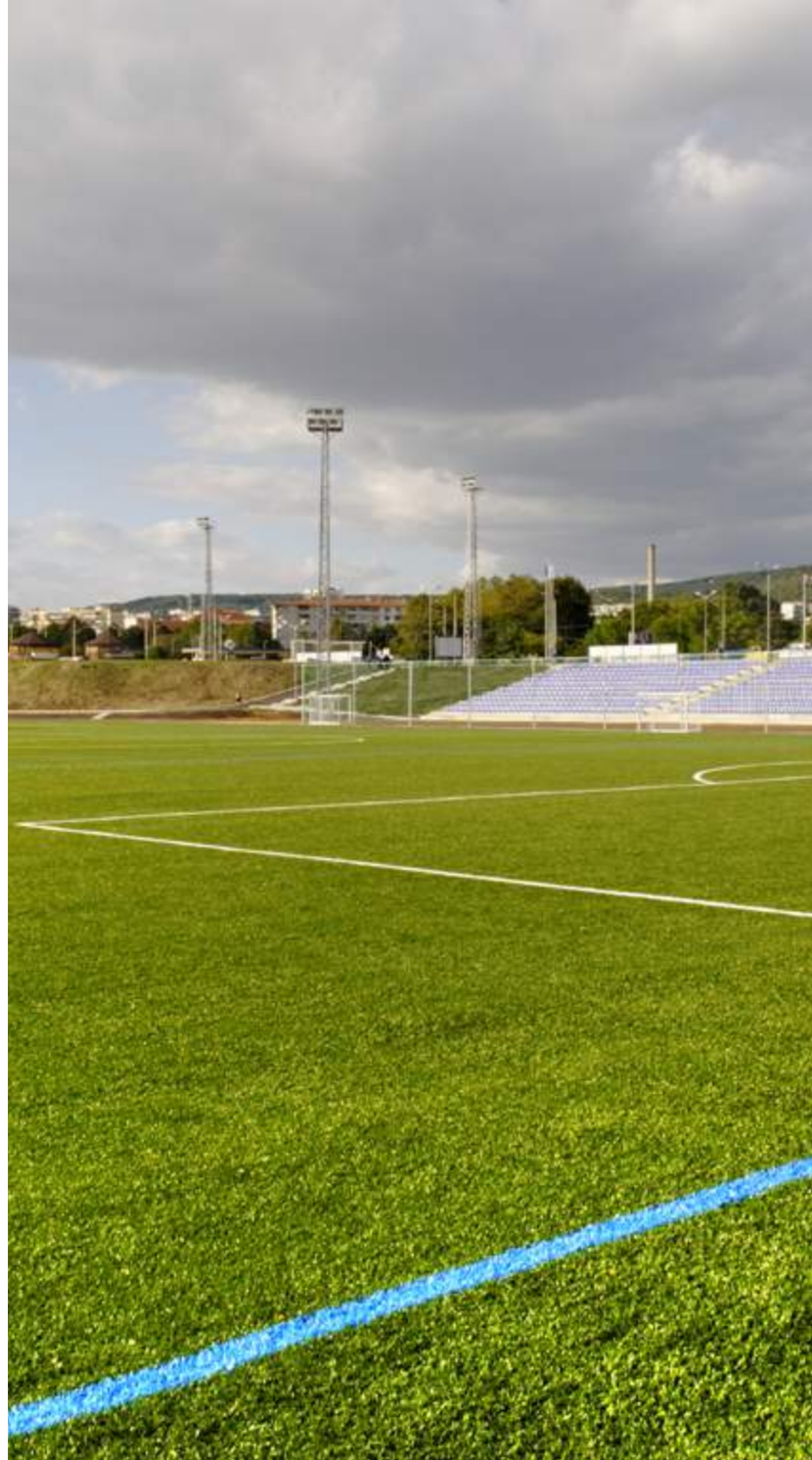
Altezza di installazione / Height of installation:
25mt

Livello Attività / Class:
(According to UNI-Italian national standardization **EN 12193**)
FIFA standards - Riprese TV

Risultati / Results:

Illuminamento medio Emed Average illuminance Emed	**750lx**
Uniformità min/med Uniformity min/med	**0.7**





CALCIO / FOOTBALL

Studio illuminotecnico / Lighting calculation

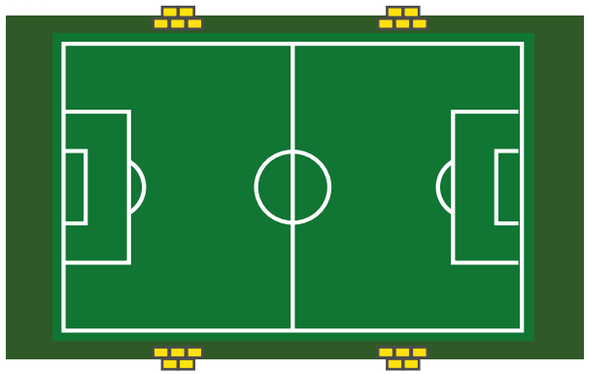
Prodotti / Products:
Match 15° 900W 830mA CRI90 5000K



Dimensioni / Dimensions:
105x65mt

Quantità prodotti / Product quantity:
140pcs

Layout:



Altezza di installazione / Height of installation:
25/30mt

Livello Attività / Class:
(According to UNI-Italian national standardization **EN 12193**)
UEFA standards - Riprese TV

Risultati / Results:

Illuminamento medio Emed Average illuminance Emed	**1500lx**
Uniformità min/med Uniformity min/med	**0.7**





CALCETTO / FIVE-A-SIDE FOOTBALL

Studio illuminotecnico / Lighting calculation

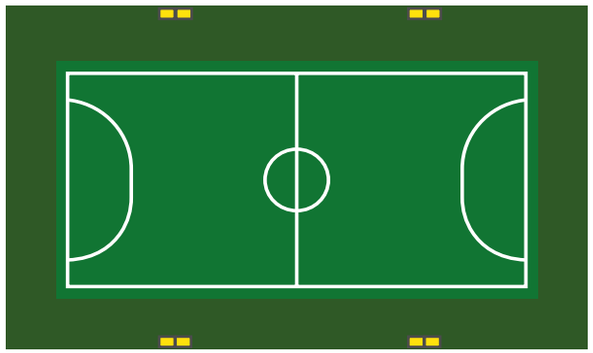
Prodotti / Products:
266543.362 Gemini Pro AS Sport 72W 700mA
CRI70 4000K



Dimensioni / Dimensions**:**
15x25mt

Quantità prodotti / Product quantity:
8pcs

Layout:

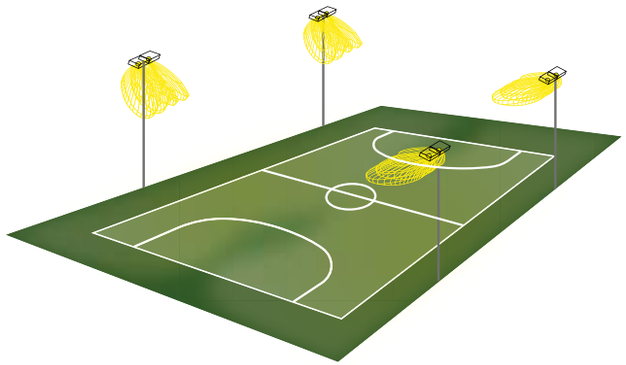


Altezza di installazione / Height of installation:
8mt

Livello Attività / Class:
(According to UNI-Italian national standardization **EN 12193**)
1

Risultati / Results:

Illuminamento medio Emed Average illuminance Emed	**100lx**
Uniformità min/med Uniformity min/med	**0.5**





CALCETTO / FIVE-A-SIDE FOOTBALL

Studio illuminotecnico / Lighting calculation

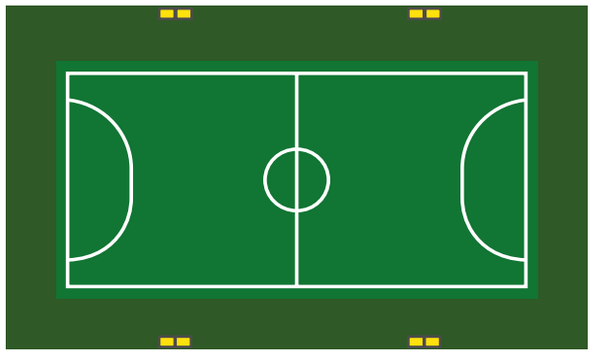
Prodotti / Products:
274543.482 Gemini Max Pro AS Sport 128W 700mA
CRI70 4000K



Dimensioni / Dimensions**:**
15x25mt

Quantità prodotti / Product quantity:
8pcs

Layout:

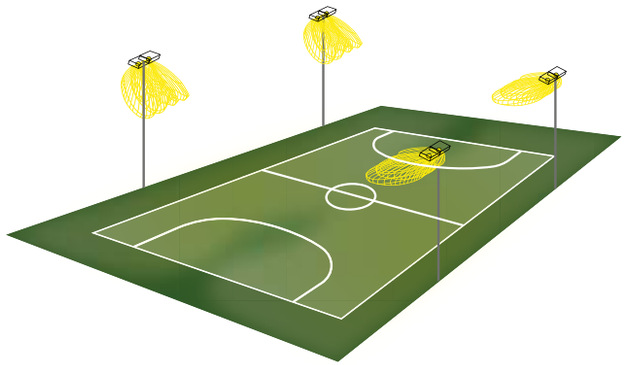


Altezza di installazione / Height of installation:
8mt

Livello Attività / Class:
(According to UNI-Italian national standardization **EN 12193**)
2

Risultati / Results:

Illuminamento medio Emed Average illuminance Emed	**200lx**
Uniformità min/med Uniformity min/med	**0.7**





CALCETTO / FIVE-A-SIDE FOOTBALL

Studio illuminotecnico / Lighting calculation

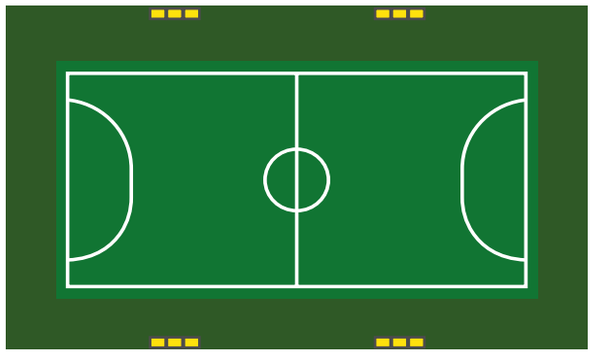
Prodotti / Products:
274543.792 Gemini Max Pro AS Sport 266W 830mA
CRI70 4000K



Dimensioni / Dimensions:
15x25mt

Quantità prodotti / Product quantity:
12pcs

Layout:

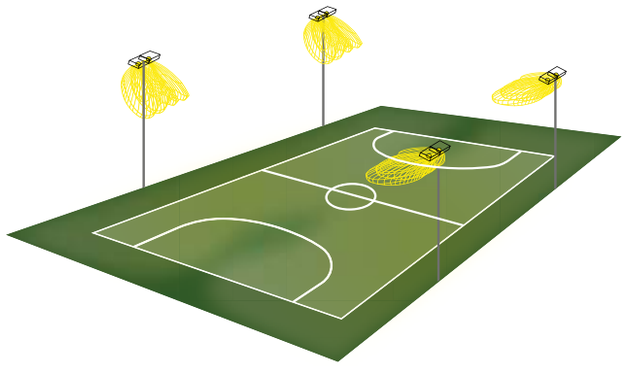


Altezza di installazione / Height of installation:
8mt

Livello Attività / Class:
(According to UNI-Italian national standardization **EN 12193**)
3

Risultati / Results:

Illuminamento medio Emed Average illuminance Emed	**500lx**
Uniformità min/med Uniformity min/med	**0.7**





BASKETBALL / VOLLEYBALL

Studio illuminotecnico / Lighting calculation

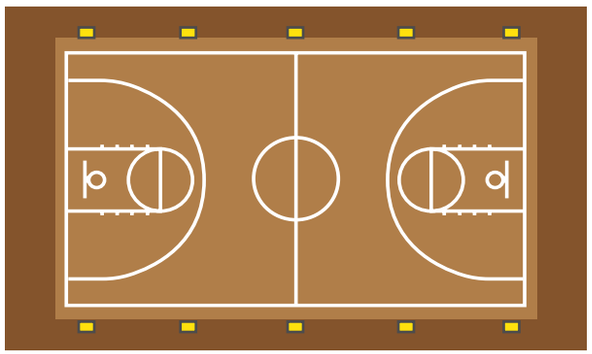
Prodotti / Products:
266543.372 Gemini Pro AS Sport 90W 850mA
CRI70 4000K



Dimensioni / Dimensions:
28x15mt

Quantità prodotti / Product quantity:
10pcs

Layout:

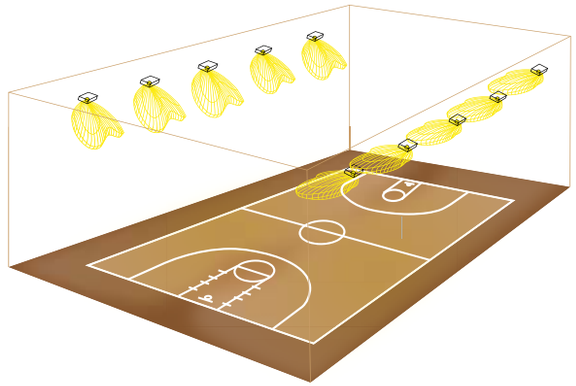


Altezza di installazione / Height of installation:
7mt

Livello Attività / Class:
(According to UNI-Italian national standardization **EN 12193**)
1

Risultati / Results:

Illuminamento medio Emed Average illuminance Emed	**200lx**
Uniformità min/med Uniformity min/med	**0.5**





BASKETBALL / VOLLEYBALL

Studio illuminotecnico / Lighting calculation

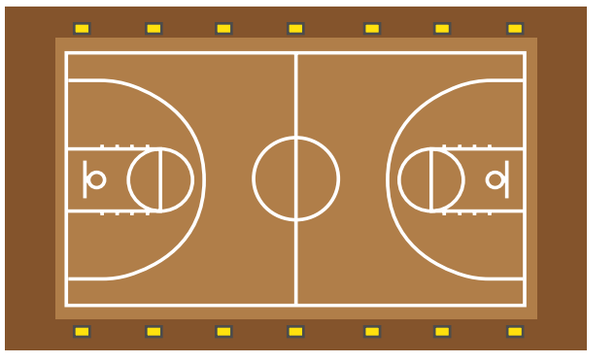
Prodotti / Products:
266543.372 Gemini Pro AS Sport 90W 850mA
CRI70 4000K



Dimensioni / Dimensions**:**
28x15mt

Quantità prodotti / Product quantity:
14pcs

Layout:

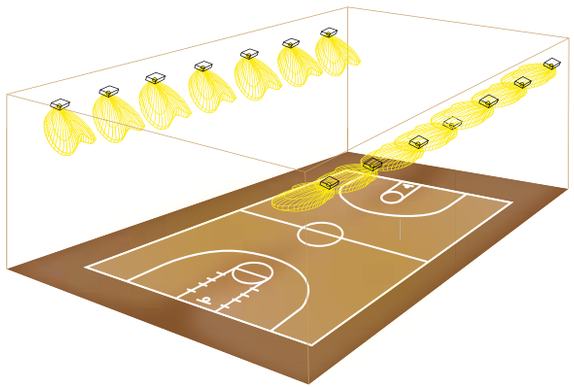


Altezza di installazione / Height of installation:
7mt

Livello Attività / Class:
(According to UNI-Italian national standardization **EN 12193**)
2

Risultati / Results:

Illuminamento medio Emed Average illuminance Emed	**300lx**
Uniformità min/med Uniformity min/med	**0.5**





BASKETBALL / VOLLEYBALL

Studio illuminotecnico / Lighting calculation

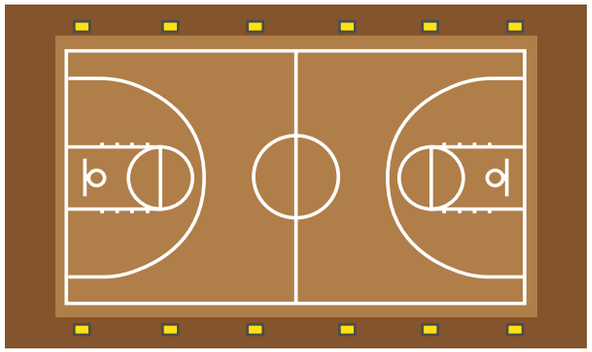
Prodotti / Products:
274543.582 Gemini Max Pro AS Sport 160W 700mA
CRI70 4000K



Dimensioni / Dimensions**:**
28x25mt

Quantità prodotti / Product quantity:
12pcs

Layout:

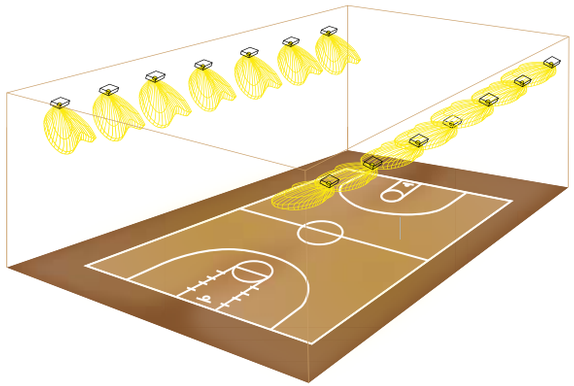


Altezza di installazione / Height of installation:
7mt

Livello Attività / Class:
(According to UNI-Italian national standardization **EN 12193**)
3

Risultati / Results:

Illuminamento medio Emed Average illuminance Emed	**500lx**
Uniformità min/med Uniformity min/med	**0.6**





BASKETBALL / VOLLEYBALL

Studio illuminotecnico / Lighting calculation

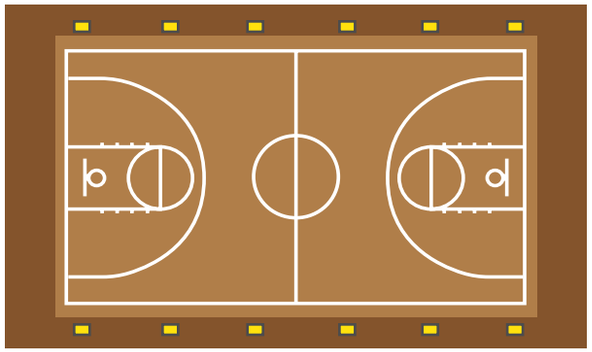
Prodotti / Products:
274543.792 Gemini Max Pro AS Sport 266W 830mA
CRI70 4000K



Dimensioni / Dimensions**:**
28x15mt

Quantità prodotti / Product quantity:
12pcs

Layout:

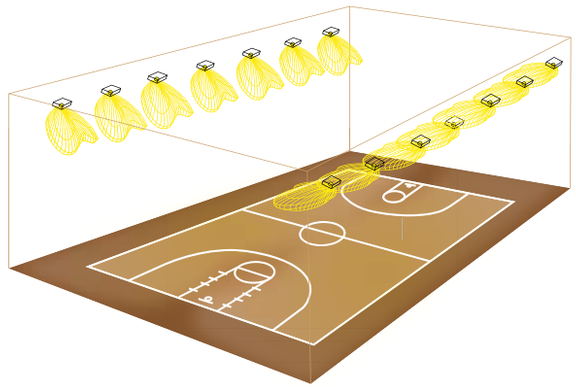


Altezza di installazione / Height of installation:
7mt

Livello Attività / Class:
(According to UNI-Italian national standardization **EN 12193**)
3

Risultati / Results:

Illuminamento medio Emed Average illuminance Emed	**750lx +**
Uniformità min/med Uniformity min/med	**0.7**





BASKETBALL / VOLLEYBALL

Studio illuminotecnico / Lighting calculation

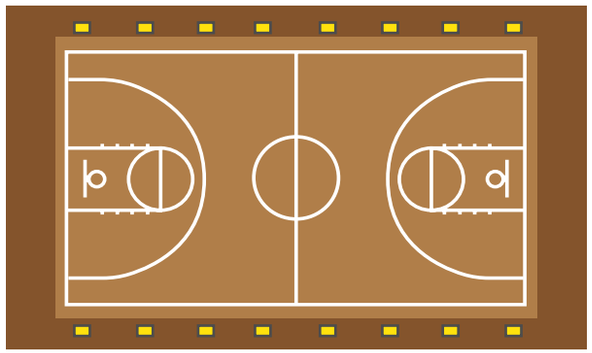
Prodotti / Products:
250543.192 Match AS 450W 830mA CRI70 4000K



Dimensioni / Dimensions**:**
28x15mt

Quantità prodotti / Product quantity:
16pcs

Layout:

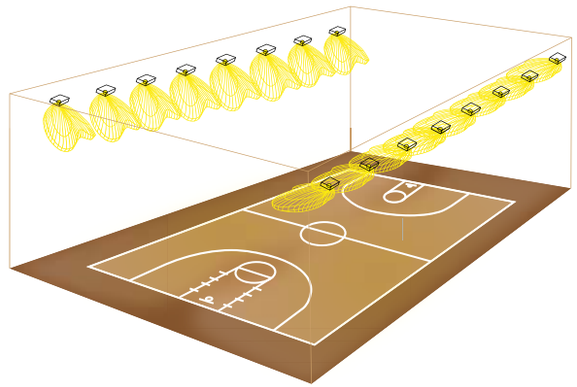


Altezza di installazione / Height of installation:
15mt

Livello Attività / Class:
(According to UNI-Italian national standardization **EN 12193**)
3 - Riprese TV

Risultati / Results:

Illuminamento medio Emed Average illuminance Emed	**1000lx +**
Uniformità min/med Uniformity min/med	**0.7**





NUOTO / SWIMMING INDOOR

Studio illuminotecnico / Lighting calculation

Prodotti / Products:
266543.262 Gemini AS Sport 48W 700mA CRI70 4000K



Dimensioni / Dimensions**:**
25x12.5mt

Quantità prodotti / Product quantity:
8pcs

Layout:

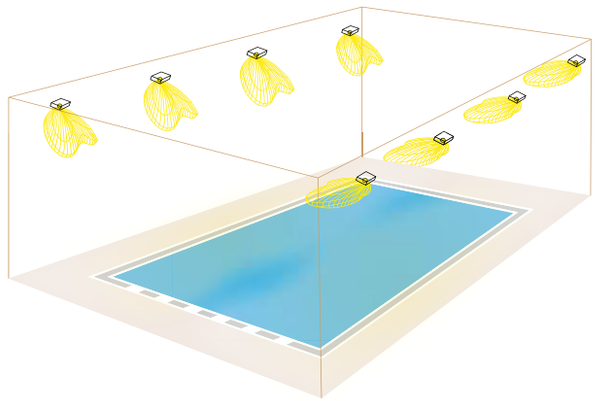


Altezza di installazione / Height of installation:
8mt

Livello Attività / Class:
(According to UNI-Italian national standardization **EN 12193**)
1

Risultati / Results:

Illuminamento medio Emed Average illuminance Emed	**100lx**
Uniformità min/med Uniformity min/med	**0.5**





NUOTO / SWIMMING INDOOR

Studio illuminotecnico / Lighting calculation

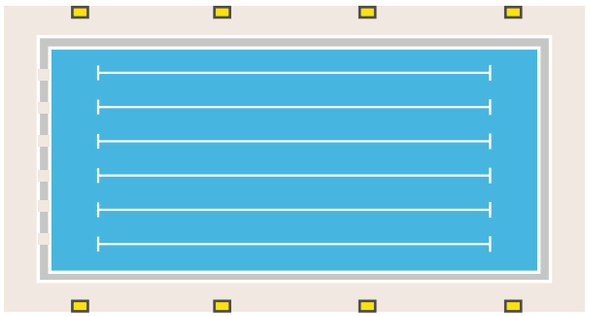
Prodotti / Products:
266543.372 Gemini AS Sport 90W 850mA CRI70 4000K



Dimensioni / Dimensions:
25x12.5mt

Quantità prodotti / Product quantity:
8pcs

Layout:

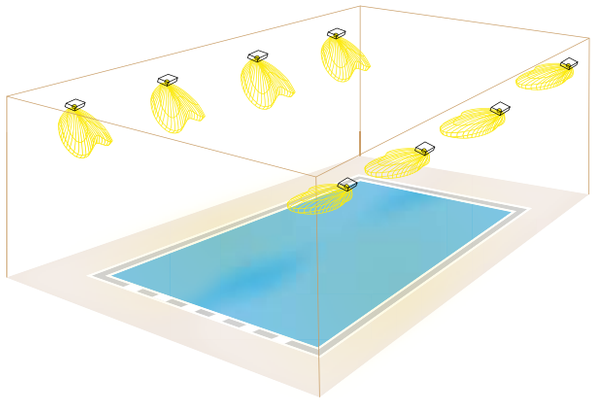


Altezza di installazione / Height of installation:
8mt

Livello Attività / Class:
(According to UNI-Italian national standardization **EN 12193**)
1

Risultati / Results:

Illuminamento medio Emed Average illuminance Emed	**200lx**
Uniformità min/med Uniformity min/med	**0.5**





NUOTO / SWIMMING INDOOR

Studio illuminotecnico / Lighting calculation

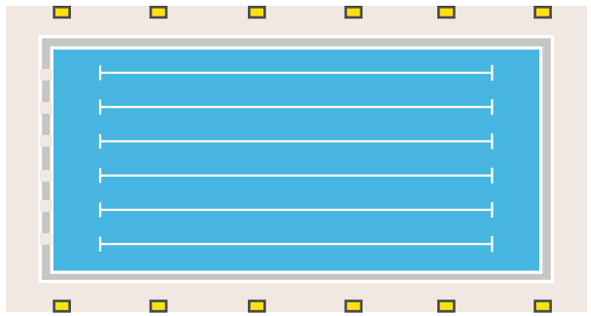
Prodotti / Products:
250543.288 Match AS 675W 830mA
CRI70 4000K



Dimensioni / Dimensions**:**
50x25mt Olimpic swimming pool

Quantità prodotti / Product quantity:
12pcs

Layout:

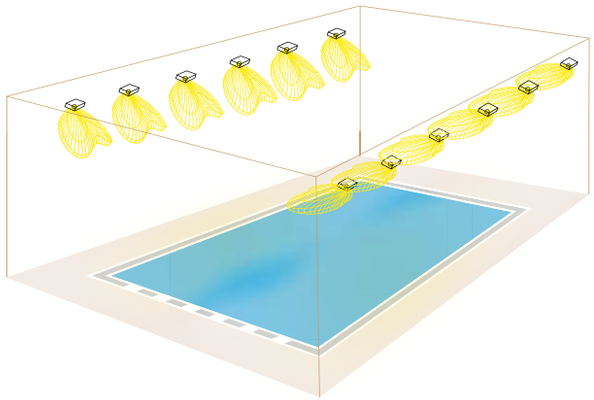


Altezza di installazione / Height of installation:
12mt

Livello Attività / Class:
(According to UNI-Italian national standardization **EN 12193**)
3

Risultati / Results:

Illuminamento medio Emed Average illuminance Emed	**500lx**
Uniformità min/med Uniformity min/med	**0.5**





NUOTO / SWIMMING INDOOR

Studio illuminotecnico / Lighting calculation

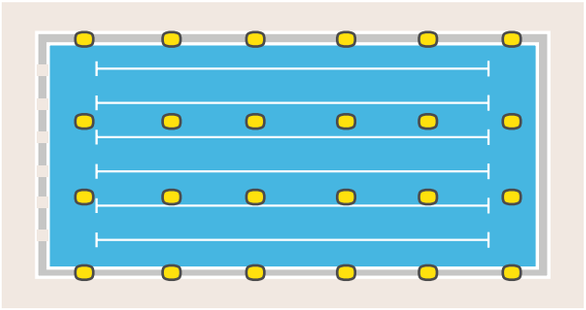
Prodotti / Products:
250543.288 Match 40° 675W 830mA
CRI70 4000K



Dimensioni / Dimensions**:**
50x25mt Olimpic swimming pool

Quantità prodotti / Product quantity:
24pcs

Layout:

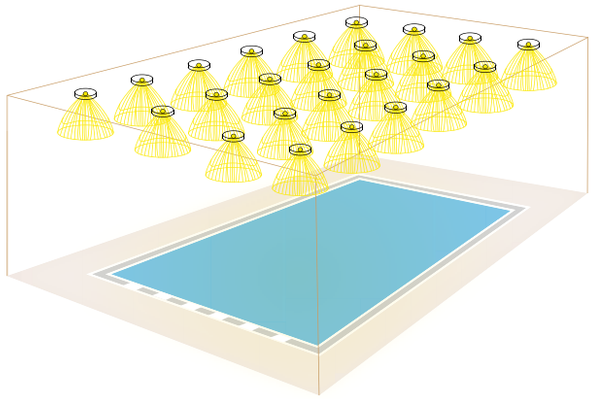


Altezza di installazione / Height of installation:
15mt

Livello Attività / Class:
(According to UNI-Italian national standardization **EN 12193**)
3 - Riprese TV

Risultati / Results:

Illuminamento medio Emed Average illuminance Emed	**1000lx +**
Uniformità min/med Uniformity min/med	**0.7**





HOCKEY

Studio illuminotecnico / Lighting calculation

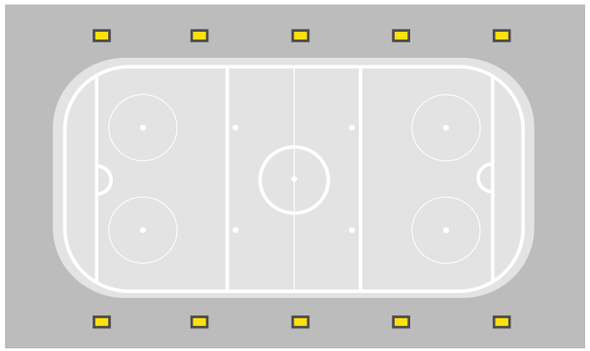
Prodotti / Products:
250643.192 Match AS 450W 830mA
CRI70 4000K



Dimensioni / Dimensions**:**
60x30mt

Quantità prodotti / Product quantity:
10pcs

Layout:

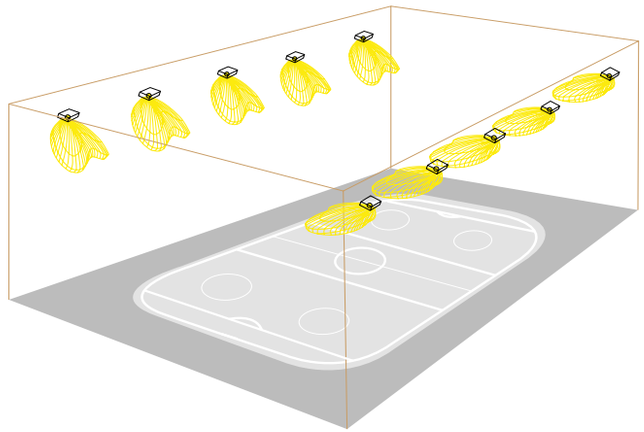


Altezza di installazione / Height of installation:
12mt

Livello Attività / Class:
(According to UNI-Italian national standardization **EN 12193**)
1

Risultati / Results:

Illuminamento medio Emed Average illuminance Emed	**100lx**
Uniformità min/med Uniformity min/med	**0.5**





SPORT LIGHTING

HOCKEY

Studio illuminotecnico / Lighting calculation

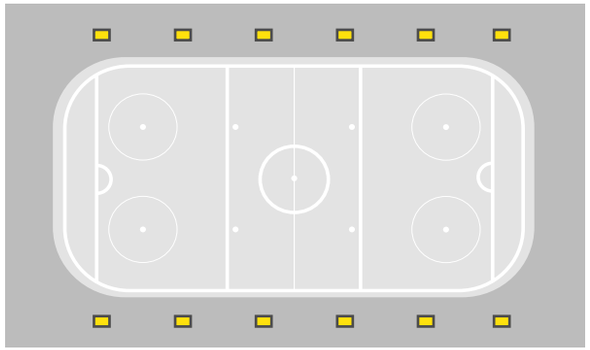
Prodotti / Products:
250643.192 Match AS 450W 830mA
CRI70 4000K



Dimensioni / Dimensions**:**
60x30mt

Quantità prodotti / Product quantity:
12/14pcs

Layout:

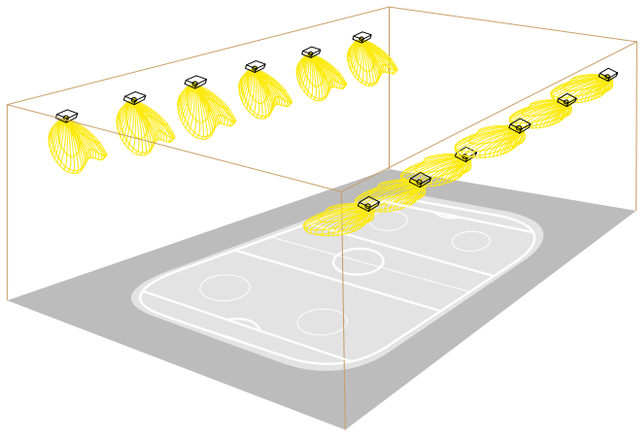


Altezza di installazione / Height of installation:
12mt

Livello Attività / Class:
(According to UNI-Italian national standardization **EN 12193**)
2

Risultati / Results:

Illuminamento medio Emed Average illuminance Emed	**200-300lx**
Uniformità min/med Uniformity min/med	**0.5**





SPORT LIGHTING

HOCKEY

Studio illuminotecnico / Lighting calculation

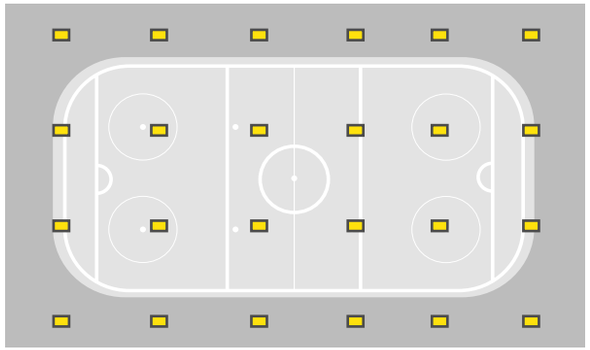
Prodotti / Products:
253543.192 Match 40° 450W 830mA
CRI70 4000K



Dimensioni / Dimensions**:**
60x30mt

Quantità prodotti / Product quantity:
24pcs

Layout:

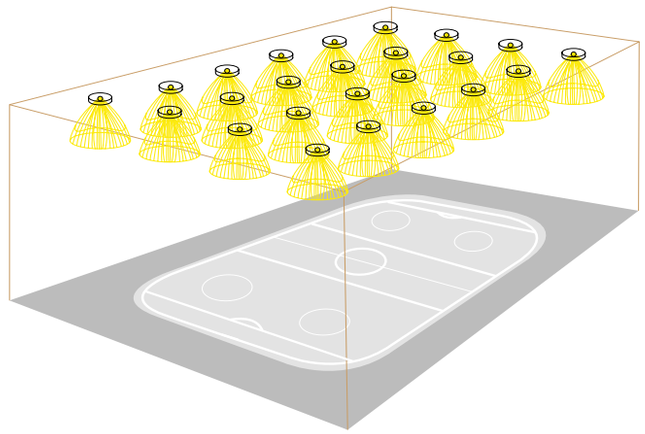


Altezza di installazione / Height of installation:
15mt

Livello Attività / Class:
(According to UNI-Italian national standardization **EN 12193**)
3

Risultati / Results:

Illuminamento medio Emed Average illuminance Emed	**500lx**
Uniformità min/med Uniformity min/med	**0.6**





SPORT LIGHTING

HOCKEY

Studio illuminotecnico / Lighting calculation

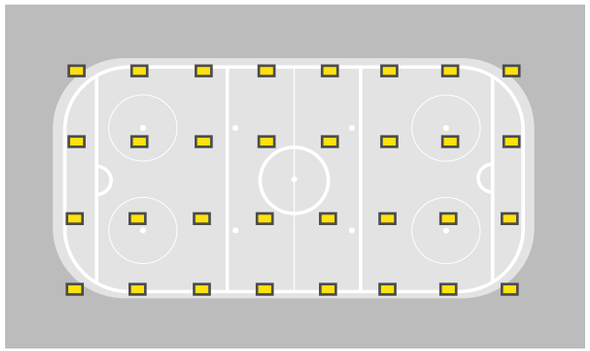
Prodotti / Products:
253543.288 Match 40° 675W 830mA
CRI70 4000K



Dimensioni / Dimensions**:**
60x30mt

Quantità prodotti / Product quantity:
32pcs

Layout:

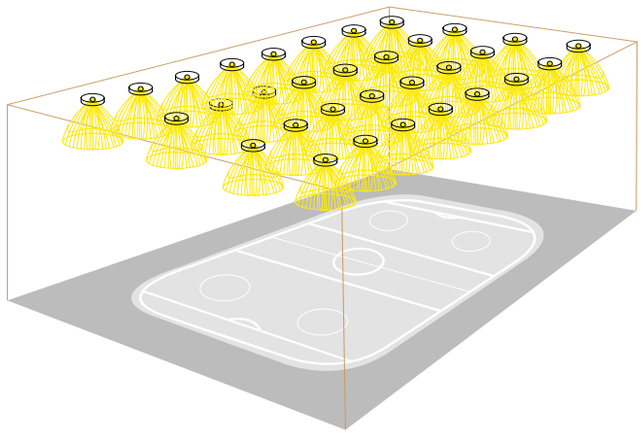


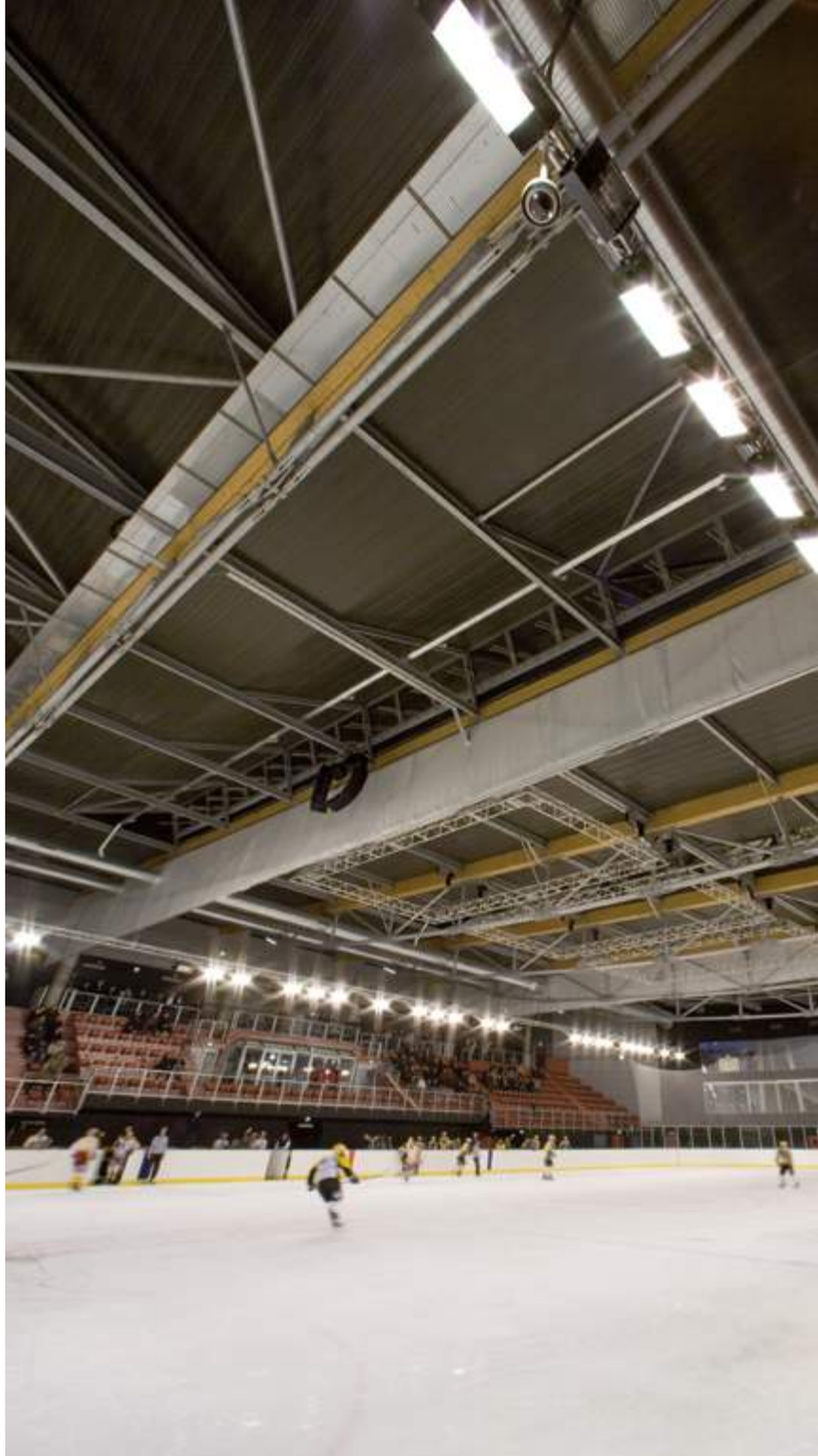
Altezza di installazione / Height of installation:
15mt

Livello Attività / Class:
(According to UNI-Italian national standardization **EN 12193**)
3 - Riprese TV

Risultati / Results:

Illuminamento medio Emed Average illuminance Emed	**1000lx +**
Uniformità min/med Uniformity min/med	**0.7**





SPORT LIGHTING

PADDLE - INDOOR

Studio illuminotecnico / Lighting calculation

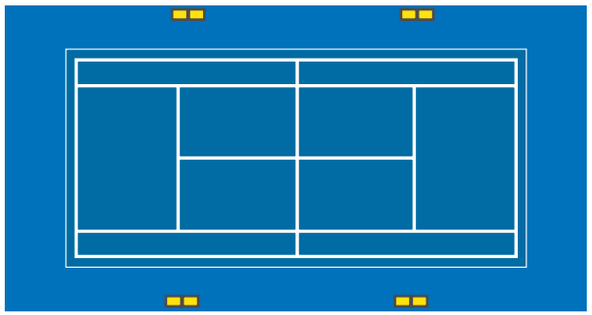
Prodotti / Products:
266543.262 Gemini Pro AS Sport 48W 700mA
CRI70 4000K



Dimensioni / Dimensions**:**
20x10mt

Quantità prodotti / Product quantity:
8pcs

Layout:

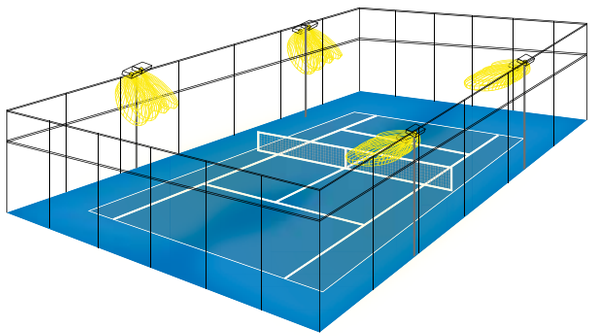


Altezza di installazione / Height of installation:
8mt

Livello Attività / Class:
(According to UNI-Italian national standardization **EN 12193**)
1

Risultati / Results:

Illuminamento medio Emed Average illuminance Emed	**100lx**
Uniformità min/med Uniformity min/med	**0.5**





PADDLE - INDOOR

Studio illuminotecnico / Lighting calculation

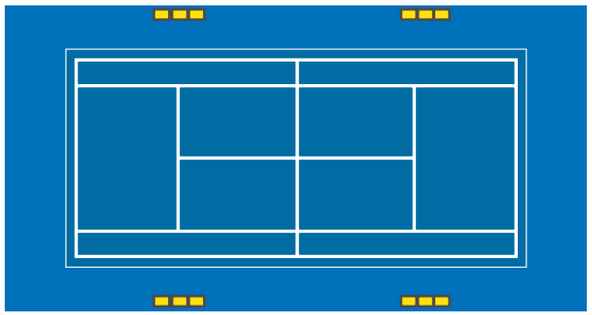
Prodotti / Products:
266543.262 Gemini Pro AS Sport 48W 700mA
CRI70 4000K



Dimensioni / Dimensions**:**
20x10mt

Quantità prodotti / Product quantity:
12pcs

Layout:

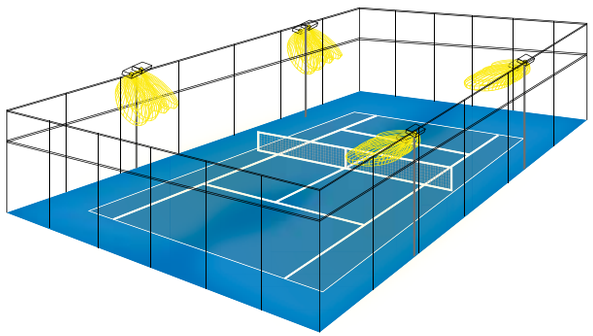


Altezza di installazione / Height of installation:
8mt

Livello Attività / Class:
(According to UNI-Italian national standardization **EN 12193**)
2

Risultati / Results:

Illuminamento medio Emed Average illuminance Emed	**300lx**
Uniformità min/med Uniformity min/med	**0.5**





PADDLE - INDOOR

Studio illuminotecnico / Lighting calculation

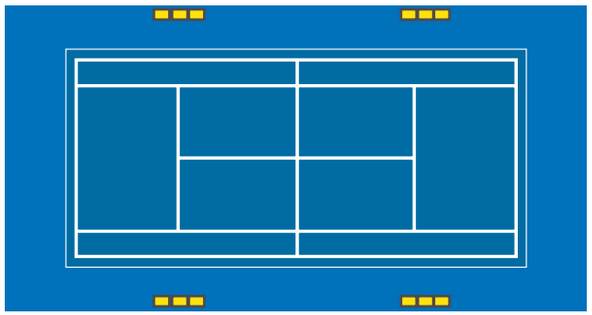
Prodotti / Products:
274543.792 Gemini MAX Pro AS Sport 266W 830mA
CRI70 4000K



Dimensioni / Dimensions**:**
20x10mt

Quantità prodotti / Product quantity:
12pcs

Layout:

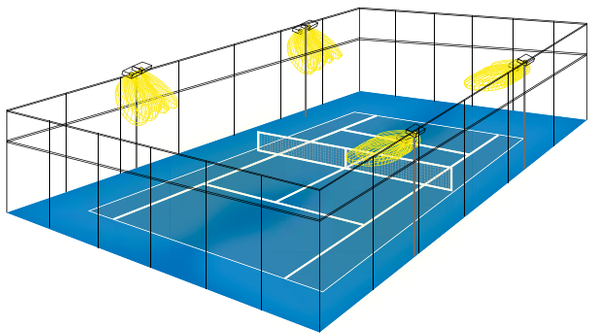


Altezza di installazione / Height of installation:
8mt

Livello Attività / Class:
(According to UNI-Italian national standardization **EN 12193**)
3

Risultati / Results:

Illuminamento medio Emed Average illuminance Emed	**500lx**
Uniformità min/med Uniformity min/med	**0.7**





DATI FOTOMETRICI / PHOTOMETRIC DATA

I dati fotometrici sono un elemento fondamentale per qualsiasi progetto di illuminazione, per tanto devono essere affidabili ed accurati in tutti i loro parametri.
Per caratterizzare in modo completo un apparecchio, bisogna avere una visione precisa delle intensità uscenti in tutte le direzioni.

Le curve fotometriche sono la rappresentazione bidimensionale dell'emissione luminosa di una sorgente o un apparecchio, i valori di intensità associati ad ogni direzione, espressa in candele o candele su kilo-lumen. (Fig.1)

Le curve sono una sezione del solido fotometrico, di solito rappresentate sotto forma di diagrammi polari, riportati su una porzione di piano, con un centro (l'origine) e un asse di riferimento che parte dal centro.
L'origine del diagramma polare rappresenta il punto in cui è situato il corpo illuminante e l'asse di riferimento è rappresentato dalla verticale dell'apparecchio. Per leggere il grafico si procede in questo modo:

1. Si individua l'angolo che ci interessa, si traccia il raggio uscente dall'origine in quella direzione;
2. Si trova il punto di intersezione fra il raggio uscente e il grafico della curva fotometrica;
3. Si misura la distanza tra questo punto e l'origine. Questa misura, rapportata alla scala della curva, rappresenta l'intensità dell'apparecchio per l'angolo cercato. È facilmente leggibile sulla scala graduata riportata in corrispondenza dei cerchi concentrici intorno all'origine.

Il solido fotometrico è la rappresentazione tridimensionale di come una sorgente luminosa emette luce nello spazio e con quale intensità. (Fig.2)

Photometric data are a fundamental element for any lighting project, so they must be reliable and accurate in all their parameters.
To fully characterize a device, it is necessary to have a precise vision of the outgoing intensities in all directions.

Photometric curves are the two-dimensional representation of the light emission of a source or luminaire, the intensity values associated with each direction, expressed in candles or candles on kilo-lumens. (Fig.1)

Curves are a section of the photometric solid, usually represented in the form of polar diagrams, shown on a portion of the plane, with a center (the origin) and a reference axis starting from the center.
The origin of the polar diagram represents the point where the lighting fixture is located and the reference axis is represented by the vertical of the luminaire. To read the graph we proceed as follows:

1. We identify the angle that interests us, we trace the radius coming out of the origin in that direction;
2. The point of intersection between the outgoing radius and the graph of the photometric curve is located;
3. The distance between this point and the origin is measured. This measurement, compared to the scale of the curve, represents the intensity of the device for the angle sought. It is easily readable on the graduated scale shown at the concentric circles around the origin.

The photometric solid is the three-dimensional representation of how a light source emits light into space and with what intensity. (Fig.2)

Fig.1

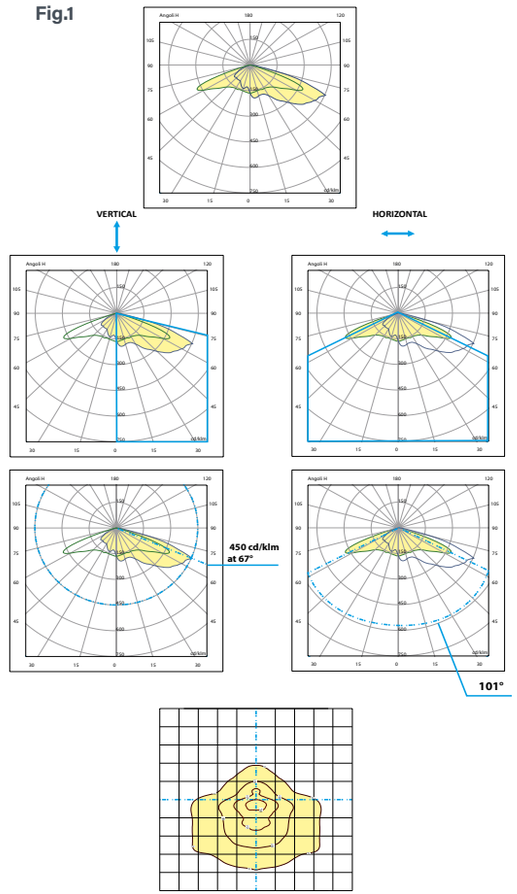
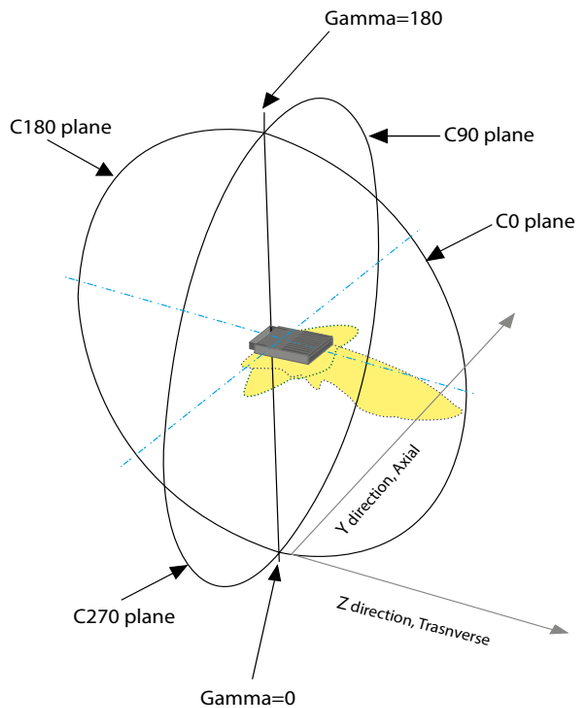


Fig.2

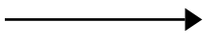


Le sigle C = 0° (90°, 180°, 270°) indicano rispettivamente i piani trasversali di sezione del solido fotometrico e gli angoli di inclinazione rispetto all'asse verticale delle intensità nei vari piani C.
The abbreviations C = 0° (90°, 180°, 270°) indicate respectively the transverse planes of section of the photometric solid and the angles of inclination with respect to the vertical axis of the intensities in the various C planes.

LETTURA PROGETTO ILLUMINOTECNICO / REVIEWING LIGHTING PROJECT

Caratteristiche dell'ambiente

Le caratteristiche dell'ambiente sono disponibili a **pagina 2**, tabelle **1.1-3**



1.1 Informazioni sul Locale

Superficie	Dimensioni [m]	Angolo°	Colore	Coefficiente Riflessione	Illum.Medio [lux]	Luminanza Media [cd/m²]
Soffitto	40.83x11.48	Piano	RGB=255,255,255	80%	163	41.58
Parete 6	3.53x40.63	180°	RGB=192,192,192	60%	208	39.70
Parete 5	3.53x7.08	90°	RGB=192,192,192	60%	206	39.42
Parete 4	3.53x0.25	169°	RGB=192,192,192	60%	0.00	0.00
Parete 3	3.53x5.08	90°	RGB=192,192,192	60%	194	37.11
Parete 2	3.53x40.78	-0°	RGB=192,192,192	60%	248	47.29
Parete 1	3.53x11.33	-90°	RGB=192,192,192	60%	258	49.32
Pavimento	40.83x11.48	Piano	RGB=128,128,128	40%	397	50.54

Dimensioni del Parallelepipedo Contenente il Locale [m]:	40.00x10.65x2.70
Reticolo Punti di Calcolo del Parallelepipedo [m]:	direzione X 0.83 - Y 0.83 - Z 0.83

1.2 Calcolo Energetico (Piano di Lavoro)

Area	419.31 m2
Illuminamento Medio	466.80 lx
Potenza Specifica	3.76 W/m2
Potenza Specifica Illuminotecnica	0.81 W/(m2 * 100lx)
Efficienza Energetica	124.04 (m2*lx)/W
Potenza Totale Utilizzata	1578.00 W

1.3 Parametri di Qualità dell'Impianto

Superficie	Risultati	Medio	Minimo	Massimo	Min/Medio	Min/Max	Medio/Max
Piano di Lavoro (h=0.85 m)	Illuminamento Orizzontale (E)	467 lux	0 lux	700 lux	0.00	0.00	0.67
Pavimento	Illuminamento Orizzontale (E)	397 lux	0 lux	638 lux	0.00	0.00	0.62

LETTURA PROGETTO ILLUMINOTECNICO / REVIEWING LIGHTING PROJECT

Informazioni Apparecchi

Rif = Lettera che identifica il prodotto, utile per rintracciare facilmente la tipologia di apparecchio.
Rif = A letter code used to uniquely identify a product, useful for easily tracking the type of device.

Nome prodotto e caratteristiche
Product name and characteristics

Codice prodotto
Product code

Quantità prodotti
Product quantity

3.1 Informazioni Apparecchi/Rilievi

Rif.	Linea	Nome Apparecchio (Nome Rilievo)	Codice Apparecchio (Codice rilievo)	Apparecchi n.	Rif.Lamp.	Lampade n.
A	ARCADIA	ARCADIA 4X LB 940 27W 350mA (ARCADIA NUOVA OTTICA)	720741.327 (CL2303-24-04I)	49	LMP-A	1
B	ARCADIA	ARCADIA 90° 3X 20W 350mA 940 (ARCADIA NUOVA OTTICA)	720741.421 (CL2303-24-04I)	10	LMP-B	1
C	NEXT	NEXT 11W 450mA (NANOTTICA 1.2ft PC TL 1300/840)	338647.111 (NEXT)	5	LMP-C	1

3.2 Informazioni Lampade

Rif.Lamp.	Tipo	Codice	Flusso lm	Potenza W	Colore K	n.
LMP-A	LED	27W_350mA_3X	3505	27	4000	49
LMP-B	LED	90°_20W_350mA_3X	2630	20	4000	10
LMP-C	LED	11W 450mA	1465	11	4000	5

Caratteristiche prodotto (W, flusso, K)
Product characteristics (W, output, K)

LETTURA PROGETTO ILLUMINOTECNICO / REVIEWING LIGHTING PROJECT

Apparecchi in emergenza

Gli apparecchi di emergenza in un progetto illuminotecnico sono dispositivi di illuminazione specifici, progettati per garantire un livello minimo di illuminazione in caso di guasto dell'impianto elettrico principale.

A cosa servono?
- Sicurezza
- Continuità operativa

Normativa:
L'installazione degli apparecchi di emergenza è regolata da specifiche normative che definiscono i requisiti minimi di illuminamento, i tempi di autonomia e le modalità di verifica. In Italia, la norma di riferimento è la **UNI EN 1838**.

Calcolo illuminotecnico App.in emergenza

X = PRODOTTO ACCESSO

3.4 Tabella Riepilogativa Puntamenti

Struttura	Fila	Colonna	Rif. 2D	On	Posizione Apparecchi X[m] Y[m] Z[m]	Rotazione Apparecchi X° Y° Z°	Puntamenti X[m] Y[m] Z[m]	R.Asse °	Coeff. Mant.	Rif.
			A-1	X	1.27;9.49;2.70	0.0;0.0;0.0	1.27;9.49;0.00	0	0.90	A
			A-19	X	13.26;5.87;2.70	0.0;0.0;0.0	13.26;5.87;0.00	0	0.90	A
			A-22	X	16.57;5.86;2.70	0.0;0.0;0.0	16.57;5.86;0.00	0	0.90	A
			A-2	X	1.27;7.09;2.70	0.0;0.0;0.0	1.27;7.09;0.00	0	0.90	A
			A-3	X	1.27;4.69;2.70	0.0;0.0;0.0	1.27;4.69;0.00	0	0.90	A
			A-4	X	1.27;2.29;2.70	0.0;0.0;0.0	1.27;2.29;0.00	0	0.90	A
			A-5	X	4.27;9.49;2.70	0.0;0.0;0.0	4.27;9.49;0.00	0	0.90	A
			A-7	X	7.27;9.49;2.70	0.0;0.0;0.0	7.27;9.49;0.00	0	0.90	A
			A-8	X	10.87;9.49;2.70	0.0;0.0;0.0	10.87;9.49;0.00	0	0.90	A
			A-9	X	4.27;7.09;2.70	0.0;0.0;0.0	4.27;7.09;0.00	0	0.90	A
			A-11	X	7.27;7.09;2.70	0.0;0.0;0.0	7.27;7.09;0.00	0	0.90	A
			A-12	X	10.87;7.09;2.70	0.0;0.0;0.0	10.87;7.09;0.00	0	0.90	A
			A-13	X	4.27;4.69;2.70	0.0;0.0;0.0	4.27;4.69;0.00	0	0.90	A
			A-14	X	4.27;2.29;2.70	0.0;0.0;0.0	4.27;2.29;0.00	0	0.90	A
			A-28	X	13.30;3.77;2.70	0.0;0.0;0.0	13.30;3.77;0.00	0	0.90	A
			A-29		14.44;1.49;2.70	0.0;0.0;0.0	14.44;1.49;0.00	0	0.90	A
			A-30		12.00;7.72;2.70	0.0;0.0;0.0	12.00;7.72;0.00	0	0.90	A
			A-31		13.00;10.04;2.70	0.0;0.0;0.0	13.00;10.04;0.00	0	0.90	A
			A-23		21.07;5.86;2.70	0.0;0.0;0.0	21.07;5.86;0.00	0	0.90	A
			A-24		25.57;5.86;2.70	0.0;0.0;0.0	25.57;5.86;0.00	0	0.90	A
			A-25		30.07;5.86;2.70	0.0;0.0;0.0	30.07;5.86;0.00	0	0.90	A
			A-26		34.57;5.86;2.70	0.0;0.0;0.0	34.57;5.86;0.00	0	0.90	A
			A-27		39.07;5.86;2.70	0.0;0.0;0.0	39.07;5.86;0.00	0	0.90	A
			A-32		23.48;7.94;2.70	0.0;0.0;0.0	23.48;7.94;0.00	0	0.90	A
			A-34		27.08;7.94;2.70	0.0;0.0;0.0	27.08;7.94;0.00	0	0.90	A
			A-35		23.48;10.34;2.70	0.0;0.0;0.0	23.48;10.34;0.00	0	0.90	A
			A-37		27.08;10.34;2.70	0.0;0.0;0.0	27.08;10.34;0.00	0	0.90	A
			A-38		22.56;1.47;2.70	0.0;0.0;0.0	22.56;1.47;0.00	0	0.90	A
			A-39		25.56;1.47;2.70	0.0;0.0;0.0	25.56;1.47;0.00	0	0.90	A
			A-40		28.56;1.47;2.70	0.0;0.0;0.0	28.56;1.47;0.00	0	0.90	A
			A-41		28.56;3.80;2.70	0.0;0.0;0.0	28.56;3.80;0.00	0	0.90	A
			A-42		25.56;3.87;2.70	0.0;0.0;0.0	25.56;3.87;0.00	0	0.90	A
			A-43		22.56;3.80;2.70	0.0;0.0;0.0	22.56;3.80;0.00	0	0.90	A
			A-44		19.56;3.80;2.70	0.0;0.0;0.0	19.56;3.80;0.00	0	0.90	A

Emergency lighting fixtures in a lighting design project are specialized lighting devices designed to provide a minimum level of illumination in the event of a primary power supply failure.

What are they used for?
- Safety
- Operational continuity

Regulations:
The installation of emergency lighting fixtures is governed by specific regulations that define the minimum lighting requirements, autonomy times, and verification procedures. In Italy, the reference standard is **UNI EN 1838**.

LETTURA PROGETTO ILLUMINOTECNICO / REVIEWING LIGHTING PROJECT

Risultati


4.4 Valori di Illuminamento su: Ufficio tipo

O (x:21.50 y:0.64 z:0.85)	Risultati	Medio	Minimo	Massimo	Min/Medio	Min/Max	Medio/Max
DX:0.83 DY:0.83	Illuminamento Orizzontale (E)	580 lux	426 lux	700 lux	0.74	0.61	0.83

Tipo Calcolo: Dir.+Indir.(7 Interriflessioni)

Scala 1/65 C.U.=0.118


4.5 Curve Isolux su: Ufficio tipo_1

O (x:21.50 y:0.64 z:0.85)	Risultati	Medio	Minimo	Massimo	Min/Medio	Min/Max	Medio/Max
DX:0.83 DY:0.83	Illuminamento Orizzontale (E)	580 lux	426 lux	700 lux	0.74	0.61	0.83

Tipo Calcolo: Dir.+Indir.(7 Interriflessioni)

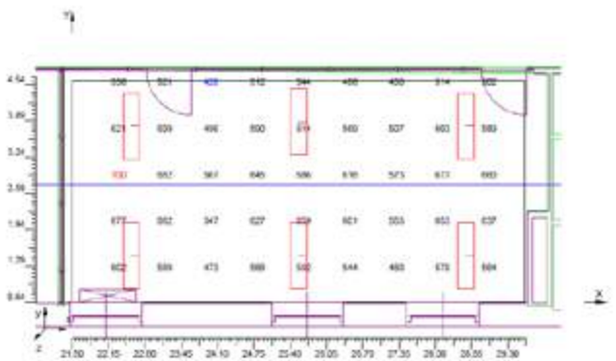
Scala 1/65

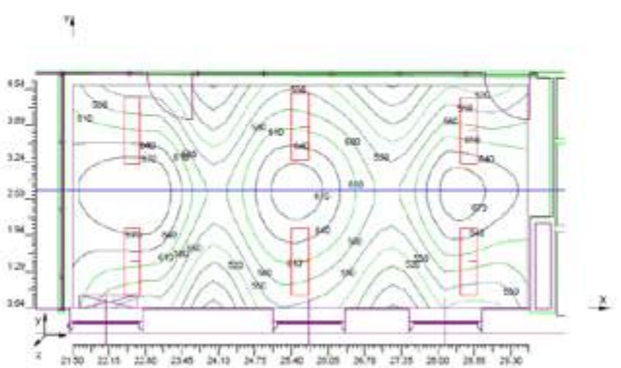

4.6 Diagramma a Spot degli Illuminamenti sul: Ufficio tipo_1_1

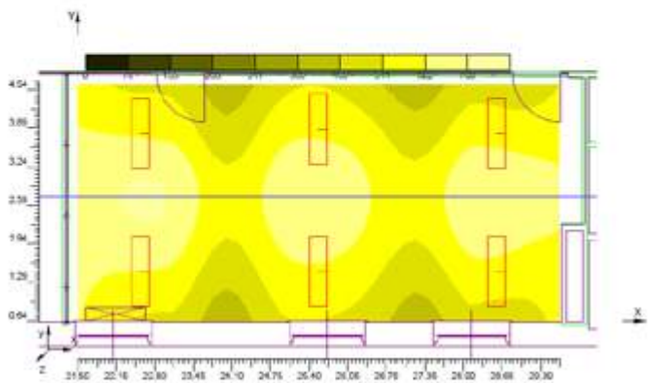
O (x:21.50 y:0.64 z:0.85)	Risultati	Medio	Minimo	Massimo	Min/Medio	Min/Max	Medio/Max
DX:0.83 DY:0.83	Illuminamento Orizzontale (E)	580 lux	426 lux	700 lux	0.74	0.61	0.83

Tipo Calcolo: Dir.+Indir.(7 Interriflessioni)

Scala 1/65







Risultati Illuminamento orizzontale / verticale Min/Medio

Horizontal/Vertical Illuminance: Minimum/ Average

C·LUCE
lighting forward

SPORT LIGHTING

C Luce Srl
Via Marmolada 5/11 20060 Truccazzano – MI
Tel. +39.02.944.35.095 | www.cluce.it | info@cluce.it

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