FRENCH ORDER DATED 27/12/2018

Concerning the prevention, reduction, and limiting of light pollution.

MINDFUL LIGHTING: A KEY AMBITION

When our company committed itself to a Corporate Social Responsibility policy in 2015, two main observations came to the forefront:

- Most of our impact on society and the environment comes from how our products are used.
- We have more and more tools available to reduce this impact.

All of our stakeholders were very quickly informed of our course of action: Ragni promotes the responsible use of artificial light, and always incorporates questions related to energy and biodiversity problems into its projects.

RECOMMENDED READING:

› The essential concept of mindful lighting

› Responsible lighting - lighting that respects all ecosystems

Ragni is a signatory of the United Nations Global Compact, and encourages all public lighting stakeholders to support the Global Sustainable Development Goals.

RAGNI

SUSTAINABLE DEVELOPMENT GOALS

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

13 CLIMATE ACTION

14 LIFE BELOW WATER

15 LIFE ON LAND

WE SUPPORT UN GLOBAL COMPACT

www.ragni.com

CONTENTS

OBSERVATIONS

LIVING THINGS AND BIODIVERSITY

Outdoor artificial light contributes to the deterioration and fragmentation of natural habitats (disorientation, drop in pollination, physical barriers, altering relationships between species, etc.). We are witnessing the sixth massive decline in biodiversity (80% of insects have disappeared in the last 30 years).
The priority is to protect and restore ecological continuities (biodiversity reservoirs, corridors, travel routes) by setting up Green and Blue Belts and darkness corridors.

ASTRONOMY AND OBSERVATION OF THE NIGHT SKY

The artificial light associated with urban infrastructures is diffuse. It creates a light halo that makes stargazing very difficult. Several associations are working to make the public authorities and lighting professionals aware of sky quality. Ragni wishes to reaffirm its willingness to hold a dialogue with these organisations. The aim is to cooperate and implement planning solutions to control lighting, because efficiently renovating lighting systems is always a better choice than totally extinguishing all the lights.

REGULATORY GUIDELINES FOR THE FRENCH TERRITORY

- Grenelle II Law (Law No. 2010-788) – Art. 173: Regulatory measure aiming to prevent, reduce, or limit light pollution.
- Decree No. 2011-831 dated 12/07/2011 concerning the prevention and limiting of light pollution.
- Standard XP X90-013 Outdoor light pollution – Calculation and monitoring methods.
- Decree No. 2012-118 dated 30 January 2012 concerning outdoor advertising, signs and signposting.
- Order dated 25 January 2013 concerning night-time lighting of non-residential buildings.
- Law No. 2016-1087 dated 8 August 2016 for the restoration of biodiversity, nature, and landscapes.
- Order dated 28/12/2018 concerning the prevention, reduction, and limitation of light pollution.
- Order dated 27 December 2018 defining the list and the perimeter of exceptional astronomical observation sites in application of Article R. 583-4 of the Environmental Code.

RESPONSIBILITIES

The effects of uncontrolled artificial lighting are of concern to everyone. Humans need light to sustain their social and economic activities, but fauna and flora need darkness to maintain their quality of life and to promote their conservation.
Sustainable development requires everyone to share the responsibility for reconciling the needs of all the ecosystems. Public policy stands at the forefront of this action, but the lighting of private areas must also be considered. That is why Ragni wants to educate all audiences about the problem of light pollution, and to point out that the most effective and sustainable actions are to replace obsolete light sources with LEDs, and to install lighting management solutions.

YOUR QUESTIONS

Concrete answers

The decree of 27/12/2018 is a French law. Its objective is to limit light pollution in the territory concerned. At Ragni, we believe that these principles should be applied in all countries.

Q Should certain luminaires be completely banned from our projects?

A **No.** Every luminaire can have its place; what's important is to carefully define its use in advance, according to the project.

Q Is there any luminaire that satisfies all the criteria in every case?

A **No.** Even a luminaire that appears to satisfy all the criteria can perform outside the accepted limits defined in the order if it is badly installed or misused.

Q I have projects already in progress! Should I reconsider my plans?

A **No.** The order applies to installations that will take place after 1st January 2020 (Art. 8).

Q My system includes some luminaires that do not satisfy the requirements. Must I replace them??

A **No.** The order is not retroactive for luminaires with ULR below 50%. On the other hand, above 50%, they will need to be replaced no later than 1st January 2025 (Art. 8).

Q If there is a dispute concerning the choice of project type, who has the last word?

A **The French Environmental Code designates the mayor as the competent authority** in upholding the provisions related to public lighting. As a last resort, the prefect has the last word.

Q What about the lighting of PRM zones?

A **The French regulations concerning PRM lighting have not changed.** The lighting of PRM zones is specified by the order dated 24/12/2015 concerning accessibility of multiple dwelling buildings (Article 10) and by the order dated 20/04/2017 concerning the accessibility of buildings open to the public for persons of reduced mobility (Article 14).

Q I want to light a monument in my town all night long. What can I do?

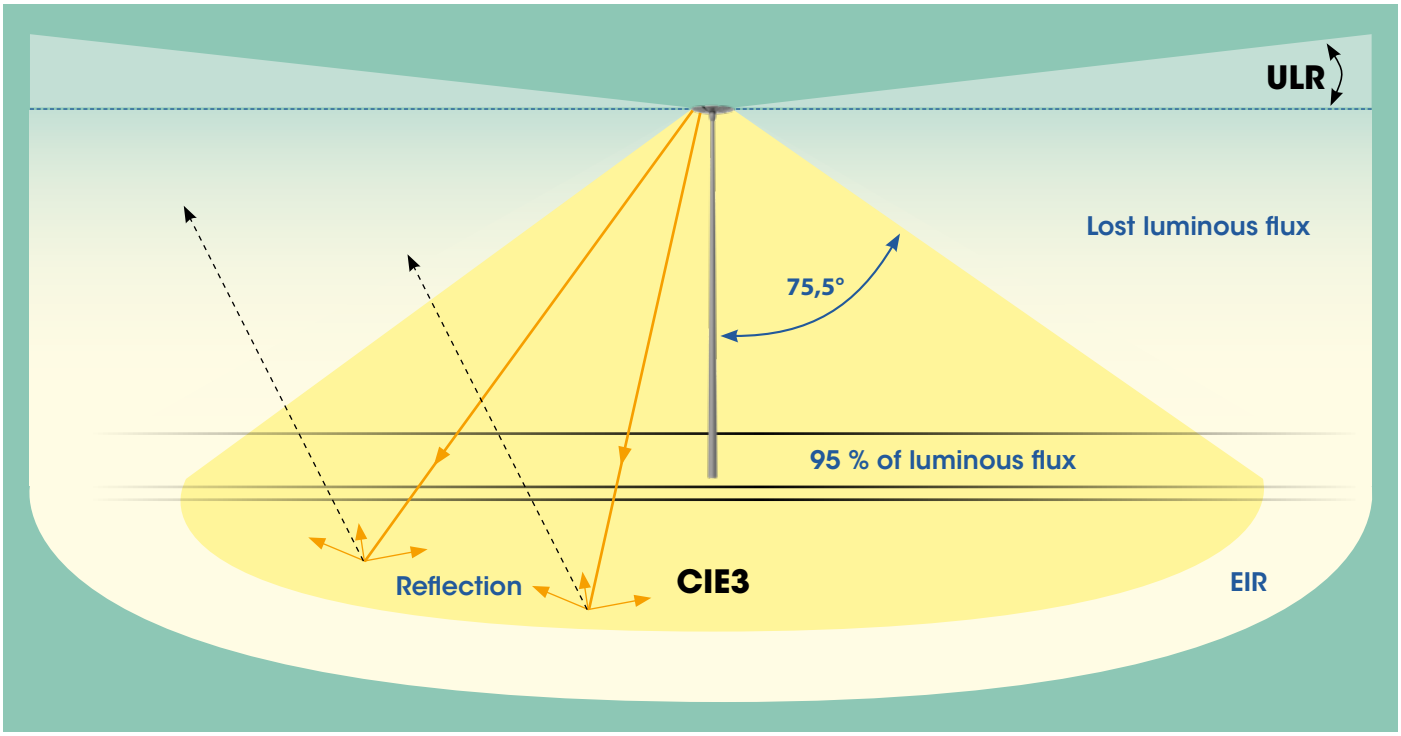
A Under the guidelines for showcasing cultural heritage, you must **switch off the light at 1 AM.** If this showcasing is related to an economic activity, you must switch off the light no later than one hour after the end of the activity.

Q Does this apply to private gardens and parks?

A The order applies to outdoor lighting, both private and public. **Only the outdoor lighting of gardens belonging to private individuals is exempt.** Nevertheless, a general effort is required for the sake of sustainable development, and it is incumbent on everyone to share this responsibility.

Q What are ULR and CIE Code No. 3?

A **ULR** is the proportion of light emitted by the luminaire above the horizontal (Article 3-II-1°).
CIE Code No. 3 is one of the five existing flux codes. It applies to lighting installations intended to promote safe travel (Art.1-a) and for uncovered or half-covered car parks (Art.1-e). It defines the proportion of the light flux (95%) included in a cone of half-angle 75.5° (Art.3-II-2°).



Q What is luminous flux surface density?

A **It is the ratio of lumens/m², i.e.,** the ratio of the total light output of sources to the effective surface area of the lighting project in lumens per square metre. The m² represents the total surface area that needs to be illuminated (including the undefined edges [EIR]).

Why this value?

To limit light pollution by means of reflection.

Q How do I find out if my project constitutes showcasing cultural heritage?

A Article L1 of the French Heritage Code defines cultural heritage as "all immovable or movable property under public or private ownership having special historic, artistic, archaeological, aesthetic, scientific, or technical interest."

Q Do the same rules apply to a seaside installation?

A **No,** the public maritime domain is subject to specific rules aiming to limit its direct illumination and the visibility of light points from the sea. The lighting systems covered by Article 1 must not directly illuminate the public river domain (PRD), bodies of water, the public maritime domain (PMD) - terrestrial and maritime parts, except in case of provisions in the Labour Code concerning port handling occupations and for safety reasons in traffic and parking areas on the shore of bodies of water or for special events (Article 4-V).

Q What is the limit between urban and extra-urban?

A An urban area is generally defined as an administrative entity (a city centre and its suburbs). It contains closely-clustered buildings and, in particular, signs indicating its entrances and exits.
By definition, therefore, your location is extra-urban when you are in a zone outside a designated area.

Q Are there any exceptions?

A **Yes.**
- On the eve of statutory holidays (festive illuminations) and during the Christmas period.
- During cultural events defined by a bye-law.
- For observation sites that implement specific nuisance-reduction plans.
- This does not apply to gardens owned by private individuals.
- Installations with presence detection.

OVERVIEW

The essence of the order decrypted

Generally speaking, the aim of the order is summarised in Article 3: "***Emissions of artificial light from outdoor lighting installations and indoor lighting installations shining towards the outside are designed to prevent, limit, and reduce light pollution, particularly any excessive disturbance to persons, fauna, flora, or ecosystems, leading to wasted energy, or preventing observation of the night sky.***"

CALENDRIER

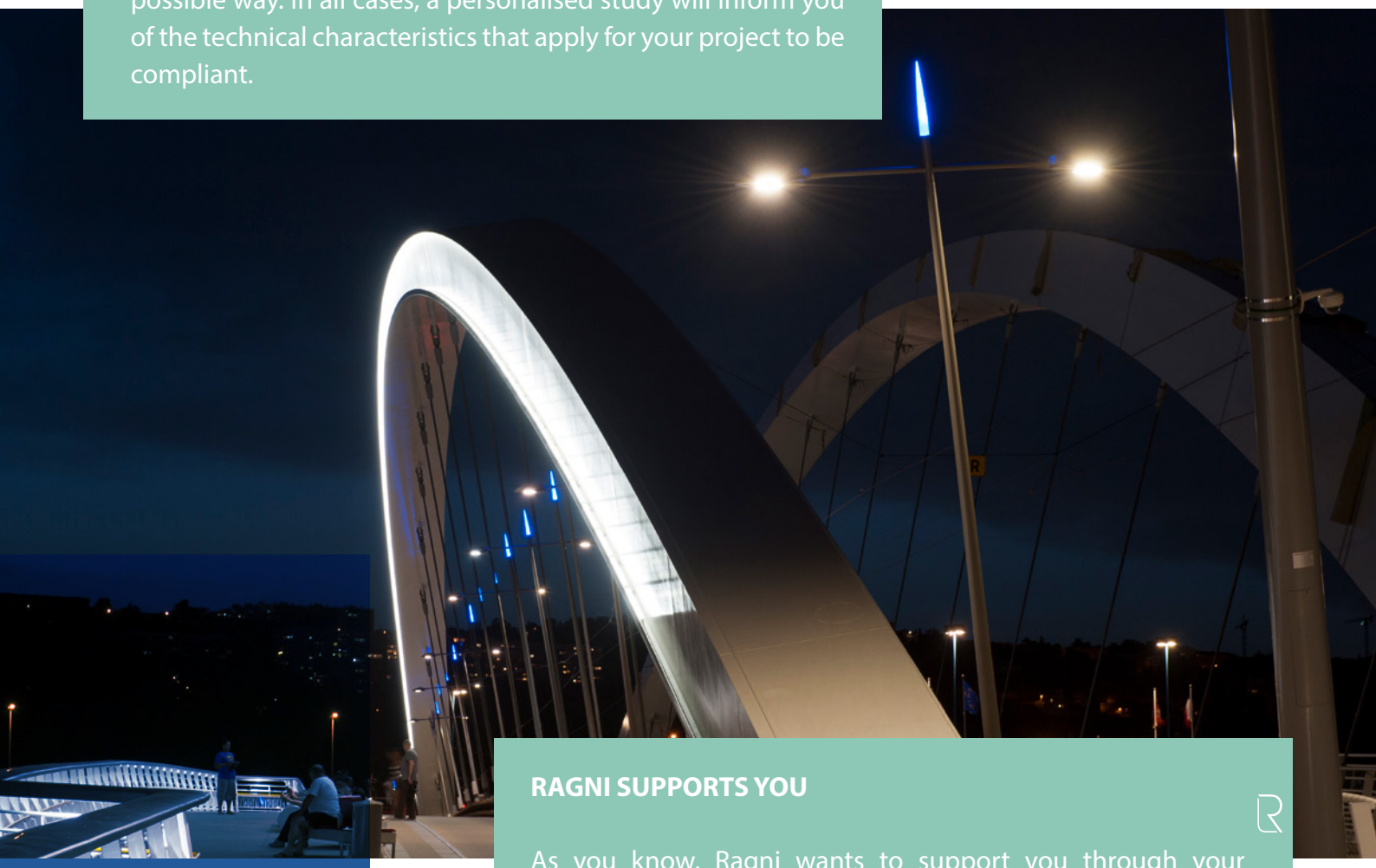
1st January 2019: lighting of non-residential buildings. Regulations already in force (see the Order dated 25.01.2013 concerning the nighttime lighting of non-residential buildings to limit light pollution and energy consumption).
1st January 2020: application (all criteria) for installations commissioned on or after this date. ULR limitations on existing and adjustable luminaires.
1st January 2021 (in cases where no separate network is created): for installations already set up and new ones, a light timing obligation.
1st January 2025 at the latest: for installations with ULR > 50%**.**

APPLICATION CRITERIA

Types of installations defined in article 1	Timing		Light distribution	Maximum flux	Color temperature
	Switch-on	Swith-off			
a. Outdoor lighting intended to facilitate safe travel	/	/	The manufacturer produces a luminaire with ULR < 1%. On site, the installer guarantees a ULR < 4%. 95% of the luminous flux must be contained in a 75.5° half-angle cone (CIE3 code).	35 lm/m² in urban zones, 25 lm/m² outside urban zones	Max. 3000 K. Astronomical observation sites: max. 2400 K
a. ublic and private outdoor lighting related to an economic activity	7 AM or one hour before business opens	One hour after close of business, at the latest Possible exception if detection.	The manufacturer produces a luminaire with ULR < 1%. On site, the installer guarantees a ULR < 4%. 95% of the luminous flux must be contained in a 75.5° half-angle cone (CIE3 code).	35 lm/m² in urban zones, 25 lm/m² outside urban zones	Max. 3000 K. Astronomical observation sites: max. 2400 K
b. Enhancement of heritage	Sunset at the earliest	1 AM at the latest (exception for Christmas lights or local events). Possible exception if detection.	ULR: 0% in astronomical observation zones	/	Astronomical observation sites: max. 2400 K
b. Parks and gardens	Sunset at the earliest	1 AM at the latest (exception for Christmas lights or local events). Possible exception if detection.	/	25 lm/m² in urban zones, 20 lm/m² outside urban zones	Astronomical observation sites: max. 2400 K
c. Sports lighting	7 AM or one hour before business opens	1 AM at the latest (exception for Christmas lights or local events). Possible exception if detection.	/	/	Astronomical observation sites: max. 2400 K
d. Non-residential buildings (premises for business use)	Sunset at the earliest, or 7 AM, or one hour before business opens	One hour after close of business. Possible exception i detection	/	25 lm/m² in urban zones, 20 lm/m² outside urban zones	Max. 3000 K. Astronomical observation sites: max. 2400 K
d. Non-residential buildings (shop windows or exhibitions)	7 AM or one hour before business opens	1 AM at the latest or one hour after close of business. Possible exception if detection.	/	25 lm/m² in urban zones, 20 lm/m² outside urban zones	Astronomical observation sites: max. 2400 K
e. Car parks	Sunset at the earliest, or 7 AM, or one hour before business opens	Two hours after close of business. Possible exception if detection.	The manufacturer produces a luminaire with ULR < 1%. On site, the installer guarantees ULR < 4% contained in a cone of half-angle 75.5° > 95%	25 lm/m² in urban zones, 20 lm/m² outside urban zones	Astronomical observation sites: max. 2400 K
f. Events	/	/	/	/	Astronomical observation sites: max. 2400 K
g. Construction sites	Sunset at the earliest	One hour after close of business	/	/	Max. 3000 K in observation sites

SOLUTIONS
RAGNI'S ADVICE

Be aware that switching off lighting is a divisive solution that prevents lighting from being converted. To take an approach that reflects the current issues in society, solutions must be sought through light management tools, and especially through promoting a responsible attitude amongst manufacturers: development work must incorporate, from the design phase, solutions that will control light distribution in the best possible way. In all cases, a personalised study will inform you of the technical characteristics that apply for your project to be compliant.

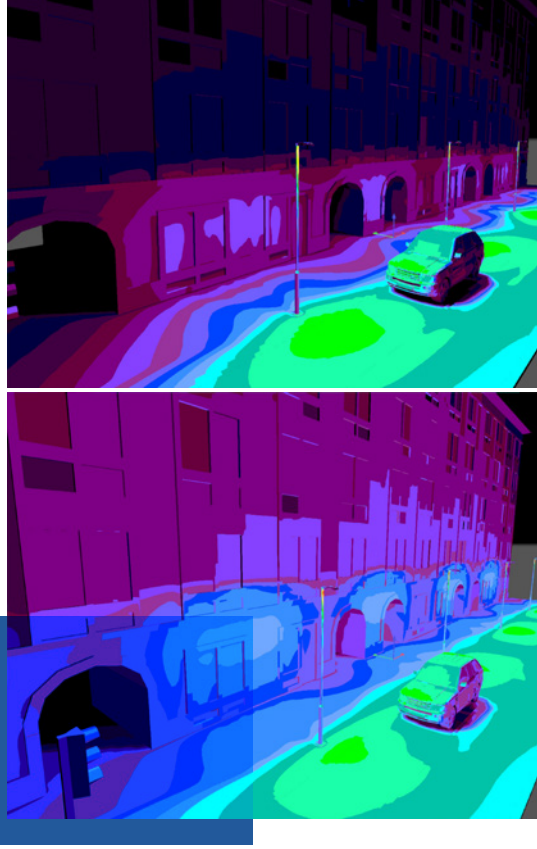


RAGNI SUPPORTS YOU

As you know, Ragni wants to support you through your projects.
We do not exclude any luminaire from our range and we adjust any products that need adjustment.
Our technical and sales teams are available to answer your questions and to carry out the necessary analyses for the deployment of lighting that both complies with regulatory requirements and satisfies your wishes.

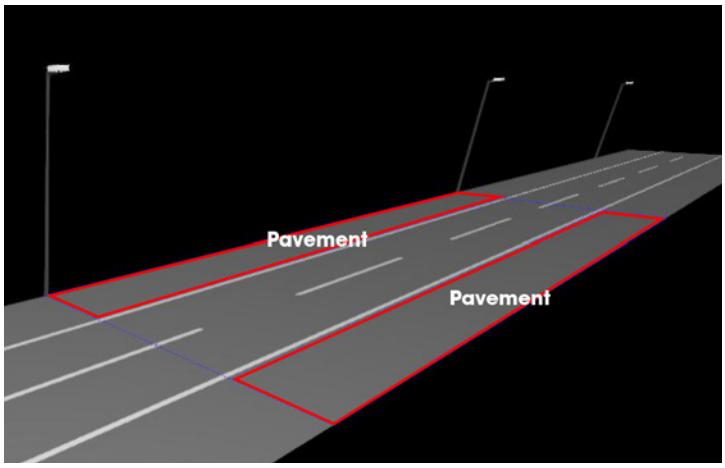
CASE STUDY

Case 1



Description:

Town through-way
Roadway width 5 m (two 2.5-m lanes)
Pedestrian pavement width 2.5 m



NF EN 13201 requirements, C4 roadway (10 lux, Uo ≥ 0.40)

Scope of application:

Outdoor lighting intended to promote safe travel of persons and goods in an urban setting excluding astronomical observation sites or nature reserves.

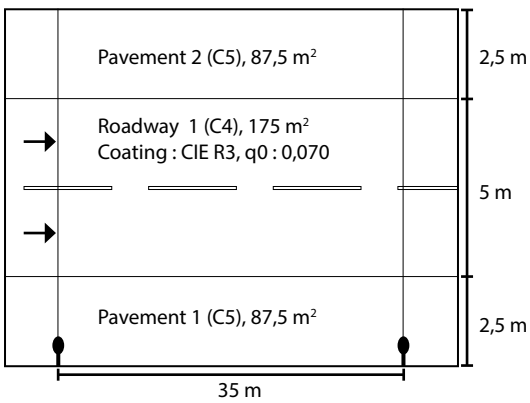
- Timing requirement: **none** (from dawn to dusk!)
- Light distribution requirements: **ULR < 1%, CIE Code 3 > 95%**
- Surface density requirement (lm/m²): **≤ 35 lm/m²**
- Colour temperature requirement: **≤ 3000 K**

In which type of installation should I classify my project?

Do I have on/off restrictions?

What specifications do I have to meet?

Photometric study : ATINIA ASY11 32 LED @ 500mA 3000K



Surface density calculation	
Total light output of luminaires (lm)	**5859**
Surface area intended to be illuminated (m²)*	**350**
Surface density (lm/m²):	**16,74**

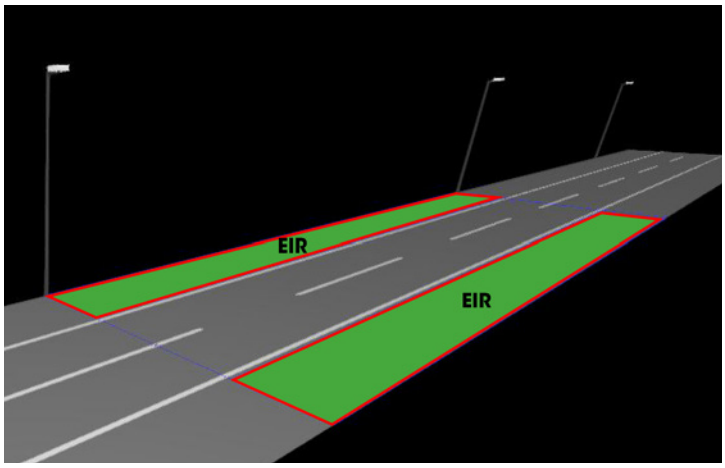
*roadway surface + pavement surface

ATINIA ASY11	**ULR=0%, code CIE 3 > 95%** ✓
3000K	**≤ 3000K** ✓
32 LED @ 500mA	**5859 lm (51W), 16,74 lm/m²** ✓

CASE STUDY

Case 2

Descriptif :
Service road
Roadway width 5 m (two 2.5-m lanes)
No pavement



NF EN 13201 requirements, C4 roadway (10 lux, Uo ≥ 0.40),
EIR: lighting of edges (1/2 the width of the adjacent zone)

Scope of application:
Outdoor lighting intended to promote safe travel of persons and goods in an extra-urban setting near an astronomical observation site.

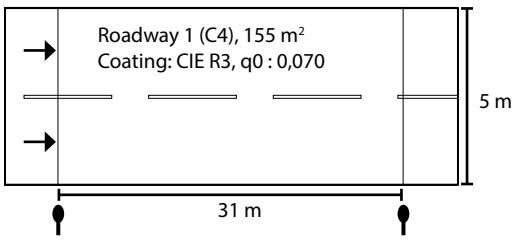
- Timing requirement: **none** (from dawn to dusk!)
- Light distribution requirement: **ULR < 1%, CIE Code 3 > 95%**
- Surface density requirement (lm/m²): **≤ 20 lm/m²**
- Colour temperature requirement: **≤ 2400 K**

In which type of installation should I classify my project?

Do I have on/off restrictions?

What specifications do I have to meet?

Photometric study : ATINIA ASY11 32 LED @ 500mA 3000K



Surface density calculation	
Total light output of luminaires (lm)	**4350**
Surface area intended to be illuminated (m²)*	**310**
Surface density (lm/m²):	**14,03**

*roadway surface + edge surface (EIR, cf NF EN 13201)

ATINIA ASY11	**ULR=0%, code CIE 3 >95%** ✓
2200K	**≤ 2200K** ✓
32 LED @ 500mA	**4350 lm (54W), 14,03 lm/m²** ✓

SOURCES AND USEFUL INFORMATION

All links mentioned here refer to content in French and concern the French territory.

Text of the Order dated 27/12/2018 concerning the prevention, reduction, and limitation of light pollution.

MINISTRY OF ECOLOGICAL AND SOLIDARITY TRANSITION

Light pollution:
https://www.ecologique-solidaire.gouv.fr/pollution-lumineuse

Biodiversity plan:
https://www.ecologique-solidaire.gouv.fr/plan-biodiversite

Mixed Natural Heritage Unit (centre for biodiversity expertise):
http://www.patrinat.fr

ASSOCIATIONS

ANPCEN (National Association for the Protection of the Night Sky and Environment):
https://www.anpcen.fr
Lighting syndicate:
http://syndicat-eclairage.com
French Lighting Association:
http://afe-eclairage.fr

Lists of French regional nature parks

ASTRONOMICAL OBSERVATION SITES

A second order defines the list and the perimeter of exceptional astronomical observation sites on French territory (Order dated 27 December 2018 defining the list and the perimeter of exceptional astronomical observation sites in application of Article R. 583-4 of the Environmental Code).

They correspond to a circle with a 10-km radius centred on the following sites:

SOUTHERN REGION
The Haute-Provence observatory at Saint-Michel-l'Observatoire
The Astronomy Centre at Saint-Michel-l'Observatoire
The Calern plateau observation site (Côte d'Azur observatory) at Caussols
The Pic de Château-Renard observatory at Saint-Véran (Astroqueyras)
The Baronnies Provençales observatory at Moydans

ILE-DE-FRANCE
The Jean-Marc Salomon astronomy centre in the Buthiers Island leisure area

BRITTANY
La Couyère planetarium and observatory

OVERSEAS DEPARTMENTS AND REGIONS
Les Makes observatory at La Rivière (Reunion Island)

OCCITANIE
The Ferme des étoiles (Star Farm) observation site - Pic du Midi Observatory at Bigorre
The Cévennes National Park observation site - (Pises Observatory)
Note: As part of the International Dark Sky Reserve (RICE), these two territories constantly strive to control night-time light emissions.

AUVERGNE-RHÔNE-ALPES
The Planet Mars - Hubert Reeves Observatory site

RAGNI

RAGNI SAS
CHEMIN DU VALLON DES VAUX - LE GUEIRARD
CS 80002 06801 CAGNES CEDEX - FRANCE
Tél. : +33 (0)4 93 31 05 48
e-mail : info@ragni.com

EPV L'EXCELLENCE DES SAVOIR-FAIRE FRANÇAIS • ENTREPRISE DU PATRIMOINE VIVANT •

La FRENCH FAB

WWW.RAGNI.COM