

# A solution for ensuring dark sky and reducing light pollution

Urban population is rapidly growing, and so are urban spaces. Together with the urbanization process, more light is needed. LED, due to its obvious advantages like high efficiency, the possibility to have connected lighting, and much less maintenance needed, is becoming the preferred lighting source. Light provides safety and visibility, but the night-time emissions of poor quality LED lighting can create problems.

A clear and dark night sky is important for scientists who need to observe stars and planets. The lack of good visibility and increasing sky glow can however make their job difficult. Moreover, increasing sky glow can also negatively impact and disturb both humans and animals, especially those that are active at night. Furthermore, the light reflected in the sky is an indication of poorly directed light which consequently leads to a significant waste of energy.

Current solutions to mitigate these phenomena include limiting the use of artificial light or even turning it off completely. But these measures can potentially lead to safety issues.

Consequently, many studies and tests have been conducted in recent years to find a possible solution that helps preserve the dark sky while satisfying the needs of urban populations. Using the results of recent research and the regulations and specifications defined by astronomy institutes, we have developed a new spectral solution which helps limit light pollution while providing sufficient night-time illumination.

## **What are the regulations in place today?**

The leading and internationally recognized Instituto de Astrofísica de Canarias (IAC), located in the Canary Islands, has been acting as a key contributor and advisor to sky laws not only in Spain but all around the world. IAC's Sky Quality Protection Technical Office (OTPC) regulates the application of the law in terms of light pollution, and its Sky Quality Group continuously monitors the parameters that define observing quality at the IAC observatories. As such, any lighting scheme within the area regulated by the Sky Law must comply with the law. IAC defines areas of usage depending on the proximity to the telescopes or the influence area depending on the orography. They regulate the luminaries, types of light sources and the projects (utilization factor, lighting levels, etc.).

To read more about the latest criteria developed by IAC visit

[http://www.iac.es/adjuntos/otpc/CATALOGO\\_ESP\\_TEC\\_2018.PDF.pdf](http://www.iac.es/adjuntos/otpc/CATALOGO_ESP_TEC_2018.PDF.pdf) and

[http://www.iac.es/adjuntos/otpc/RESUMEN\\_RECOMENDACIONES\\_AGOSTO-2018.pdf](http://www.iac.es/adjuntos/otpc/RESUMEN_RECOMENDACIONES_AGOSTO-2018.pdf)

### A light recipe for a dark sky

We developed a special light recipe to contribute to the reduction of sky pollution. The recipe is fully compliant with the latest regulations defined by leading astronomy institutes such as the IAC.

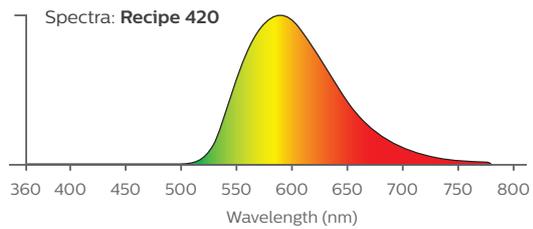
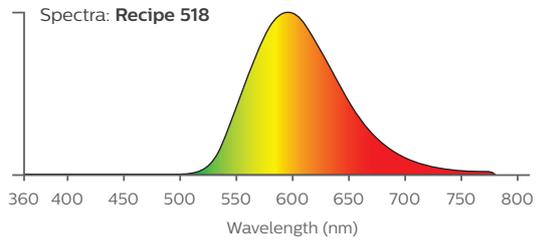
While being fully compliant with sky laws, the recipe also delivers sufficient night-time illumination and visibility for drivers and residents.

### The new optics, certified by the IAC, fulfill the following specifications:

- Max <0.6% emission below 440 nm
- Max <1% emission below 500 nm
- Max <10% emission below 550 nm (as filters are used)
- Considers total radiance between 350-800 nm
- Highest radiance should be at 595 ± 10 nm
- Average wavelength <100 nm (as filter is used)
- At least 86% of total radiance must be located between 550 and 700 nm
- There must not be any singular emission below 500 nm higher than 1/50 of the highest emission

By August 2018 the following two light recipes have been certified:

Light recipe	Ra	Tc (K)
Recipe 518	48	1800
Recipe 420	36	2000



The luminaire efficiency is 24% higher compared to PC Ambar solutions. This luminaire efficiency depends on the type of luminaire, as shown in these two examples:

Luminaire	Luminaire efficiency Recipe 518 (lm/W)	Luminaire efficiency Recipe 420 (lm/W)
ClassicStreet	59-63	77-83
DigiStreet	79-86	99-108

The light recipe is available in combination with various Philips LED luminaires designed for road and urban applications.

All of them are certified by the Instituto de Astrofísica de Canarias (IAC).



ClassicStreet



Villa LED



Harmony LED



Quebec LED



DigiStreet



Luma



ClearWay gen2



LumiStreet and UniStreet



## The world leading Astronomy Institute in Puerto de la Cruz uses the new Philips light recipe

The Canary Islands have the clearest view of the night sky in Europe and are therefore home to several renowned observatories. The quality of the sky is even protected by Spanish law which requires municipalities to take measures to mitigate light pollution.

To this end, we initiated the installation of the dedicated light recipe, applying optics that reduce light spillage and also filter the blue part of the light spectrum, which could interfere with nearby observatories. By meeting all criteria defined by the law, the solution has also been certified by the IAC. The new light points are wirelessly connected to our Interact City lighting management software so that they can be dimmed and controlled remotely. Using these features, the municipality can ensure that light is only used when and where it is required. Thanks to the new solution, the municipality of Puerto de la Cruz is already benefitting from an energy saving of 60 to 65% compared to the old conventional solution they used previously.



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