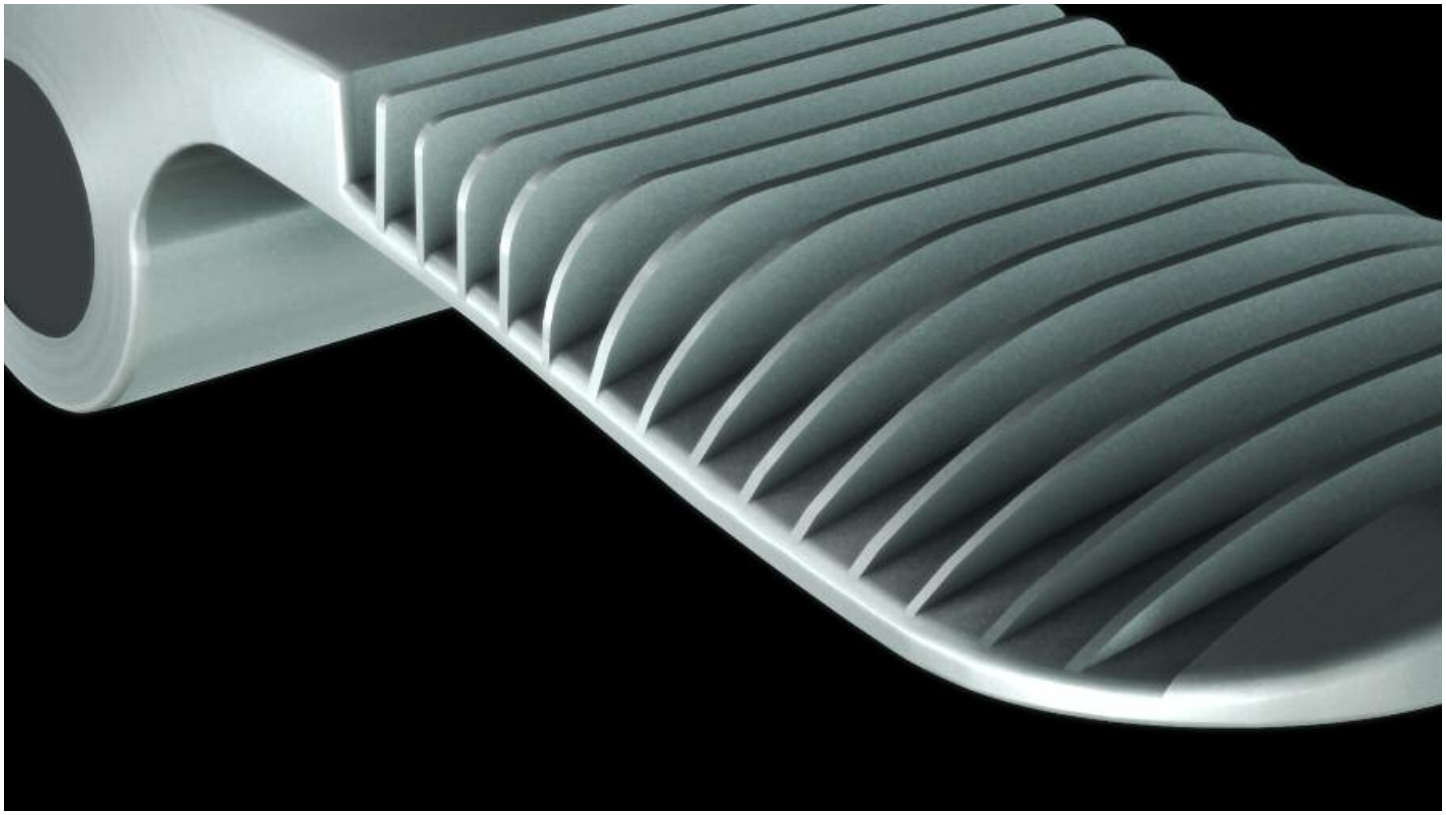
ATENA FVG



technical report

LED road optics solution
ZEUS

technical report

LED road optics solution

ZEUS

Saving energy means, not only save money, but also to adopt a more responsible and farsighted perspective towards the use of resources and its impacts. The aspects that makes eco-sustainable the adoption of a road optics solution like Zeus, are numerous, useful and relevant.

Name	Code	Bulb
Zeus	ATE 09-1Z-48	48x1W LED natural white
	ATE 09-1Z-60	64x1W LED natural white

general characteristics

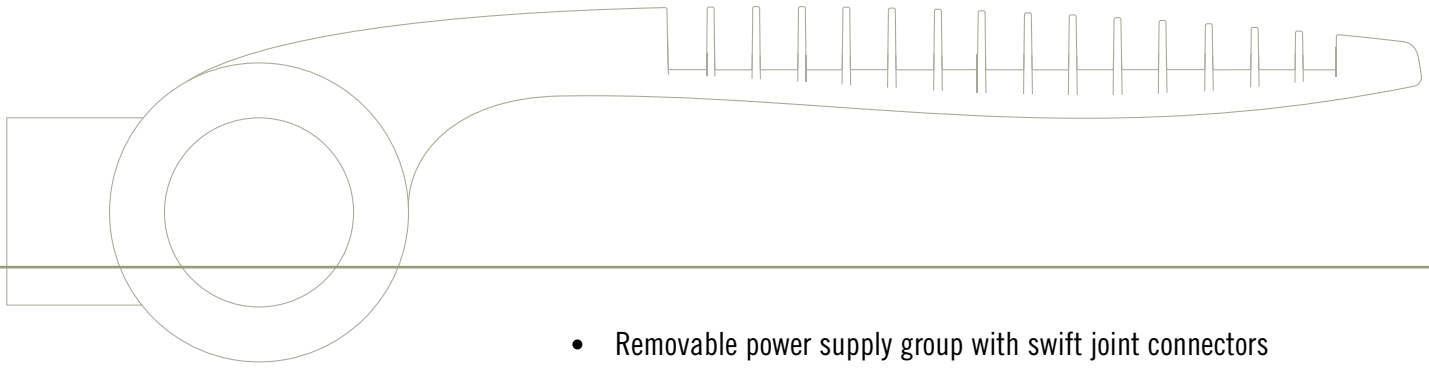
Energy saving of about 50% compared with HST bulbs

Light pollution elimination and absence of light dispersion towards high

Total electronic control

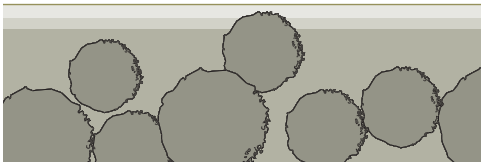
Long lasting and absence of maintenance

Easy components' separation for disposal at the end of the cycle



- Removable power supply group with swift joint connectors
- Fully watertight device
- 48 or 64 Neutral White colour (4000K) LED circuits
- Patented optics
- External screws made of stainless steel
- Adjustable rotor (from 0° to 90°)
- Index of protection IP 66 and class II insulation
- Wide range of customizations, from colours to electronic control systems

*The LED road optics unit **ZEUS**. In its several power configurations, is homologated for the following applications:*



Urban and extraurban roads

Situations where the predominant traffic is vehicular requiring high levels of longitudinal uniformity (from Ul=0.6).

Legend:

h	Installation height
L	Road width
Nc	Number of lanes
Na	Number of devices
A	Distance between posts
Lm	Average luminance in cd/m^2
Uo	Average uniformity
Ul	Longitudinal uniformity

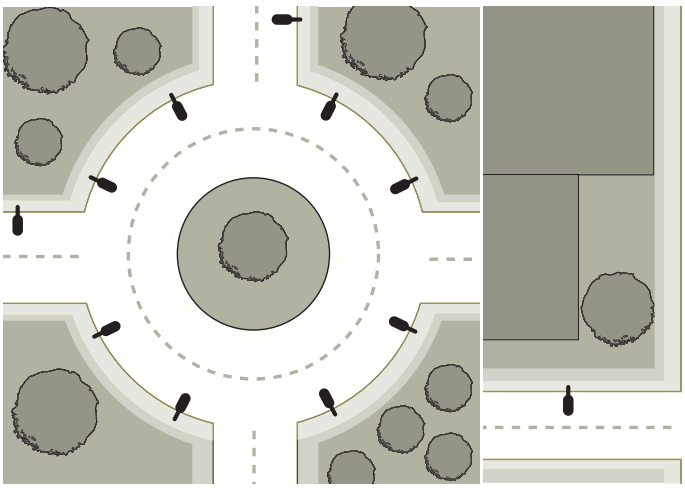
The dat files for the optics simulations are available for data reliability tests in the table below.

ZEUS 64LED						
H (m)	L (m)	Nc	A (m)	Ul	U0	Lm
8/10	9	2*	32	0.7	0.6	1.1

* considering no. 2 pavements 1,5m each

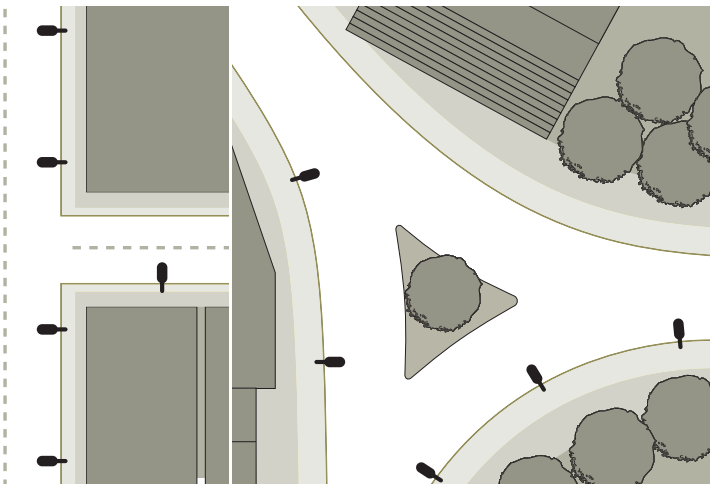
The 64 LED road optic will be available in 2010.

applications



Quarter and interquarter urban roads

Vehicles prevalence road and presence of roundabouts, cycle tracks, pavements and pedestrian crossings. The values of longitudinal uniformity are included between 0.5 and 0.6.



Local urban roads

Vehicular traffic roads regulated by 50 km/h speed limit.
The average luminance values must be 0.75

Pedestrian roads, squares, parkings, parks, historic centres, pedestrian areas, roundabouts

Roads for vehicles, bicycles, pedestrians.
The illuminating values must be:
average: 7,5 lux -minimum: 1,5 lux

ZEUS 48LED

H (m)	L (m)	Nc	A (m)	UI	U0	Lm
6/9	7/8	2*	20/30	0.5	0.4	1

* considering no. 2 pavements 1,5m each

The recent energy-saving policies adopted by the European Union look firmness at reducing waste and curb the consumption of electricity. For this reason, the EuP Directive gradually aims to remove from the market the light devices considered inefficient and / or that make use of technologies and features that imply excessive power consumption.
It also requires that Public Administration turned their electric system into energy saving one using energy saving lighting devices. Among the available technologies, the distinguished one is LED technology for many advantages: low power consumption, long life and practically no maintenance. Since the devices are mostly installed on roads, it should also consider the security standard offered.
A spectrometric frequency very similar to the characteristics of the human eye perception, an immediate lighting without latency time, the light homogeneity and constancy in time on the road surface, make the LED light much more effective and appropriate than the traditional technologies to illuminate the areas of transit for vehicles and persons.

Average life of LEDs and electronic power supply

It is essential, in this device, the layout of a very specific and efficient dissipation system that allows the high temperatures dissipation generated by electronic board.
This allows us to ensure a long life to the LEDs and electronic components, such as power supplies.

Primary importance is the research that led to obtain a power supply with a lifetime similar to the LEDs average one.

Component	Calculated average life	mA
LED	50.000h (B50,L70)	350 to 500

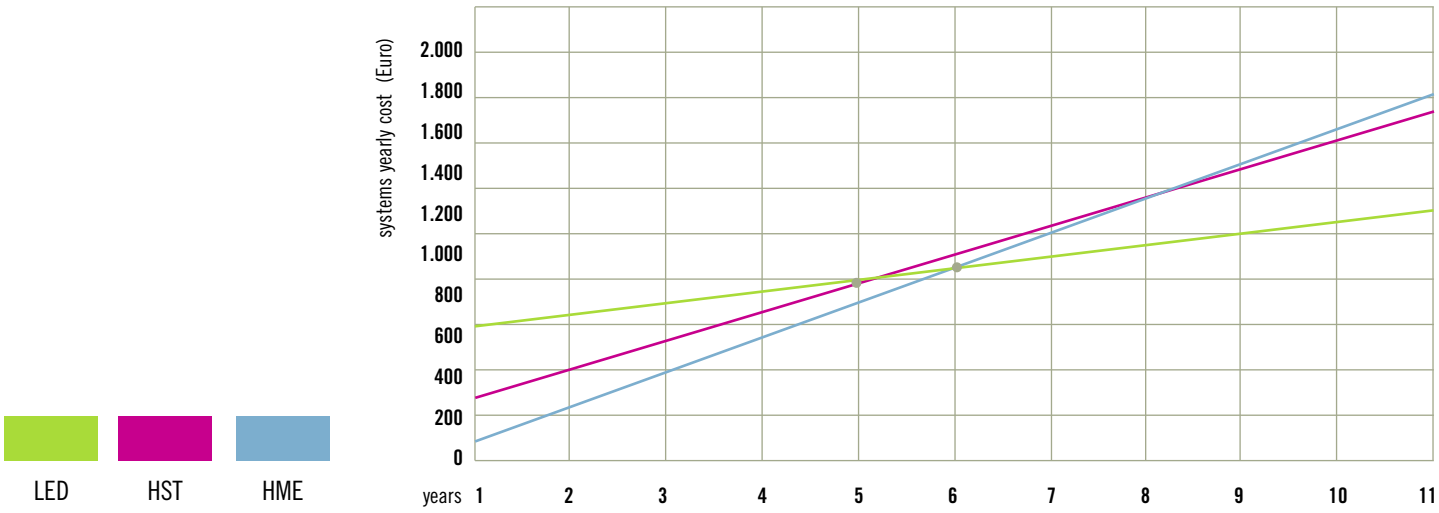
The data in the table are referred to a Ta =25°

energy saving

Payback comparison

The payback time is on average about 5 years compared with a sodium system to and 6 years compared with a mercury system.

These are average evaluations made on existing installations. It is possible to have significantly better data with low voltage new lines and electronic devices (i.e. twilight sensors) able to optimize the features of the LED road optics system.



Energy savings for 1000 light points on annual basis

It is essential, in this device, the layout of a very specific and efficient dissipation system that allows the high temperatures dissipation generated by electronic board.
This allows us to ensure a long life to the LEDs and electronic components, such as power supplies.

Primary importance is the research that led to obtain a power supply with a lifetime similar to the LEDs average one.

	Source of light	System power	Total annual energy	Emitted CO2 in the atmosphere
ENERGY SAVING 55% / CO2 -55%	48 LED	75W	328 500 Kwh	174 433 Kg CO_2
	150W HST	166W	727 080 Kwh	386 079 Kg CO_2
ENERGY SAVING 55% / CO2 -55%	64 LED	89W	389 820 Kwh	206 990 Kg CO_2
	200W HST	210W	919 800 Kwh	488 400 Kg CO_2

Comparison parameters - 4.380 h/year - 12h/day - LED average life at Ta=25°: 50.000h (B50.L70)
Italian electric mix factor 0,531 Kg CO2/kWh - (source: Ministry of the Environment)

electronical management

Basic version

The electronic of the device provides for the presence of a twilight sensor that regulates the switching on/off the lamp. This allows us to increase by 10% the energy savings because, thanks to the immediately switching on of the LEDs, we are able to activate the device only when the atmosphere reaches certain percentage of darkness.
This product is ideal for applications that don't require specific needs.

Advanced version

This version is under study and experimentation. With advanced electronic that allows to manage the whole lighting network. The device is connected to a internal or external network, which can monitoring the status of the lighting system and, if necessary, to modify the parameters such as on/off data or light efficiency. This connection to the network can be used to set fixed programs for the management of the light flow based on road traffic parameters in order to attenuate the light flux at certain hours of the night. Moreover, thank to the use of several sensors, it is possible to know, in any moment, fundamental data for the efficiency and lifetime of the system as internal temperature of the devices or possible electronic anomalies.
These applications allow to reduce the consumption of further 20%.

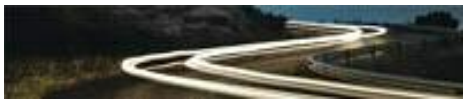
ENERGY SAVING 20%

Example of a profile that reduces the light power during the central hours of the night.

Accessory

kit adapters poles diameter

External light changer sensor



Solutions in study

photovoltaic panel + battery

Video surveillance systems

construction characteristics

Spectrometry	The LEDs emit neutral white light with a 4.000 K colour temperature, very	effective for a clear perception of shapes and colours.
Orientability	ZEUS road optics is designed to offer the maximum installation versatility and adaptability. Considering the large existing case histories, in order to avoid the compromising of the optimal output, the device	is equipped with a rotor that allows to adjust the installation by inclinations from 0° to 90°. This adjustment is possible without open the device and made it easy with a graduated scale.
Optical space opening	To access to the optical space it is necessary to remove the 5 fixing screws made of stainless steel.	Their hooking to the lower housing of the lamp is watertight sealed.
Rapid replacement system in case of bad working of the optical unit	In case of bad working of the LEDs, a clip system allows to extract easily the sideboards and quickly replace the out of order one.	This makes the product, even at the end of the life cycle of its inner components, regenerable without having to replace the whole lighting device.
Working extreme conditions	LED technology, although has the best condition at low temperatures, ensuring a constant and lasting performance	within a wide thermal gradation range. Its output is guaranteed at working temperature from -30° C to +50 C°.
Coating system	Thanks to a special and innovative coating system that doesn't use powder, it is possible to create an external protective coat very homogeneous and compact.	The product is guaranteed for a greater resistance to the extreme environmental conditions (saline fogs) and to the ultraviolet rays that can maintain over the time its original colour.
Safety	Class II devices, also known as double insulation, are designed so do not require (and therefore they should not have) an earth connection.	They are made so a single failure can not cause the contact with dangerous voltages by users.

example of applications (real mode)

ZEUS 48 LED

Installation
h 6/9 m

STREETS

Installation
h 5/10 m

EXTERNAL BUSINESS AREA

Real Simulation

In this simulation, the lights reflect the real efficiency of the device, in the difference type of application.

Installation
h 4/8 m

PARKINGS SQUARES

Installation
h 4/6 m

PARKS PEDESTRIAN AREAS CYCLE ROADS

example of applications (lux detail mode)

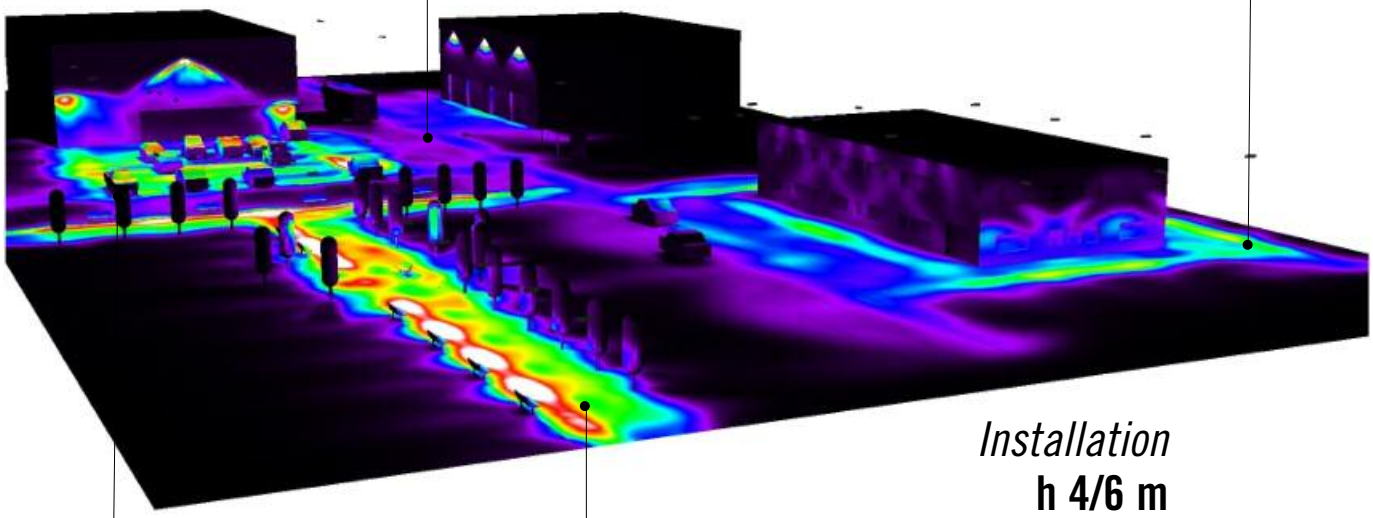
ZEUS 48 LED

Installation
h 6/9 m

STREETS

Installation
h 5/10 m

EXTERNAL BUSINESS AREA



Installation
h 4/6 m

PARKS PEDESTRIAN AREAS CYCLE ROADS

Installation
h 4/8 m

PARKINGS SQUARES

lx

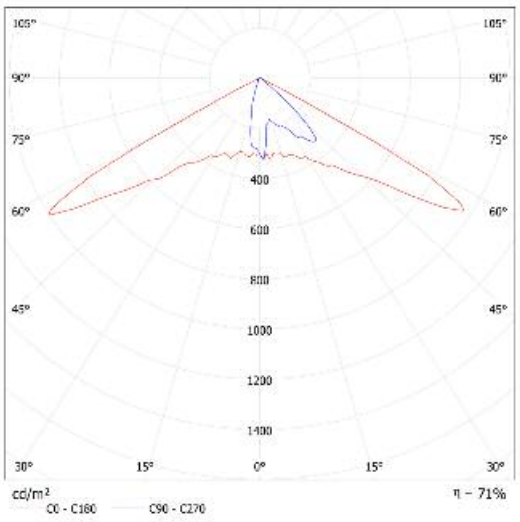
Real Simulation

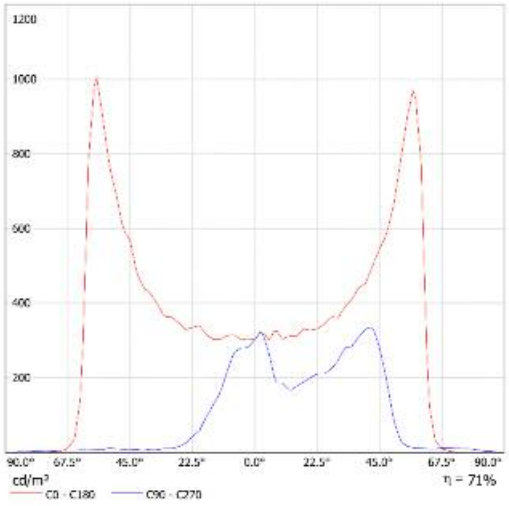
In this simulation, the lights reflect the real efficiency of the device, in the difference type of application.

lighting characteristics

Polar irradiation diagram

Diagram of typical polar irradiation of White Neutral LED light





Example

Led street Lamp

ZEUS

In this picture there is a versione of Zeus 48 LED in function

Apllicated in street

product sheet

Technical data	
Type of lighting device	LED light system for urban areas
Use	Outdoor
Power	75W
Source type	48 LED
Producer LED	Philips
Light efficiency	> 6380 lumen
Neutral white colour	3800/4300K
Average life guaranteed	50.000/60.000 hours
Operating temperature	-30°C to +50°C
Physical characteristics	
Assembly	Lampost entering from the side. To lamppost head.
Lamppost adapter	Included; it allows the fixing to the existing lampposts
Materials	Die-cast aluminium; PMMA plastic; ABS plastic
Characteristics of the materials	Self-extinguish and ideal for dissipation UV ray resistant Infrangible Recyclable materials High temperature resistant
Basic colour	Grey (customizable on demand)
Dimension	734mm x 50mm x 298mm
Weight	7/8 kg
Main reference norms	
UNI1043900	Road illumination: lighting requirements of motorized traffic roads
UNI1081900	Road illumination: requiremnts for the limit of the dispersion toward high of the light flux
UNI1124800	Road illumination: lighting class selection
UNIN1320102	Road illumination: performance requirements
UNIN1320103	Road illumination: performance estimation
UNIN1303201	Measuring and presentation of the photometric data of lamps and illumination devices
Electric characteristics	
Power supply	Included
Protection	IP 66
Insulation class	II (without earth connection)
Voltage	220V (existing lines)
Optical characteristics	
Laying	Adjustable, 0° to 90° with 5° steps
Beam adjustment	Rack
Side opening	120°
Front opening	40°

product sheet

Example
Led street Lamp

ZEUS

In this picture
there is a versione of
Zeus 48 LED
in function

Applicated inside the Square

Product Overview
Led street Lamp

ZEUS

Atena FVG s.r.l. via J. Linussio, 1 - 33020 Amaro (UD) - fax +39 0433 469029 - info@atenafvg.com - www.atenafvg.com

Bearzi Engineering
DVM Systems
Gielle Plast
Studio Marangone
Car-Audio-System
Elettrica
Arte Edile