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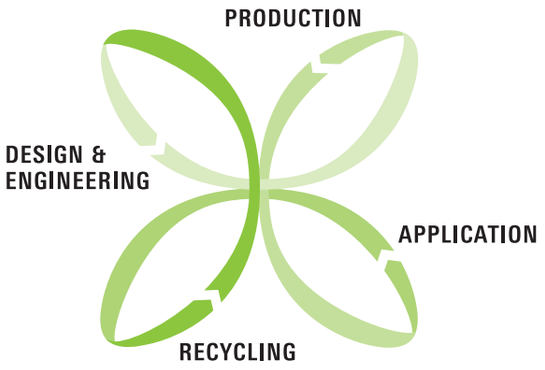
IOS® – INNOVATIVE OPTICAL SYSTEMS

for Roads, Pathways and Public Spaces

German Edition

2009



IOS®

Supported by an in-house lighting laboratory that develops high performance '**I**nnovative **O**ptical **S**ystems' IOS® WE-EF combine the latest advances in lamp technology, with specially designed reflectors and lenses. Applied to road lighting IOS® optimises luminaire spacings, whilst ensuring the best lighting result. The development of high quality, efficient reflectors and lenses is one of WE-EF's main compentencies.

IOS® Advantages

Each lighting project will have its unique characteristics and accordingly its challenges. A professional lighting plan must balance the demands of environmental protection, lighting standards, public health and safety as well as meeting budgets.
IOS® helps balance these various needs and shows that even through the reduction of energy, costs and CO_2 output that the quality of the lighting design need not be compromised.

Example:
Changing the light source from Mecury Vapour[1] (HQL) to LEDs, Metal Halide (HIT), High Pressure Sodium (HST) or CosmoPolis (HIT-COS) in combination with WE-EF IOS®, over a 1 km stretch of road[2] for a period of 20 years, has the potential to save up to 122 Tonnes of Greenhouse Gasses.[3]

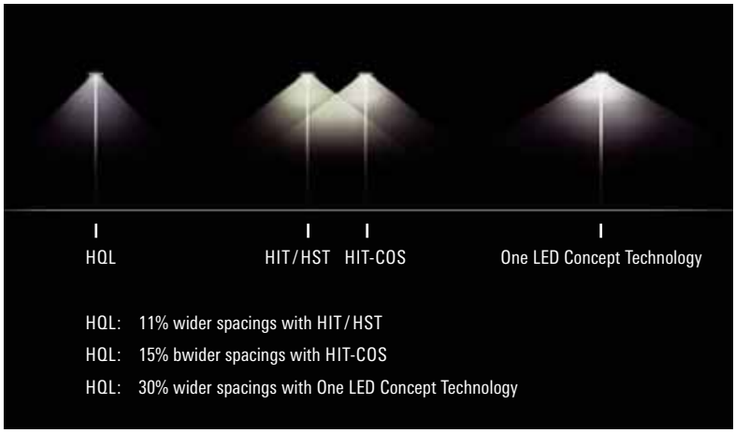
Shown on the following pages are the potential savings when switching from 125 W Mecurty Vapour to LEDs, or Metal Halide or High pressure Sodium or CosmoPolis.

COST SAVING

ENERGY SAVING

CO_2 REDUCTION

[1] Phase out by 2015 of Mecury Vapour lamps in line with new European laws
[2] Switching Cycle: 10 Hours, singlesided arrangement, Mounting Height: 7 m, DIN ME5
[3] N.I.C and 'Verband Elektrizitätswirtschaft'



WE-EF IOS® optimises the relationship between new light sources and reflector/lens technology. This means cost and CO_2 reductions and of course less energy through wider spacings. The various light sources have different advantages such as efficiency, colour rendering and life time. For the optimum solution for your project please contact WE-EF.

IOS® with Lens Technology

WE-EF has taken the unique and critical features of the LED (eg. Long lifetime) as basis for the One LED Concept Technology. The current trend in LED streetlighting has the LEDs with a either a symetrical or elliptical distribution selectively orientated, as a means of achieving a uniform distribution. The interaction and overlapping of the beams from the indivually oriented LEDs, provides the overall light level and to some extent uniform distribution. This Standard solution is know as the 'Multi Spot' Technique. WE-EFdoes away with this thinking and adopts via OLC technology the 'Multi Layer' principal. Each LED in combination with the special 'butterfly' lens illuminates the same area. The sum of all the layers provides the uniform output.

Standard Solution: Multi Spot

WE-EF Solution: Multi Layer

The five advantages:

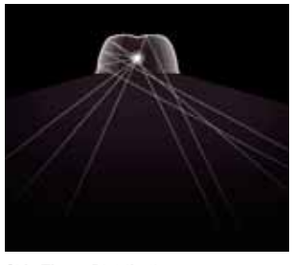
1. If one LED fails and the light level drops, uniformity is retained.
2. It is possible to simply switch off individual or groups of LEDs to drop the light level, without the need of dimmer or similiar control systems.
3. The system ensures through modular engineering that blocks of LEDs can be simply and quickly exchanged if there is a failure.
4. The same modular system means that when more efficient LEDs become available, they can simply be retrofitted. The light technical performance remains the same. The One LED Concept technology has been developed with the future in mind.
5. Light is strictly controlled and any light pollution is kept to an absolute minimum through the exact aiming of the LEDs in combination with the unique 'butterfly' lens.

IOS® with Reflector Technology

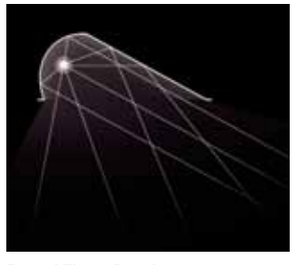
The optimal use of resources to maximise light output must also be balanced against the issue of light pollution, the concerns of 'Dark Sky'.and the DIN EN 13201 standard for streetlighting. This is achieved through WE-EF in-house CAD designed reflectors that have been optimised for Ceramic Metal Halide lamps.

The five advantages:

1. Zero light emission above the 90°
2. High beam efficiency
3. Superior glare control and visual comfort through appropriate lamp shielding angles
4. Tightly controlled candela intensities in the critical high angle glare zone at 80-90°
5. Wide range of optional accessories.



Side Throw Distribution



Foward Throw Distribution

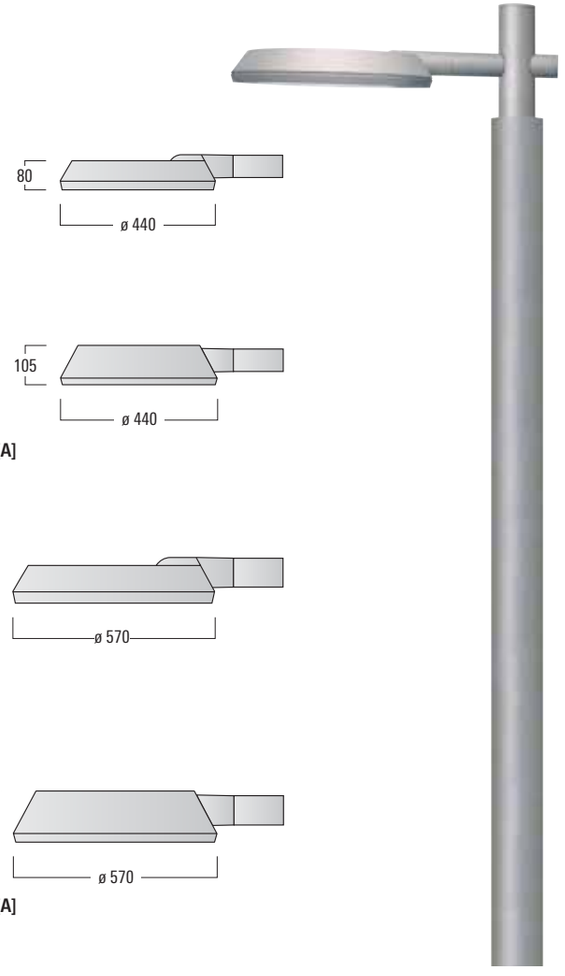
SERIES RFL500

Post mounted luminaire with asymmetrical distribution; side and foward throw.
IP66, SKI. Marine-grade, die-cast aluminium alloy, PCS hardware 5CE superior corrosion protection. Powdercoat finish in RAL 9004, RAL 9007, RAL 9016 or Classic Silver.

Light Source: LED 29-118 W, HIT 35-25 W, HST 150-250 W, HIT-COS 45-140 W

Example 1: 125 W HQL vs. 88 W LED with One LED Concept Technology

COST SAVING *	**35.960 €**
ENERGY SAVING **	**204.035 kWh**
CO_2 REDUCTION ***	**106 Tonne**



RFL530 LED

RFL530 [S] / [A]

RFL540 LED

RFL540 [S] / [A]

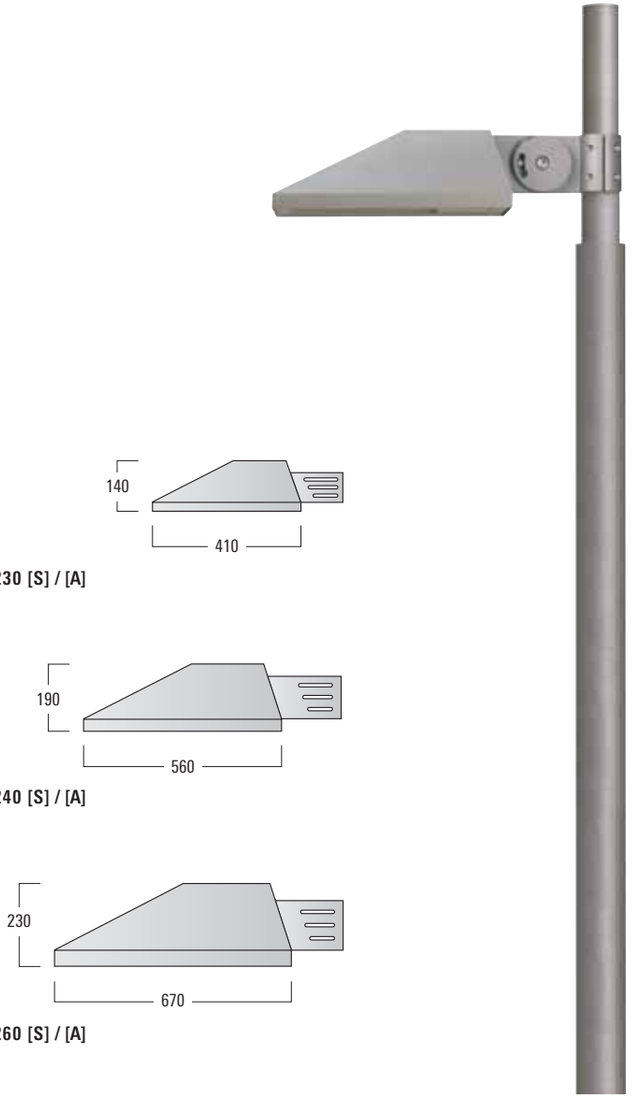
SERIES PFL200

Post mounted luminaire with asymmetrical distribution; side and foward throw.
IP66, SKI. Marine-grade, die-cast aluminium alloy, PCS hardware 5CE superior corrosion protection. Powdercoat finish in RAL 9004, RAL 9007, RAL 9016 or Classic Silver.

Light Source: HIT 35-400 W, HST 70-400 W, HIT-COS 45-140 W

Example 2: 125 W HQL vs. 60 W CosmoPolis

COST SAVING *	**26.475 €**
ENERGY SAVING **	**234.403 kWh**
CO_2 REDUCTION ***	**122 Tonne**



PFL230 [S] / [A]

PFL240 [S] / [A]

PFL260 [S] / [A]

* Cost Saving: Operating and Maintenance Costs
** Switching Cycle: 10 Hours, singlesided arrangement, Mounting Height: 7 m, DIN ME5
*** N.I.C and 'Verband Elektrizitätswirtschaft'

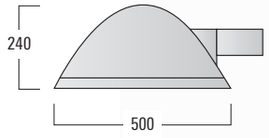
NFL300

Post mounted luminaire with asymmetrical distribution; side and foward throw. I P66, SKI. Marine-grade, die-cast aluminium alloy, PCS hardware 5CE superior corrosion protection. Powdercoat finish in RAL 9004, RAL 9007, RAL 9016 or Classic Silver.

Light Source: HIT 70-150 W, HST 70-150 W, HIT-COS 60-90 W

Example 3: 125 W HQL vs. 70 W Metal Halide

COST SAVING *	**28.710 €**
ENERGY SAVING **	**204.364 kWh**
CO_2 REDUCTION ***	**106 Tonne**



NFL530 [S] / [A]

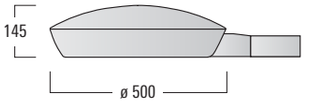
SERIES RBL600

Post mounted luminaire with asymmetrical distribution; side and foward throw. IP66, SKI. Marine-grade, die-cast aluminium alloy, PCS hardware 5CE superior corrosion protection. Powdercoat finish in RAL 9004, RAL 9007, RAL 9016 or Classic Silver.

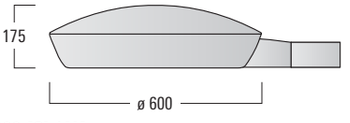
Light source: HIT 70-400 W, HST 250-400 W, HIT-COS 60-140 W

Example 4: 125 W HQL vs. 70 W High Pressure Sodium

COST SAVING *	**27.649 €**
ENERGY SAVING **	**186.296 kWh**
CO_2 REDUCTION ***	**97 Tonne**



RBL640 [S] / [A]

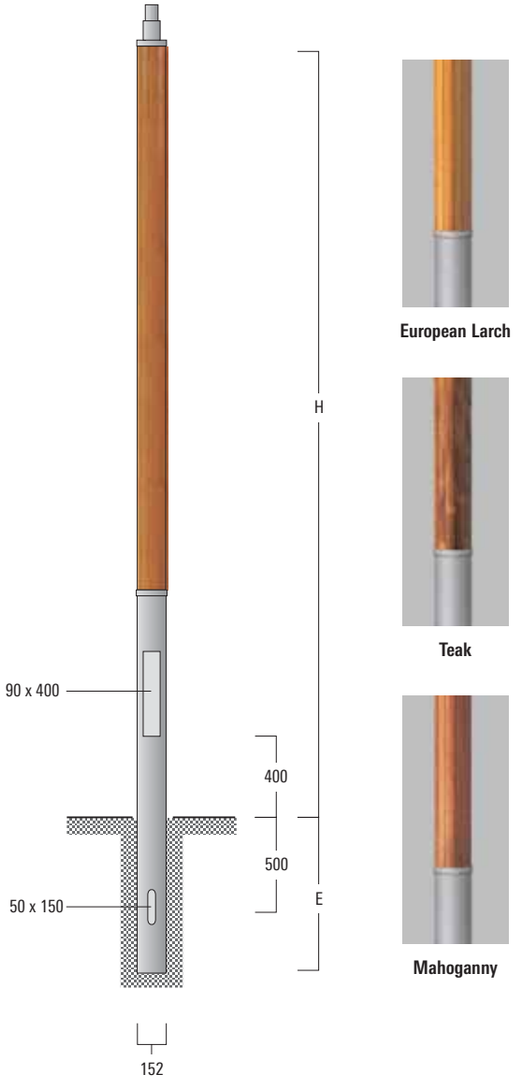


RBL660 [S] / [A]

LIGHTING COLUMN SERIES AMW-Z

Impregnated hardwood top section; Larch, Teak or Mahaghonny.
Inner section galvanised steel. Chromated and powdercoated.
Service door with stainless locking fasteners and rail for Termination chamber.

Wood is a natural material that will weather. WE-EF recommend the application of a sealant once a year.



European Larch

Teak

Mahoganny

POLE SERIES AM-Z

Steel pole, galvanised. Chromated and powdercoated.
Service door with stainless locking fasteners and rail for Termination chamber.