



**MOLONEYFOX**  
CONSULTING ENGINEERS

20.2068

**SITE LIGHTING DESIGN REPORT  
BRODERICK BOTHAR NA CHOISTE Res SHD  
GALWAY**

**DATE: 25/06/2022**

**Moloney Fox Consulting Limited**

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**Contents**

1. Executive Summary
2. Design Guidelines
3. Proposed Site Lighting Design
4. Conclusion

**Appendices**

- a. Light Design Report
- b. Light Fitting Warranty
- c. Light Fitting Data Sheet
- d. Photocell Warranty



## **1.0 Executive Summary**

This report outlines the design intent and considerations to be taken with regards to bat populations in conjunction with the proposed development, Bothar an Choiste, Castlegar, Galway

The report outlines the lighting design as developed by Moloney Fox Consulting. As part of the lighting design process, we consulted with MKO's Ecological Department. The lighting design has been developed with the following principal considerations:

- To minimise the impact of lighting on the bats natural habitat.
- Provide adequate illumination to contribute towards the safe use of the proposed pathways, roads and buildings.
- Contain the lighting within the site.
- Minimise light pollution and visual glare to the surrounding neighbourhood.
- Provide a visually interesting environment.

The complete external lighting installation will be designed in accordance with the regulations for electrical services as ETCI National Rules for Electrical Installations IS10101 as well as consideration of relevant publications including "The Effect of Street Lighting on Bats" (2008) by Matt Emery, and "Bats and Lighting" (2014), Emma Stone - University of Bristol/Bat Conservation Trust.

The predicted performance of the external lighting installations has been assessed in detail using Lighting Simulation software.

Our design intent comprises of column lighting for the pathways and site roads

An indicative example of the type of proposed luminaires (light fittings) have been included, with accompanying images.

An accompanying layout drawing indicates the proposed locations of light fittings and the calculated light levels from the simulation.

The light fitting itself, is approved by Galway County Council, and is listed SEAI Triple E Register.

Attached is the fitting warranty and Technical Data Sheets.

## 2.0 Design Guidelines

A study of artificial light sources and controls was undertaken by Emery (2008) and concluded that shielding and masking of streetlights using internal or external louvres, can reduce light spillage by as much as 97%. He recommends that due to their high cost, they are used where the lighting is extremely close to bats. In other areas he recommends that shields can be used which reduce light spill by up to 40%.

Emery considered several lamp types in his analysis, but not however LED sources, which were not as prevalent for external streetlights then as they are now.

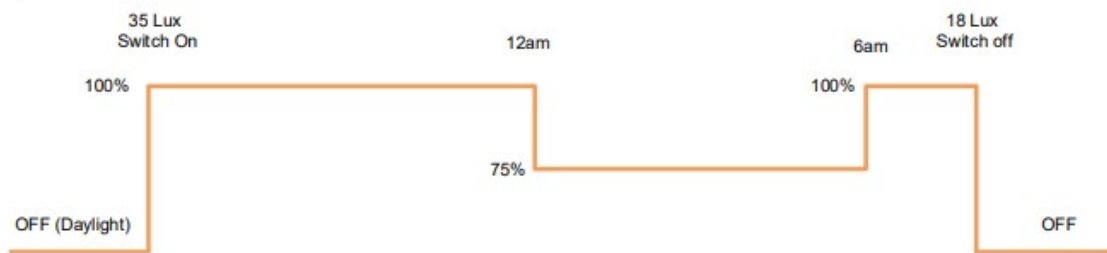
A comprehensive study by Emma Stone (2014) University of Bristol/Bat Conservation Trust, entitled “Bats and Lighting”, considers the optimum means to mitigate the effects of artificial lighting on bats. This study concludes that the type of light fitting with the lowest negative impact on bats are

- Narrow Spectrum Lights with no UV content
- Low pressure sodium and warm white LED\*
- Directional downlights - illuminating below the horizontal plane which avoid light trespass into the environment.

The study highlights that warm Low-Pressure Sodium and Warm White LED (2700K) sources have a low relative attractiveness for insects, and therefore least effect on bat prey items.

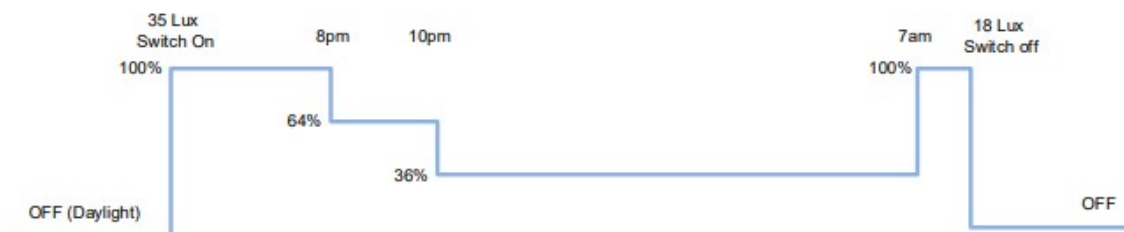
This study also proposed that lighting control regimes be considered such as dimming lights at certain times, in order to reduce illumination and spill. Public Lighting Profile 2A can be selected in this regard.

### Profile 2A



In areas where bats are passing and feeding, light levels will be reduced further to a minimum of 1.2 lux whilst maintaining compliance with the regulations. Public Lighting Profile 4D will be selected in this regard.

### Profile 4D





### **3.0 Proposed Site Lighting Design**

The proposed scheme comprises primarily of LED luminaires on 6-metre-high poles for pathways and roadway areas, located as per drawing 20.2068 /E100 / E101 and designed as per Appendix A of this report.

The quantity of luminaires has been calculated to achieve an average illuminance on pathways and roads in line with Classes P2 and P3 of IS EN 13201/BS5489

The proposed light fitting/scheme has the following features which will help mitigate the effect of the artificial lighting on the bat population:

- Warm White LED (2700K) light source – less attractive to insects, and a good light source to enable directional luminaires.
- Internal Louvres – to reduce light spill and eliminate upward light.
- Lowest possible design illuminance levels considering the nature of the site.

#### **20 - 60W**

100 - 277 Vac – 50/60 Hz – Class I

100 - 277 Vac – 50/60 Hz – Class II

12/24 Vdc (photovoltaic system)



**Figure 1: Proposed Luminaire**

#### **Simulation Results**

The results of the simulation calculations are indicated on drawing 20.2068 /E100.



#### **4.0 Conclusion**

The proposed lighting scheme has been carefully considered in order to minimise the effect on bat populations.

The Scheme comprises primarily of pole mounted Warm White (2700k) LED fittings with internal louvres. The Warm White LED light source has the least negative impact on insects and bat prey items as identified in previous studies and is also a compact light source which enables easier control of the light spread.

The internal louvres minimise light spill, particularly to the rear of the fitting, and also completely eliminate any upward light from the fittings. Internal louvres are a recommended strategy for reducing the impact of lighting on bats as identified in previous studies.

The fittings at the will be angled no greater than 5 degrees to further reduce light spill.

The design light levels have been chosen in order to both comply with Irish Standards for external lighting, while at the same time maintaining light levels as low as practically possible considering the safety of people on site, the locality, and the proximity of bats to the site.

In addition, the site lighting profiles shall be selected as described in section 2 of this report, when human activity on the site will be lower in order to further reduce the impact of the site lighting on bats.



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## Lighting Design Report

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## Content

Cover page .....	1
Content .....	2
Contacts .....	3
Luminaire list .....	4

### Product data sheets

MICROPLUS GERMANY - MPG-1N (1x MICROLED 2700K) .....	5
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### Site 1

Luminaire layout plan .....	6
Calculation objects / Light scene 1 .....	11

Site 1

### Estates

Workplane (Estates) / Light scene 1 / Perpendicular illuminance (adaptive) .....	13
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Site 1

### Road

Workplane (Road) / Light scene 1 / Perpendicular illuminance (adaptive) .....	14
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## Luminaire list

$\Phi_{total}$                    $P_{total}$   
307800 lm                3729.6 W

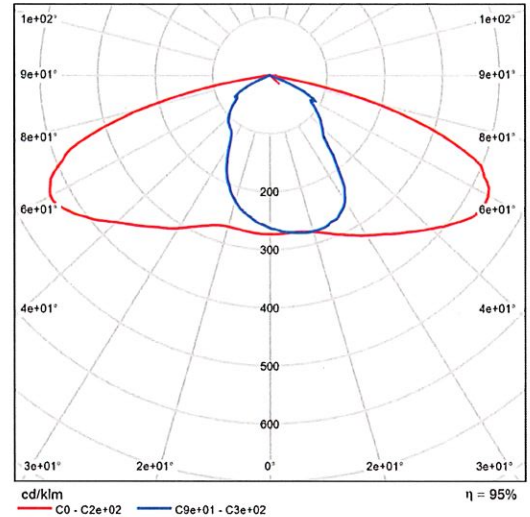
pcs.	Manufacturer	Article No.	Article name	P	$\Phi$
72	MICROPLUS GERMANY	MPG-1N 50W 2700K	MPG-1N	51.8 W	4275 lm

## Product data sheet

MICROPLUS GERMANY - MPG-1N

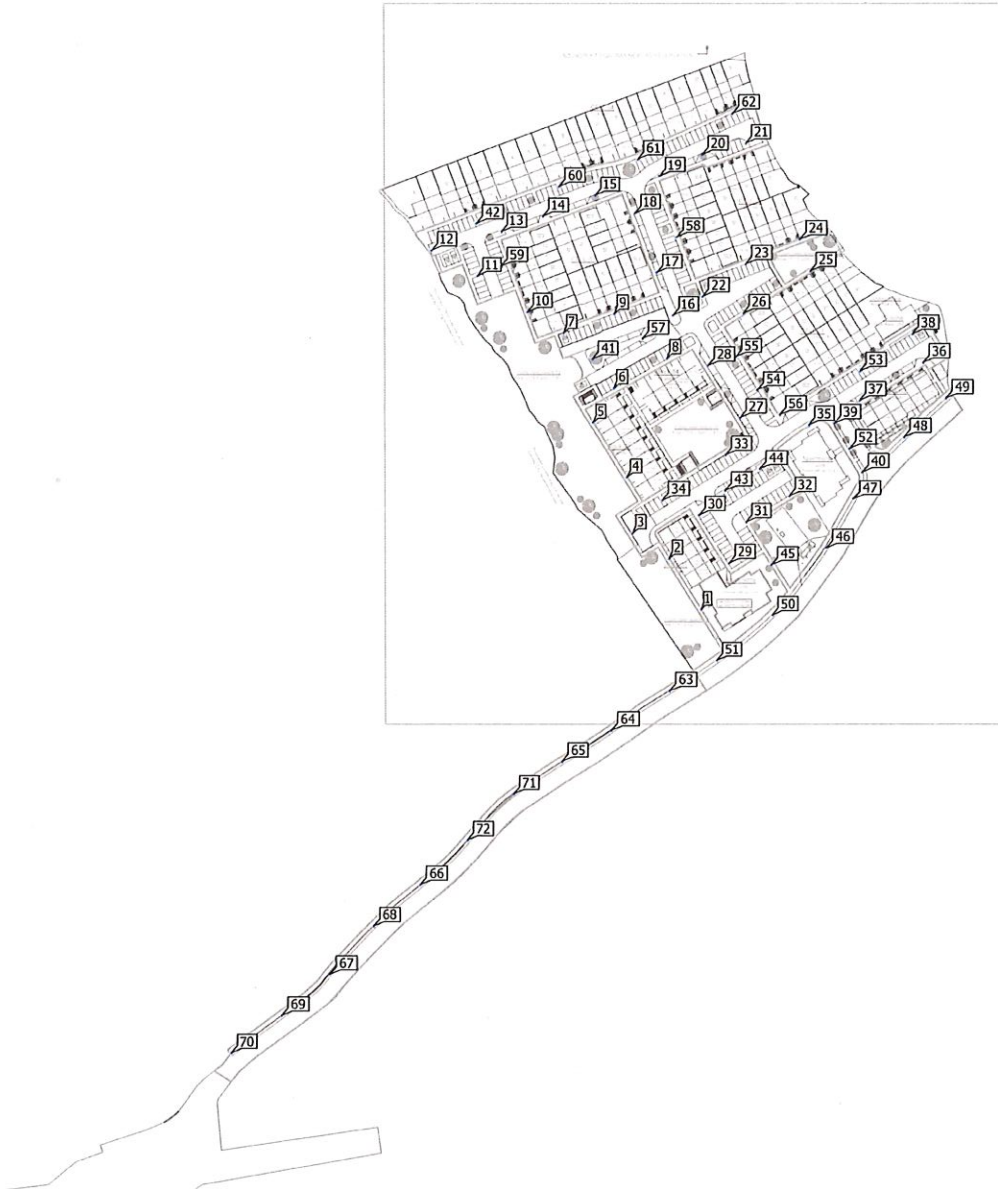


Article No.	MPG-1N 50W 2700K
P	51.8 W
$\Phi_{Lamp}$	4500 lm
$\Phi_{Luminaire}$	4275 lm
$\eta$	94.99 %
CCT	2700 K
CRI	72



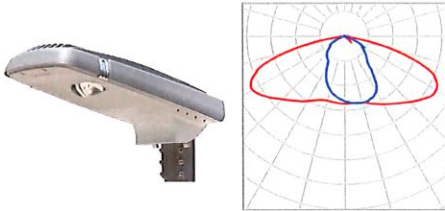
Polar LDC

Site 1  
Luminaire layout plan



Site 1

## Luminaire layout plan



Manufacturer	MICROPLUS GERMANY	P	51.8 W
Article No.	MPG-1N 50W 2700K	$\Phi_{\text{Luminaire}}$	4275 lm
Article name	MPG-1N		
Fitting	1x MICROLED 2700K		

### Individual luminaires

X	Y	Mounting height	Luminaire
145.934 m	52.345 m	6.000 m	1
131.249 m	75.596 m	6.000 m	2
114.380 m	87.161 m	6.000 m	3
111.806 m	112.882 m	6.000 m	4
96.305 m	137.875 m	6.000 m	5
105.943 m	153.443 m	6.000 m	6
82.812 m	178.843 m	6.000 m	7
130.480 m	167.151 m	6.000 m	8
106.248 m	187.582 m	6.000 m	9
66.091 m	188.406 m	6.000 m	10
43.021 m	204.952 m	6.000 m	11
21.813 m	216.553 m	6.000 m	12
54.376 m	224.976 m	6.000 m	13

Site 1

## Luminaire layout plan

X	Y	Mounting height	Luminaire
73.346 m	232.104 m	6.000 m	14
97.621 m	241.656 m	6.000 m	15
133.290 m	186.897 m	6.000 m	16
125.868 m	206.489 m	6.000 m	17
115.830 m	233.513 m	6.000 m	18
127.187 m	250.663 m	6.000 m	19
147.013 m	260.214 m	6.000 m	20
167.190 m	265.397 m	6.000 m	21
146.970 m	195.433 m	6.000 m	22
166.973 m	210.219 m	6.000 m	23
191.993 m	221.496 m	6.000 m	24
196.886 m	207.064 m	6.000 m	25
165.821 m	187.802 m	6.000 m	26
164.014 m	140.097 m	6.000 m	27
149.340 m	163.859 m	6.000 m	28
158.764 m	73.621 m	6.000 m	29
145.122 m	95.555 m	6.000 m	30
166.992 m	92.264 m	6.000 m	31
186.894 m	104.202 m	6.000 m	32
157.418 m	123.071 m	6.000 m	33
128.251 m	102.295 m	6.000 m	34
195.931 m	136.730 m	6.000 m	35
248.751 m	165.205 m	6.000 m	36
219.535 m	147.901 m	6.000 m	37

Site 1

## Luminaire layout plan

X	Y	Mounting height	Luminaire
243.851 m	178.295 m	6.000 m	38
207.702 m	137.530 m	6.000 m	39
220.542 m	115.132 m	6.000 m	40
96.127 m	166.809 m	6.000 m	41
42.703 m	228.790 m	6.000 m	42
157.169 m	106.731 m	6.000 m	43
173.251 m	116.705 m	6.000 m	44
178.546 m	72.827 m	6.000 m	45
203.704 m	80.757 m	8.000 m	46
216.282 m	103.243 m	8.000 m	47
239.924 m	131.183 m	8.000 m	48
259.054 m	148.822 m	8.000 m	49
179.021 m	49.721 m	8.000 m	50
153.140 m	28.992 m	8.000 m	51
214.721 m	126.005 m	6.000 m	52
219.751 m	161.295 m	6.000 m	53
172.085 m	152.773 m	6.000 m	54
162.159 m	167.935 m	6.000 m	55
182.618 m	141.344 m	6.000 m	56
119.263 m	176.203 m	6.000 m	57
135.188 m	222.709 m	6.000 m	58
53.917 m	209.341 m	6.000 m	59
80.810 m	245.597 m	6.000 m	60
117.290 m	258.097 m	6.000 m	61

Site 1

**Luminaire layout plan**

X	Y	Mounting height	Luminaire
160.972 m	279.098 m	6.000 m	62
131.356 m	15.003 m	8.000 m	63
104.447 m	-2.998 m	8.000 m	64
81.638 m	-17.201 m	8.000 m	65
15.935 m	-73.613 m	8.000 m	66
-26.325 m	-114.220 m	8.000 m	67
-5.777 m	-92.581 m	8.000 m	68
-48.108 m	-133.366 m	8.000 m	69
-71.314 m	-150.453 m	8.000 m	70
59.474 m	-31.918 m	8.000 m	71
37.944 m	-53.201 m	8.000 m	72

Site 1 (Light scene 1)  
**Calculation objects**





Site 1 (Light scene 1)

## Calculation objects

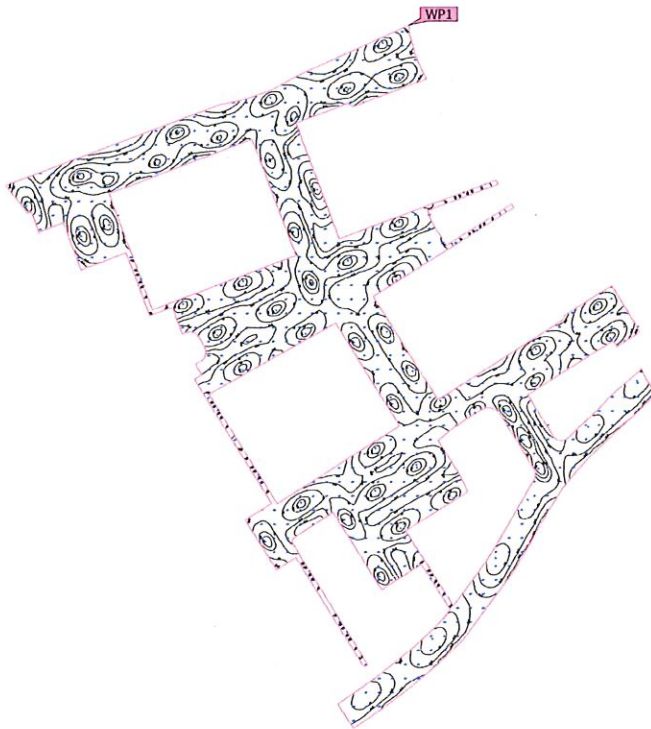
### Work planes

Properties	$\bar{E}$ (Target)	$E_{\min}$	$E_{\max}$	$g_1$	$g_2$	Index
Workplane (Estates) Perpendicular illuminance (adaptive) Height: 0.000 m, Wall zone: 0.000 m	10.4 lx ( $\geq 7.50$ lx) ✓	1.51 lx	34.2 lx	0.15	0.044	WP1
Workplane (Road) Perpendicular illuminance (adaptive) Height: 0.000 m, Wall zone: 0.000 m	7.51 lx ( $\geq 7.50$ lx) ✓	2.26 lx	15.7 lx	0.30	0.14	WP2

Utilisation profile: DIALux presetting, Standard (outdoor transportation area)

Estates (Light scene 1)

### Workplane (Estates)

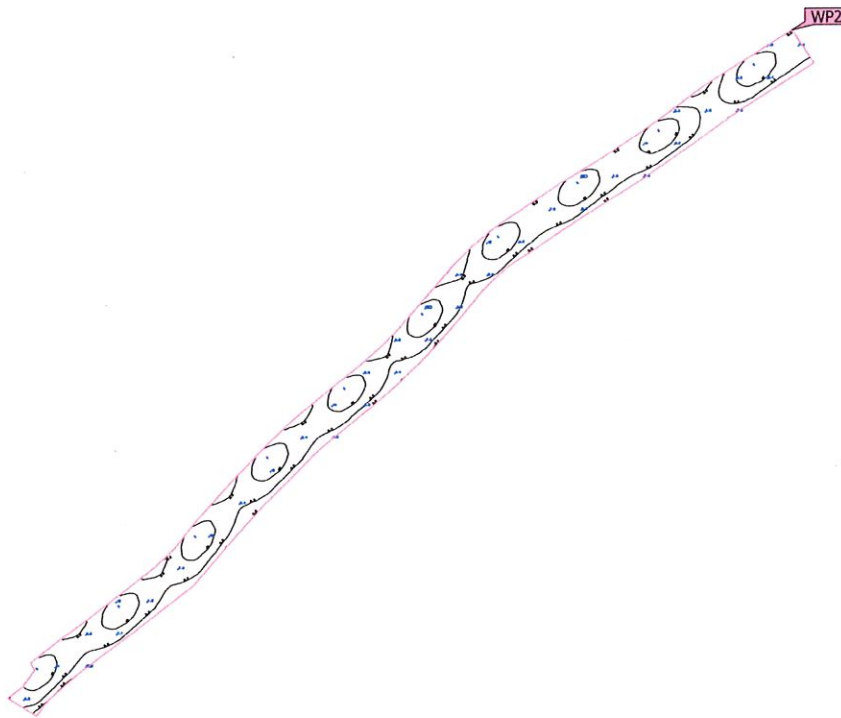
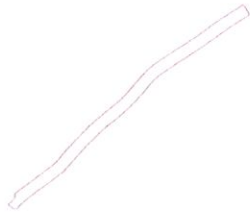


Properties	$\bar{E}$ (Target)	$E_{min}$	$E_{max}$	$g_1$	$g_2$	Index
Workplane (Estates) Perpendicular illuminance (adaptive) Height: 0.000 m, Wall zone: 0.000 m	10.4 lx ( $\geq 7.50$ lx) ✓	1.51 lx	34.2 lx	0.15	0.044	WP1

Utilisation profile: General circulation areas at outdoor workplaces, Ireland housing development

Road (Light scene 1)

### Workplane (Road)



Properties	$\bar{E}$ (Target)	$E_{min}$	$E_{max}$	$g_1$	$g_2$	Index
Workplane (Road) Perpendicular illuminance (adaptive) Height: 0.000 m, Wall zone: 0.000 m	7.51 lx ( $\geq 7.50$ lx) ✓	2.26 lx	15.7 lx	0.30	0.14	WP2

Utilisation profile: General circulation areas at outdoor workplaces, P3

# LONG LIFE NEMA PHOTOCELLS

Accurate switching and long service life - recommended for LEDs

The Charles Endirect 8480, 8481, 8483 & 8480-H Long Life Photocells incorporate a silicone integrated photodiode & amplifier with spectral and angular response, approximating that of an accurate colour-corrected cosine photometer. The use of silicone light sensors in light detection is of great importance, due to the increased awareness by electricity supply utilities of the high drift associated with other detectors. These Long Life Photocells also employ the patented Relay Assisted Triac (RAT) switching technique which has been employed in Charles Endirect lighting controls to reliably switch reactive lighting loads for decades. Charles Endirect Long Life Photocells are manufactured in the EU to the highest standards offering you the most reliable street light on/off switching solution.

All these photocells are available with user specified switch on illumination levels (specified in lux (lx) or foot candles (fc)) and with user specified switch 'ON' and switch 'OFF' light levels i.e. the 'switching ratio' and user specified time delays.

**Key benefits:**

- Recommended for use with LED luminaires owing to the Long service life achieved by Relay Assisted Triac switching
- Accurate evening to morning switching
- RAT (Relay Assisted Triac) patented switching with negligible power loss in RAT switch
- Special anti-weathering plastic enclosure material
- Incorporates a state-of-the-art micro-controller
- Circuit power consumption <0.25 watts @ 230V 50Hz (Charles Endirect 8480, 8480-H)
- Controls reactive loads
- Switching cycles on loads of 3 X 400 Watt High Pressure Sodium Luminaires
- The RAT switch has been independently tested to 30,000 switching cycles on the 8480.



Charles Endirect

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Wincanton Business Park  
Wincanton  
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**Technical Specification**

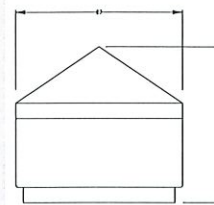
	<b>8480</b>	<b>8481</b>	<b>8483</b>	<b>8480-H</b>
<b>NEMA Base</b>	✓	✓	✓	
<b>Hard Wired</b>				✓
<b>Supply Voltage</b>	200 to 260 Volts	105 to 305 Volts 50/60Hz	105 to 305 Volts 50/60Hz	200 to 260 Volts 50/60Hz
<b>Power Supply consumption</b>	<250mW @ 230V 50Hz	350mW nominal @ 230 volts AC	350mW nominal @ 230 volts AC	<250mW @ 230V 50Hz
<b>Maximum load current (A)</b>	10	16	16	10
<b>Load Rating</b>	2kVA	1800VA, 1000W	1800VA, 1000W	2kVA
<b>Operating Temperature</b>	-20°C to + 70°C (-4°F - 158°F)	-40°C to 70°C (-40°F - 158°F)	-40°C to 70°C (-40°F - 158°F)	-20°C to + 70°C (-4°F - 158°F)
<b>Switch On Levels</b>	70 lux (others on request)	3fc (others on request)	3fc (others on request)	70 lux (others on request)
<b>Light Sensor</b>	Colour corrected silicon photodiode + amplifier	Colour corrected silicon photodiode + amplifier	Colour corrected silicon photodiode + amplifier	Colour corrected silicon photodiode + amplifier
<b>Switch On: Switch OFF ratio:</b>	1:0.5 standard (others on request)	1:0.5 standard (others on request)	1:0.5 standard (others on request)	1:0.5 standard (others on request)
<b>ON to OFF and OFF to ON time delays</b>	25 seconds standard (others on request)	25 seconds standard (others on request)	25 seconds standard (others on request)	25 seconds standard (others on request)
<b>Standards Compliance</b>	Environmental: RoHS and WEEE		Manufacturing: IS EN ISO 9001: 2008	

The 8480, 8481 and 8483 have a three blade NEMA plug-in locking electrical connection. The 8480-H has a 3 cable flying lead hard-wired electrical connection system and an M20 threaded mounting se-cured by locknuts and gaskets.

The 8481 and 8483 incorporate a universal power supply capable of operating on the voltages from 105 to 305 Volts 50/60 Hz. The 8483 has a north facing window; the 8480, 8481 and 8480-H have upward facing light sensors that can view the whole sky.



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**100.000 Horas** para el Microled Plus, **10 AÑOS** en todos los productos salvo los que se especifique **5 AÑOS**.

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100 000 heures pour le Microled Plus, 10 ANS pour tous les produits sauf ceux spécifiés 5 ANS.

Le couvercle comprend la réparation ou le remplacement des produits défectueux reconnus par notre laboratoire technique et / ou d'essai, conformément à **MICROPLUS GERMANY GENERAL ASSURANCE** de celui-ci est rassemblé ici seulement un extrait, et selon **CONDITIONS PARTICULIÈRES DE GARANTIE** pour chacun des produits ou gammes de produits commercialisés sous la marque **MICROPLUS GERMANY**

cas de force majeure, l'usure naturelle, une mauvaise manipulation et / ou de l'échec de la direction à suivre les instructions, un mauvais entretien, une mauvaise utilisation, les phénomènes atmosphériques ne sont pas expressément prévus ou tout autre défaut ou non imputables à des produits, des équipements ou du personnel technique sont exclus, de **MICROPLUS GERMANY**.

**MICROPLUS GERMANY** se réserve le droit de fournir un modèle différent du produit et / ou d'un composant pour répondre aux demandes de garantie dans le cas où le modèle original ne soit plus fabriqué.

# MPG-1N

N° INDUSTRIAL DESIGN 002419168

180 Lm/w  
100.000 LIFE TIME HOURS

DRIVER BY  
**MW**  
MEAN WELL

UP TO **75%**  
ENERGETIC  
SAVING

## 20-70w

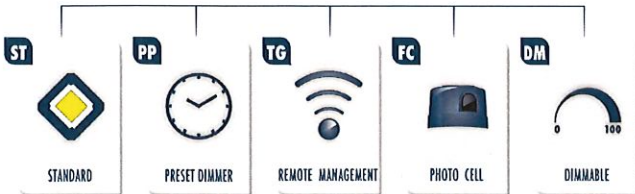
90 - 305Vac • 50/60Hz • Class I

**OPTION:**

90 - 305Vac • 50/60Hz • Class II  
12/24 Vdc (photovoltaic systems)



### OPTIONS



**RoHS**  
2002/95/EC

CE



EN62471:2009  
PHOTOBIOLOGICAL SAFETY  
OF LAMP AND LAMP SYSTEM



CB

**ENERGY SAVER** 75%  
A++

**Germany**

Diese neuen MPG-1N-Leuchten enthalten MICROLED PLUS der neuesten Generation mit 150-160 Lm/w und TÜV-Zertifikat sowie neu entwickelte Glaslinsen von hohem Reinheitsgrad (96%) und niedriger Absorption (unter 5%). Ihre divergierend-asymerische Geometrie gibt dem Lichtstrahl eine größere Ausdehnung und macht ihn gleichmäßiger.

Vollständig aus sehr korrosionsbeständigem Aluminium hergestellt; verfügbar in den Farben, die Sie dem Anhang entnehmen können; zeichnet sich unter anderem durch Härte und Langlebigkeit sowie eine höhere Belastbarkeit gegenüber UV-Strahlen aus, so dass die Wartungskosten niedriger sind.

Eingebauter TÜV-zertifizierter Regler mit hohem Überspannungsschutz gegen in öffentlichen Stromnetzen häufig vorkommende Spannungsschwankungen.

Die Leuchten Serie MPG-1N wird in verschiedenen Spannungen angeboten 90 - 305VAC oder optional auch in 12 - 24VDC sowie in verschiedenen Lichtfarben, von 3.000K - 5.500K.

**Spain**

Estas nuevas luminarias MPG-1N incorporan los nuevos MICROLED PLUS de última generación de 150-160Lm/w, con certificado TÜV, además de novedosas lentes de vidrio de alta pureza (96%) y baja absorción (menos de un 5%), que presentan una geometría divergente-asiétrica, generando un haz lumínico de mayor extensión y uniformidad.

Fabricada íntegramente a partir de un aluminio muy resistente a la corrosión; disponible en los colores que adjuntamos, entre sus cualidades destaca su dureza y su larga vida, además de una mayor resistencia a los rayos UV, lo que reduce los costes de mantenimiento.

Instalamos en su interior, arrancadores con certificado TÜV y con gran protección frente a las sobretensiones, típicos de las redes de distribución públicas.

La gama MPG-1N de luminarias se suministra en un rango de tensión 90 - 305VAC, opcional 12 - 24VDC; así como en diversas temperaturas de color (3.000 - 5.500 K).

**UK**

This new streetlamp MPG-1N incorporate the latest generation of MICROLED PLUS of 150-160lm/w, with TÜV certificate, as well as novel lens made with high purity glasses (96%) and low absorption (less than 5%) with a divergent-asymeric geometry, generating a greater extent and uniformity light beam.

Made entirely with aluminium high corrosion resistant, available in colours attached. Among its qualities stand out its hardness and long life, besides a greater UV resistance, than reduce the maintenance cost.

Drivers installed in, with TÜV Certificate and with great protection to overvoltages, typical by public distribution grid.

The MPG-1N luminaire range can be supplied at different voltage ranges: 90 - 305VAC, optional 12 - 24VDC, as well as in various color temperatures (3.000 - 5.500K).

**Portugal**

Estas novas luminárias MPG-1N incorporam os novos MICROLED PLUS de última geração de 150-160Lm/w, com certificado TÜV, e ainda lentes de vidro de alta pureza (96%) e baixa absorção (menos de 5%), que apresentam uma geometria divergente-asiétrica, gerando um feixe lumínico de maior extensão e uniformidade.

Fabricadas integralmente a partir de um alumínio muito resistente à corrosão; disponíveis nas cores que anexamos, entre as suas qualidades destacam-se a sua dureza e a longa duração, além de uma maior resistência aos raios UV, o que reduz os custos de manutenção.

Incluem no seu interior, arrancadores com certificado TÜV e com grande proteção às sobretensões, típicos da rede de distribuição pública.

A gama de luminárias MPG-1N é fornecida com tensões entre os 90 - 305 VAC, opcional 12 - 24 VDC; assim como em diferentes temperaturas de cor (3.000 - 5.500 K).

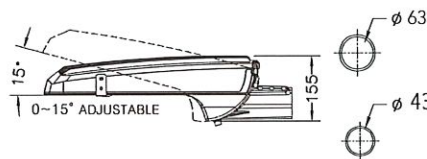
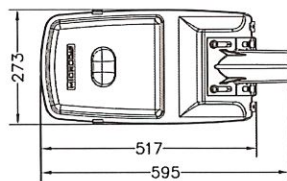
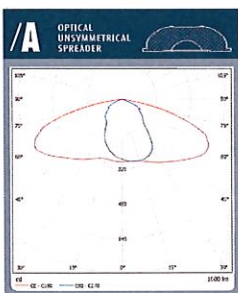
**France**

Ces nouvelles luminaires MPG-1N incorporent les nouveaux MICROLED PLUS de dernière génération de 150-160lm/w, avec certifica TÜV, avec de nouvelles lentilles de verre de haute pureté (96%) et basse absorption (moins de 5%), qui présentent une géométrie divergent-asyométrique, en produisant un faisceau lumineux plus étendu et uniforme.

Fabriquée complètement à partir d'un aluminium très résistant à la corrosion; disponible dans les couleurs que nous joignons, entre ses qualités il souligne sa dureté et sa longue vie, avec une plus grande résistance aux rayons UV, ce qui réduit les coûts de mainfien.

Ils installent dans leur intérieur, démarreurs avec certifica TÜV et avec une grande protection face aux surtensions, typiques des réseaux de distribution publics.

La gamme de luminaires MPG-1N est fourni dans une gamme de tension 90 - 305VAC, en option 12 - 24VDC; ainsi que diverses température de couleur (3.000 - 5.500 K).



RENDIMIENTOS DE LA LUMINARIA EN PRUEBAS DE LABORATORIO CON TEMPERATURA AMBIENTE DE 25° C

PERFORMANCE OF THE LUMINARIES IN LABORATORY TESTS WITH ROOM TEMPERATURE OF 25 ° C

REFERENCE MODEL	OPTIONS					TECHNICAL CHARACTERISTICS OF THE STREETLAMP												
	CONTROL	NOMINAL POWER	VOLTAGE	TEMPERATURE	LENS TYPE	STREETLAMP POWER	LUMINOUS FLUX	WEIGHT	SIZE STREETLAMP	INPUT VOLTAGE	CONSTRUCTION STREETLAMP	SYSTEM LIGHTING	LIFETIME	WORKING TEMPERATURE	EFFICIENCY	PROTECTION		
																IP	IK	ELECTRIC
MPG-1N	/ST /PP /TG /FC /DM	/020	/VAC /VDC /VACII	/3.0 /3.8 /4.5 /5.5	/A	20W	3,000 Lm	6 kg  6,15 kg  6,35 kg	540 x 255 x 100 mm	90 - 305 Vac or 12 / 24 Vdc	INJECTED ALUMINIUM	1 MICROLED PLUS 32 Vdc	100.000 HOURS	- 40° C ~ + 55° C	92 %	IP67	IK08  (option IK10)	TYPE I or TYPE II
		/030				30W	4,500 Lm											
		/040				40W	6,000 Lm											
		/050				50W	7,500 Lm											
		/060				60W	9,000 Lm											
		/070				70W	10,500 Lm											





## WESTIRE (16) SIXTEEN YEARS GUARANTEE

**WESTIRE Ireland Limited, Industrial Estate, Belmullet, County Mayo, F26TE81, Ireland** hereafter designated and trading as "WESTIRE", guarantees that its Photocell Products are free from defects in their components and manufacturing for a period of (16) sixteen years from the date of installation. This date guarantee calendar is molded into the base section of each photocell so as the user can indicate or inscribe when the photocell was installed. If no date is indicated or inscribed, then the date of manufacturer will comply as the installation date.

### Definitions:

**WESTIRE:** WESTIRE Ireland Limited, producer of the products covered by this guarantee.

**Products:** WESTIRE Photocells one and Two-Part NEMA and Hard-Wired types and all identified by WESTIRE logo, reference number, and serial number.

**End-User:** The company who acquired the Products for installation in light fixtures and lanterns owned directly by the company or for a third party under an outsourcing contract or a financial construction. Typically, the End-User is the legal owner of the Products.

**The Guarantee is applicable and valid only when these products are used with appropriate Road and Street Lighting that is in conformity with the standards in force in the European Union. This guarantee is reserved only for the company who acquired the Products and following presentation of proof of purchase. This guarantee is null and void if the Products are not used in a normal way, or if WESTIRE determines that the defect is caused by, but not limited to:**

- Short circuiting power factor correction capacitors if fitted.
- Abnormalities in the gas-discharge arc tube.
- Incorrect wiring insulation shorting to earthing parts or metal parts.
- Incorrect fusing or means of protection against abnormal mains conditions in the connected load. (e.g. Lightning discharge, unusual mains transients, mains surges, mains brown outs etc.)
- Ingress of water, condensation into the Luminaire or Electrical Cabinets. (applicable to WESTIRE internal fitted photocells only and not accessories and external fitted photo electric lighting controls)
- Type of load connected to the WESTIRE Product.
- Any unusual abnormality in the incoming mains supply or the mains supply voltages as specified in our fitting instruction or catalogues. (The mains supplied to WESTIRE Products must conform to the specification as outlined in the standard for the supply of AC mains in force)
- Modifications, tampering or any unauthorized attachments connected to the Products.
- Accidental falls or misuse.
- Unsuitable environmental conditions.
- Operation beyond the useful life of the Products.
- Malfunctioning Third Party components or products connected to the WESTIRE Products.

WESTIRE Products are only intended for the control of all types of Reactive Outdoor and Public Lighting Loads including: LED Outdoor and Public Lighting and are not designed or guaranteed for use in the control of other loads not like outdoor lighting loads. WESTIRE Products should be installed as per WESTIRE's fitting instructions and any other necessary additional fitting recommendations supplied by WESTIRE. WESTIRE always should be made aware as to the type of loads its lighting control Products are controlling or connected to.

If a Product becomes defective according to the terms of this guarantee, WESTIRE will examine the said Product, and, only at its own discretion, proceed to repair or replace it. WESTIRE will then ship a Product similar in specification to the said defective Product in terms of its performance back to the user if it finds that the malfunction was because of a faulty component or design defect. If it is because of a faulty component and this was due to the component supplier's quality control or workmanship, WESTIRE will hold the component supplier fully responsible for same. WESTIRE will make every effort to pursue the component supplier for costs associated with replacement and the fitting of the Product arising from the defect. Those said costs will be passed on to the user of the defective WESTIRE Product when received including any additional extra compensation claimed on behalf of the End-User. The only responsibility and exclusive recourse WESTIRE will have concerning the recognized defects, will be to repair or replace the product in question. WESTIRE may, at its own discretion, replace it with a rebuilt product. In the case of a faulty component delivered to WESTIRE not fit for the purpose an Independent International Test Laboratory will be used to determine that the said component was defective before approaching the said component supplier. A copy of the received independent test report will be forwarded to both the customer of WESTIRE's Product and to the said component supplier.

This guarantee covers only the repair or the replacement of the WESTIRE defective Products listed in its catalogues: WESTIRE declines all responsibility for any costs related to the maintenance and/or installation and/or removal of WESTIRE's Products only the replacement on a one for one basis of the supplied WESTIRE Product.

The End-User's sole remedy under this guarantee is set forth in this document. For any claim concerning performance or non-performance of WESTIRE's Product under this guarantee, the End-User may recover actual damages up to the limit set forth in the following paragraph.

WESTIRE's liability for actual damages from any cause whatsoever will be limited to the amount of money the End-User paid for the Product that is returned to WESTIRE as a defective Product.

This limitation of liability will not apply to claims by you for bodily injury or damage to real property or tangible personal property or for replacement costs. IN NO EVENT WILL WESTIRE BE LIABLE FOR ANY LOST PROFITS, LOST SAVINGS, INCIDENTAL DAMAGE, OR OTHER ECONOMIC OR CONSEQUENTIAL DAMAGES. This is true even if the End-User advises WESTIRE of the possibility of such damages. WESTIRE is not liable for any claim by the End-User based on a third-party claim. This limitation of remedies also applies to claims against any Suppliers, Agents, Distributors and Remarketers of WESTIRE's Products. WESTIRE and its Suppliers' Agents, Distributors and Remarketers' limitations of remedies are not cumulative. Such Suppliers, Agents, Distributors and Remarketers are intended beneficiaries of this limitation.

WESTIRE WILL IN NO WAY BE HELD RESPONSIBLE, UNDER ANY CIRCUMSTANCES AT ALL, FOR INDIRECT, CONSEQUENTIAL OR ACCESSORY DAMAGES, OR FOR THE LOSS OF LIGHTING.

NOTE: WESTIRE is committed not to terminate support of their Products, or to consider the Products obsolete, if the necessary components included in the Product are available on the market, and a reasonable demand exists from its clients for these Products.

Signed: 

Date 13 | February | 2019.

**Sean Noone**  
Title: **Managing Director.**