Requirements

In the opinion of the BBA, the ULTIPAVE 10 mm Thin Surfacing System, when assessed in accordance with the BBA HAPAS *Guideline Document for the Assessment and Certification of Thin Surfacing Systems for Highways* and used in accordance with the provisions of this Certificate, will meet or contribute to meeting the requirements of the *Manual of Contract Documents for Highways Works* (MCHW)[1], Volume 1 *Specification for Highways Works* (SHW), Series 900, Clause 942, incorporating Interim Advice Note 154/12.

(1) The MCHW is operated by the Overseeing Organisations: Highways England (HE), Transport Scotland, the Welsh Assembly Government and the Department for Infrastructure (Northern Ireland).

Regulations

Construction (Design and Management) Regulations 2015

Construction (Design and Management) Regulations (Northern Ireland) 2016

Information in this Certificate may assist the client, designer (including Principal Designer) and contractor (including Principal Contractor) to address their obligations under these Regulations.

See section: 3 *Delivery and site handling* of this Certificate.

Additional Information

CE marking

The Certificate holder has taken the responsibility of CE marking the stone mastic asphalt in accordance with harmonised European standard BS EN 13108-5 : 2016. An asterisk (*) appearing in this Certificate indicates that data shown are given in the manufacturer's Declaration of Performance.

Technical Specification

1 Description

1.1 The ULTIPAVE 10 mm Thin Surfacing System is a stone mastic asphalt surface course, consisting of a paving grade bitumen to BS EN 12591 : 2009, cellulose fibres and limestone filler, and fine and coarse aggregates to BS EN 13043 : 2002.

1.2 The system is used in conjunction with a spray-applied, bitumen emulsion tack coat conforming to BS EN 13808 : 2013, or a proprietary polymer-modified bitumen emulsion bond coat.

1.3 Ancillary items used with the system include:

- joint preparation — hot applied 40/60 penetration bitumen to BS EN 12591 : 2009 or a cold-applied, thixotropic bitumen emulsion, for use on all cut joints
- tack coat — C40 B 4 (K1-40) bitumen emulsion tack coat conforming to BS EN 13808 : 2013, for use on small areas not accessible by machine application.

2 Manufacture

2.1 The stone mastic asphalt is manufactured using conventional asphalt production methods.

2.2 As part of the assessment and ongoing surveillance of product quality, the BBA has:

- agreed with the manufacturer the quality control procedures and product testing to be undertaken
- assessed and agreed the quality control operated over batches of incoming materials
- monitored the production process and verified that it is in accordance with the documented process
- evaluated the process for management of nonconformities
- checked that equipment has been properly tested and calibrated
- undertaken to carry out the above measures on a regular basis through a surveillance process, to verify that the specifications and quality control operated by the manufacturer are being maintained.

2.3 The management system of Tarmac Trading Ltd has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2008 by BSI (Certificate FM 503516).

3 Delivery and site handling

3.1 The system components are delivered in bulk in insulated vehicles.

3.2 Bond and tack coats may be delivered to site either in bulk by tanker or in 205 litre drums.

3.3 The Certificate holder has taken the responsibility of classifying and labelling the system components under the *CLP Regulation (EC) No 1272/2008 on the Classification and Labelling and Packaging of Substances and Mixtures*. Users must refer to the relevant Safety Data Sheet(s).

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on the ULTIPAVE 10 mm Thin Surfacing System.

Design Considerations

4 Use

4.1 The ULTIPAVE 10 mm Thin Surfacing System can be designed to meet or contribute to meeting the relevant installed requirements of the MCHW, Volume 1, SHW, Series 900, Clause 942, as identified in Table 9/11.

4.2 The system is satisfactory for use on bituminous or concrete substrates, provided they are stable and have sufficient loadbearing strength to support the loads imposed during installation and service.

4.3 Guidance on evaluating the condition of an existing surface is provided in the *Design Manual for Roads and Bridges* (DMRB)[1], HD 30/08, 7.3.3.

4.4 Guidance on appropriate surfacing selection is provided in the DMRB[1], HD 36/06, 7.5.1. Local Authorities may have different criteria, which should be taken into consideration.

(1) The DMRB is operated by the Overseeing Organisations: Highways England (HE), Transport Scotland, the Welsh Assembly Government and the Department for Infrastructure (Northern Ireland).

5 Practicability of installation

The system is installed only by contractors approved by the Certificate holder using conventional paving equipment (see the *Installation* part of this Certificate).

6 Surface macrotexture

The system is designed to comply with the initial and retained texture depth requirements for an installed 10 mm upper aggregate size thin surfacing system in accordance with the MCHW, Volume 1, SHW, Clause 942, incorporating Interim Advice Note 154/12, Clause 921, Tables 9/3SR and NG 9/32, and is satisfactory for use on roads with this requirement.

7 Bond to substrate

The torque bond strength for the system measured greater than 400 kPa and meets the minimum requirement of Table B.5 of the Guideline Document.

8 Maintenance

The system is not subject to any routine maintenance requirements. However, any damage must be repaired (see section 14).

9 Durability

When installed in accordance with this Certificate, the system will provide a durable surface course for new and maintenance road construction, in accordance with the MCHW, Volume 1, SHW, Series 900, Clause 942, incorporating Interim Advice Note 154/12.

Installation

10 General

10.1 Application of the system, within the context of this Certificate, is carried out by installers recommended or recognised by the Certificate holder. Such an installer is a company which:

- employs operatives who have been trained and approved by the Certificate holder to install the system
- has undertaken to comply with the Certificate holder's application procedure
- is subject to supervision by the Certificate holder, including site inspections.

10.2 As part of the assessment and ongoing surveillance of the quality of installation of the system, the BBA has:

- agreed the quality control procedures and testing to be undertaken
- monitored the process and verified that it is in accordance with the documented procedures
- evaluated the process for management of nonconformities
- checked that equipment has been properly tested and calibrated
- undertaken to carry out the above measures on a regular basis through a surveillance process, to verify that the quality control operated is being maintained.

10.3 The system must be installed in accordance with the Certificate holder's installation procedures, incorporating guidance provided in BS 594987 : 2015.

10.4 The system can be applied to bituminous or concrete substrates at a nominal layer thickness of between 25 and 50 mm in depth on roads installed in accordance with the MCHW, Volume 1, SHW, Series 900, Clause 942. The minimum thickness at any point must not fall below 20 mm.

10.5 Provided the substrate is free from standing water or ice and that the minimum rolling temperature can be achieved, the system can be installed at a minimum ambient temperature of –1°C measured on a rising thermometer.

11 Substrate preparation

11.1 The substrate must be prepared in accordance with BS 594987 : 2015, Section 5.

11.2 Bitumen emulsion bond coat or tack coat is spray applied to achieve a minimum 0.3 $kg \cdot m^{-2}$ residual bitumen on concrete and 0.15 to 0.35 $kg \cdot m^{-2}$ on bitumen substrates. A polymer-modified bond coat must be used when the nominal thickness is less than 30 mm.

11.3 For small areas and detailing, bitumen emulsion tack coat can be applied leaving a uniform coating, using appropriate hand-held equipment.

11.4 The emulsion must be allowed to break (change from brown to black) prior to the application of the system

12 Laying and compaction procedures

12.1 Machine and hand installation must follow the requirements of BS 594987 : 2015, Sections 6.3, 6.4 and 6.7.

12.2 Compaction must follow the requirements of BS 594987 : 2015, Sections 9.2 and 9.3.

12.3 Rolling and compaction must commence as soon as possible above the minimum rolling temperature. The temperature is binder specific and will be either 110 or 130°C. This must be identified by the Certificate holder prior to the commencement of installation.

13 Joints

13.1 All joints must be prepared in accordance with BS 594987 : 2015, Sections 6.8.1 and 6.8.2. Any cut joints must be saw cut to a full depth vertical face, cleaned and painted with a thick uniform coating of joint preparation as identified in section 1.3.

13.2 Cold longitudinal joints must be either:

- cut to a full-depth vertical face and painted prior to matching, or
- formed into a chamfer during the laying process and subsequently painted prior to matching. Chamfers must be at an angle of 70 to 80° rather than a vertical right angle.

13.3 Hot longitudinal joints may be hot matched, provided that the temperature of the earlier laid mat is at least 120°C.

14 Repair

Any damaged areas must be cut back to sound material by planing or other suitable means and replaced with a material appropriate to the location, traffic and area of re-instatement. Materials must be selected in agreement with the Certificate holder and the purchaser.

Technical Investigations

15 Tests

An assessment was made of data supplied as part of installation trials and of test data to BS EN 13108-5 : 2016, and in accordance with the *Guideline Document for the Assessment and Certification of Thin Surfacing Systems for Highways* in relation to:

- texture depth
- wheel tracking (resistance to permanent deformation)*
- torque bond
- visual condition of system installation and performance trial (SIPT)
- sensitivity to water.

16 Investigations

16.1 An installation trial was carried out to assess the practicability of the installation and on-site quality control procedures. A visual inspection of the site concluded that it was free from significant abnormalities. Results from the installation confirmed that it complied with the contractual requirements.

16.2 A user/specifier survey relating to existing sites that were at least two years old was carried out to confirm the system's performance in use.

16.3 The manufacturing process was evaluated by inspection of a typical coating plant, including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used. The inspection confirmed that the plant operated in accordance with the requirements of the Quality Plan and Quality System agreed with the BBA.

16.4 Data gathered from a monitored installation trial show that, when laid at a nominal thickness of 30 mm on a road of Stress Level 1[1] and estimated Traffic Level[2] of 1200 cv/l/d, the system will meet Clause 942, Interim Advice Note 154/12, Clause 921, Tables 9/3SR and NG 9/32 requirements for initial and retained surface macrotexture. The initial texture measured was 1.3 mm and the retained texture was 0.9 mm.

(1) Site Stress Levels are defined in Interim Advice Note 154/12, Clause NG942SR, Table NG 9/27SR.

(2) Traffic Levels (cv/l/d) are defined as commercial vehicles/lane/day.

Bibliography

BS 594987 : 2015 + A1 : 2017 *Asphalt for roads and other paved areas — Specification for transport, laying, compaction and product type testing protocols*

BS EN 12591 : 2009 *Bitumen and bituminous binders — Specifications for paving grade bitumens*

BS EN 13043 : 2002 *Aggregates for bituminous mixtures and surface treatments for roads, airfields and other trafficked areas*

BS EN 13108-5 : 2016 *Bituminous mixtures — Material specifications — Stone mastic asphalt*

BS EN 13808 : 2013 *Bitumen and bituminous binders — Framework for specifying cationic bituminous emulsions*

BS EN ISO 9001 : 2008 *Quality mangement systems — Requirements*

Guideline Document for the Assessment and Certification of Thin Surfacing Systems for Highways, January 2000 and May 2008

HD 30/08 *Design Manual for Roads and Bridges : Volume 7, Pavement Design and Maintenance : Section 3, Pavement Maintenance Assessment : Part 3, Maintenance Assessment Procedure*

HD 36/06 *Design Manual for Roads and Bridges : Volume 7, Pavement Design and Maintenance : Section 5, Pavement Materials : Part 1, Surfacing Materials for New and Maintenance Construction*

IAN 154/12 *Revision of SHW Clause 903, Clause 921 and Clause 942*

Manual of Contract Documents for Highway Works, Volume 1 *Specification for Highway Works*, Series 900 *Road pavements — bituminous bound materials*

Conditions of Certification

17 Conditions

17.1 This Certificate:

relates only to the product/system that is named and described on the front page

- is issued only to the company, firm, organisation or person named on the front page — no other company, firm, organisation or person may hold or claim that this Certificate has been issued to them
- is valid only within the UK
- has to be read, considered and used as a whole document — it may be misleading and will be incomplete to be selective
- is copyright of the BBA
- is subject to English Law.

17.2 Publications, documents, specifications, legislation, regulations, standards and the like referenced in this Certificate are those that were current and/or deemed relevant by the BBA at the date of issue or reissue of this Certificate.

17.3 This Certificate will remain valid for an unlimited period provided that the product/system and its manufacture and/or fabrication, including all related and relevant parts and processes thereof:

- are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA
- continue to be checked as and when deemed appropriate by the BBA under arrangements that it will determine
- are reviewed by the BBA as and when it considers appropriate.

17.4 The BBA has used due skill, care and diligence in preparing this Certificate, but no warranty is provided.

17.5 In issuing this Certificate, the BBA is not responsible and is excluded from any liability to any company, firm, organisation or person, for any matters arising directly or indirectly from:

- the presence or absence of any patent, intellectual property or similar rights subsisting in the product/system or any other product/system
- the right of the Certificate holder to manufacture, supply, install, maintain or market the product/system
- actual installations of the product/system, including their nature, design, methods, performance, workmanship and maintenance
- any works and constructions in which the product/system is installed, including their nature, design, methods, performance, workmanship and maintenance
- any loss or damage, including personal injury, howsoever caused by the product/system, including its manufacture, supply, installation, use, maintenance and removal
- any claims by the manufacturer relating to CE marking.

17.6 Any information relating to the manufacture, supply, installation, use, maintenance and removal of this product/system which is contained or referred to in this Certificate is the minimum required to be met when the product/system is manufactured, supplied, installed, used, maintained and removed. It does not purport in any way to restate the requirements of the Health and Safety at Work etc. Act 1974, or of any other statutory, common law or other duty which may exist at the date of issue or reissue of this Certificate; nor is conformity with such information to be taken as satisfying the requirements of the 1974 Act or of any statutory, common law or other duty of care.

British Board of Agrément
Bucknalls Lane
Watford
Herts WD25 9BA

tel: 01923 665300
clientservices@bbacerts.co.uk
www.bbacerts.co.uk

Road Marker

PHILIPS

PHILIPS

Outdoor Lighting

ONROADLED

Markers

Product guide

ONROADLED guides you in a safe way

Safe guidance with LED road markers

Contents

Roundabouts

About ONROADLED

By combining revolutionary Inductive Power Transfer (IPT) with tough and intelligent LED markers, ONROADLED incorporates an active road guidance technology that is set to establish a new lighting standard.

ONROADLED is inherently resilient. The system relies on power supplies that can be up to 2.5 kilometer apart, a shallow cable, nodes to separate the cable at road-marker sites, and high-impact UV-stable polycarbonate markers incorporating LED markers.

ONROADLED markers exploit the unique characteristics of IPT, drawing their power wirelessly from the recessed cable. Additionally, IPT provides communication functionality to individual markers as well as receiving diagnostic data from each marker.

The power supplies interface with a range of standards and can be monitored remotely. They are available in mains and 24 V versions and can be customized.

ONROADLED – Road guidance

The perfect solution for outdoor lighting needs

In these times of budgetary and other pressures, city authorities are looking to reduce energy costs and light output, but at the same time want to create a safe and secure environment for residents and visitors.

Active on-road LED guidance systems are being used in an increasingly wide range of traffic applications, as municipal authorities worldwide seek to improve traffic flows, reduce accidents and improve safety. With cities becoming increasingly busy, the need for traffic safety is a major trend in outdoor lighting. The presence of on-road LED guidance can help create a safe feeling for all traffic participants, making it easier, faster and safer to negotiate crowded spaces.

Another major trend in outdoor lighting is the increasing need to reduce light pollution. The world needs more light to help people feel safer, but the downside is increased night-time light disturbance for people and wild life. Active on-road LED guidance systems can help reduce light pollution by means of focused light beams.

ORM

LvL

ORM with snowcap

Some advantages of ONROADLED guidance

- **High visibility** — markers emitting their own light can be seen from a greater distance than passive reflectors, thereby giving drivers advance warning of bends or hazards.
- **Delivery of intense, focused beams of light** — delineate roads in rain or fog and during the night and the day.
- **Clear guidance** — markers are positioned directly in the drivers' line of sight, with the result that they instinctively follow the line of lights.
- **Programmable** — markers can be controlled so they remain invisible until activated, or they can be made to flash to increase driver awareness.

Family range

ONROADLED – a robust, intelligent road marker system

ONROADLED is a complete marker system. As well as a wide variety of markers, a wide range of power supplies and accessories are also available. This complete portfolio allows you to create any marker system needed to enhance safety.

Portfolio overview

Inductively Powered Markers

SST
Inductively powered, intelligent, directional LED off-road marker

360
Inductively powered, intelligent, omni-directional LED pedestrian marker

Levellight
Inductively powered, intelligent, omni-directional LED pedestrian marker

***ORM & OR+**
Inductively powered, intelligent, directional LED road marker (OR+ adds vertical light)

*ORM & OR+ have Department for Transport Type Approval for use on UK public highways and roads

Additional items

Nodes (IPH/IPL)
Nodes for inductively powered markers

Cabling (IPH/IPL)
Cabling and "inline" capacitors for inductively powered markers

Power Supply
Power supplies for inductively powered markers, standard or intelligent

Accessories
Various accessories (snow-cap and flange/ base)

Installation materials
Adhesives and marker adhesive application stamp

Installation tools
Coring bits and various installation tools (Air Dual Applicator)

ONROADLED features

Safety

Inductive power is spark-free and there is no danger of electrocution. This makes it suitable for installation and maintenance of the markers themselves by non-electrical specialists and much safer to use than traditional wiring systems.

High performance and system longevity

Few lighting applications are more demanding than road guidance. The LED markers are made from specially formulated UV-stable polycarbonate that is scratch-resistant and able to withstand extreme conditions and temperatures. The shell face is designed to concentrate light at the desired intensity — markers are visible from a distance of up 800 meters — and to facilitate self-cleaning. The markers are designed to meet three main criteria: they can withstand high volumes of traffic, they are cost-effective to install or replace, and they are sustainable in order to ensure a low total cost of ownership.

Water tightness

Markers can be completely sealed and therefore they are corrosion-free and more resilient than hard-wired products.

Intelligent control and diagnostics

The same cables that generate the magnetic field to light up the LED markers are used to communicate with microprocessors in each light. This makes them individually programmable, allowing dimming, flashing, sequencing and changes in the color of the light. Each marker has the capability for independent diagnostic tests and can provide system evaluation reports. IPT power supplies are compatible with a range of interface protocols and can be controlled remotely.

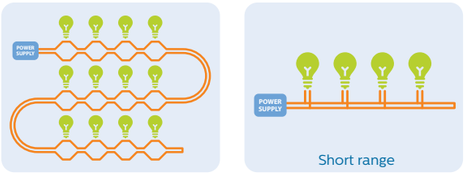
ONROADLED features

Safer

No exposed wires, no electrocution danger, no sparks, double insulation.

Long range

Power 2500 meters of cable maximum from one power supply. A wired system is typically less than 800 meters.

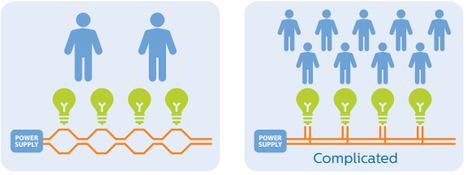


Durable

Completely sealed lights. No connections means no corrosion. High performance in high traffic applications. High performance in extreme temperatures.

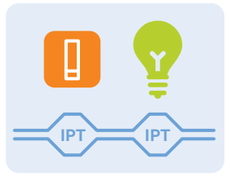
Simple

Easy installation and maintenance. Faster fault detection. Easier to maintain.



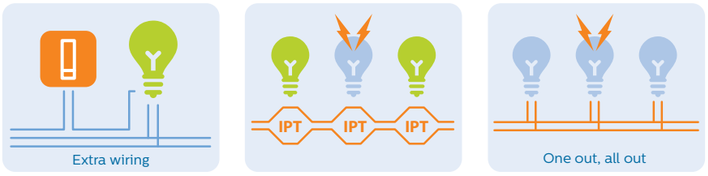
Wireless control

Wireless controllers control the lights individually. Inductive communication transfer, no wires.



Independent power transfer

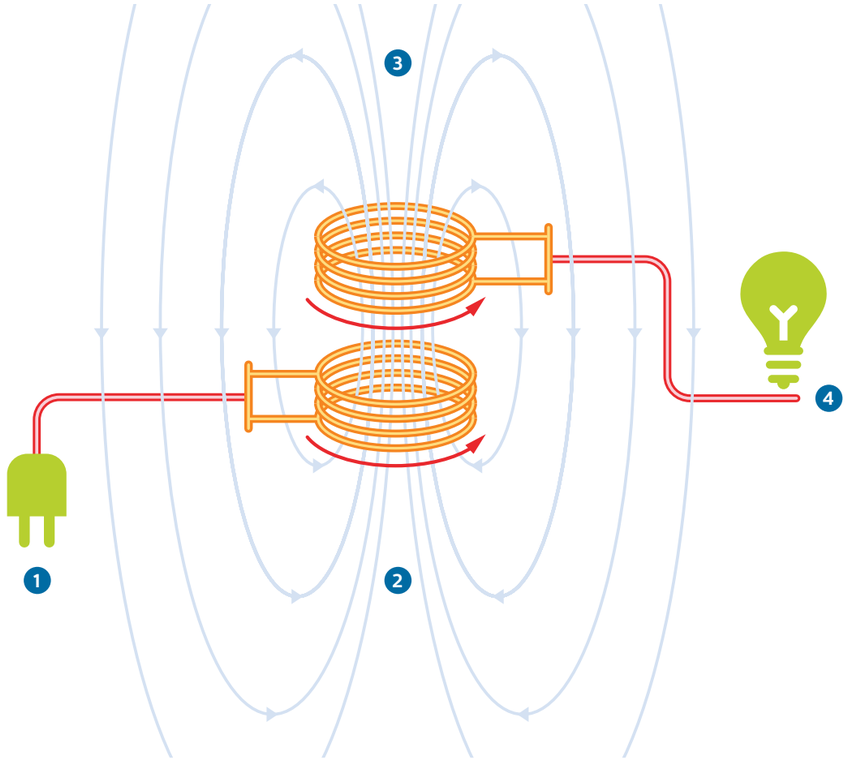
All units powered independently. There is no risk of a failure affecting the remaining markers



ONROADLED features

Inductive power

Inductive Power Technology (IPT) represents a breakthrough in product durability, control and electrical safety. IPT's wireless transfer of electricity using magnetic induction means that there is no need for a physical wire connection between power source and light. The inductive system is very simple to use and install, with a minimum number of components. A single power supply can power and control up to 250 markers over a distance of 2.5 kilometers. The use of induction power reduces the total cost of ownership and enhances the return on the investment in LED lighting solutions.

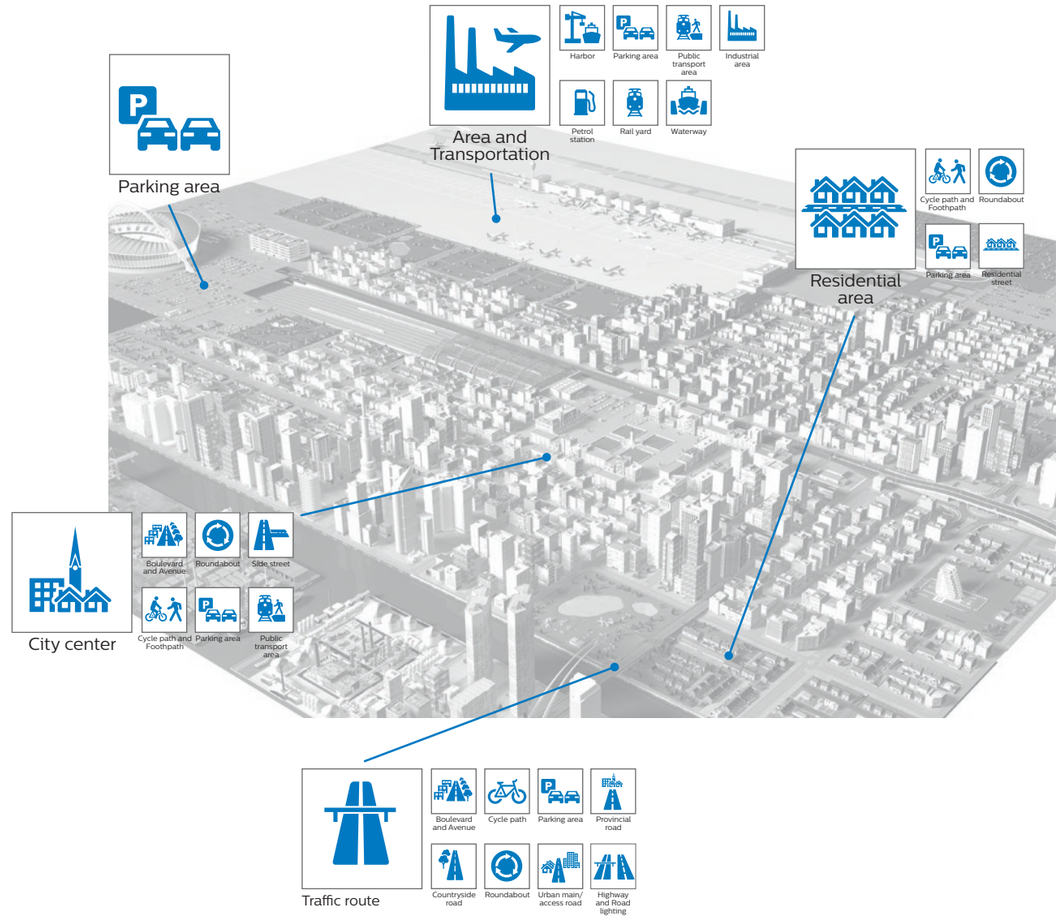


Power transmission by way of electromagnetic induction

1. ONROADLED Power supply – Electricity is applied to the wires around the node
2. ONROADLED Node – A magnetic field occurs from the node in the ground
3. 4. ONROADLED Marker – The magnetic field passes through the marker-coil and creates an electric current that powers the LEDs.

Applications

The ONROADLED product range provides a solution for all sorts of applications of on-road and off-road guidance.



Application examples

Bus lanes

To discourage drivers from incorrectly using the bus lanes, local traffic authorities issue heavy fines to eligible vehicles for non-compliance. ONROADLED can reduce the amount of incorrect bus lane usage considerably.

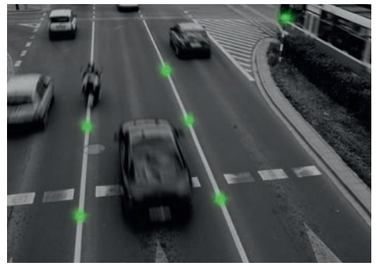
Cycle paths

The ONROADLED solution combines road markers and an input signal from the traffic controller. As the cyclist rides along, a running green light indicates that by keeping up with the light the rider will reach the next set of traffic lights during the green phase.

Dangerous curves

The ONROADLED solution warns drivers of an upcoming dangerous corner or series of bends. A detection tool analyzes a vehicle's speed when approaching the dangerous curve and the ONROADLED markers provide warnings if the driver is going too fast.

Roads



The ONROADLED Smart Mobility Vehicle application calibrates each vehicle on the road. Each passing vehicle will be given an advisory speed by matrix signs, plus their own unique LED on-road markers to follow that will form a green wave. If the advised speed is respected, a green light at the next traffic light in the through direction is guaranteed. Note – this was a special concept proposal subject to further validation.

Tidal flows

The presence of lane controls allows authorities to close or reverse lanes when circumstances require the use of fewer or more lanes to maintain an orderly flow of traffic.

Left-hand turns

During the permitted-left-turn green phase at intersections on divided highways, the vehicles turning simultaneously in the opposite left-turn lane frequently block drivers' view. ONROADLED can provide clear guidance to position your car in the correct lane.

Highways

The system provides the best guidance and visibility levels for on/off ramps. The light units can be switched on or set in flashing mode as well as sequencing mode according to the individual situation.

Harbours

Harbour traffic safety requires high visibility and guidance systems. ONROADLED markers have features that combine vertical and horizontal LED lights in one unit. It warns drivers in the line of sight, either on the road or up in the driver seat on cranes.

Bridges

The ONROADLED system provides the best guidance and visibility levels on bridges. The light units can be switched on or set in flashing mode as well as sequencing mode according to the individual situation. Tidal flow applications on bridges are easily controllable.

Obstacles

ONROADLED provides intelligent LED marker solutions for the delineation of obstacles. The driver will have increased awareness of potential danger, reducing accidents and saving lives.

Railway platforms and crossings

Intersections where roads and rail tracks cross are a relic of a bygone era when both rail and road transport operated at much lower speeds, and lower volumes of traffic, than they do today. ONROADLED can provide extra security and awareness on these crossings. Rail applications may be subject to specific local planning regulations and approvals.

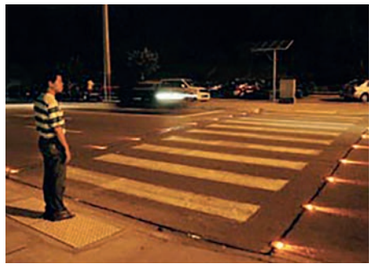
Roudabouts

Drivers may get confused when approaching a roundabout – thus creating the potential for a traffic accident. The ONROADLED system provides increased safety for drivers navigating roundabouts.

School zones

The ONROADLED lighting system warns drivers about high-risk school zones. The driver is more aware of potential danger and will reduce speed.

Crosswalks



The ONROADLED markers provide high-contrast guidance to protect pedestrians by acting as a warning system both at night and during the day.

Overhead light replacement

Overhead light replacement may be desirable in various situations, e.g. for environmental reasons or in areas where blind spots are caused by the overhead lighting.

ONROADLED in control

The ONROADLED system is compatible with most standard control systems. The power supplies feature a potential-free I/O system which can be integrated with a control system such as SCADA, PLCs, timer relays, light sensors, push buttons, etc.

The inputs on the power supply I/O control panel all relate to different ONROADLED marker states. Each input will result in a different function, for example flashing or a preset dimming level for the markers. Once an input is triggered, for example by a push of a button, the power supply will send out a signal to all the markers to update their state.

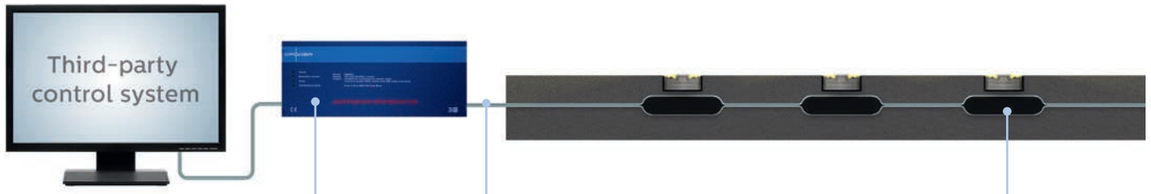
Philips can provide customized interfaces for most applications, including custom software to communicate with the ONROADLED markers via the RS232 serial port on the power supply.

Typical applications and control systems:

- **Pedestrian crosswalk lighting systems:** controlled via push buttons or camera pedestrian detectors for example.
- **Bus lane or school zone lighting systems:** controlled via PLCs, clocks or timer relays.
- **General outdoor lighting systems:** controlled via light sensors.
- **Intersection lighting systems:** controlled via relays connected to the existing traffic signals or overhead lights.
- **Dangerous curve lighting systems:** controlled via inductive loops, radar or other vehicle detectors.
- **For complex remote control applications:** a third party systems integrator may be required.

Bridges

ONROADLED system



Power supplies for inductively powered ONROADLED systems

- Intelligent control or manual control.
- Switching and dimming capabilities.
- Fully programmable light sequencing.
- Capable of powering up to a maximum 2500 meters of cable and up to 250 markers.

IPL/IPH cable

Dual-core, stranded copper wire, special PE insulated (halogen-free) flat cable.

IPL/IPH Node/Nodex

Plastic cable separator at ONROADLED marker location. Each marker requires a node/nodex to separate the cable wires to inductively couple the power from cable to LED marker.

Document order number: 3222 635 69708
11/2020
Data subject to change.

www.philips.co.uk/ledmarkers