Tunnel lighting
Led and discharge lamps luminaires
AEC introduces a complete range of products for tunnel lighting developed for access, exit and internal zones. The luminaires are equipped with asymmetric and symmetric optics, high pressure sodium and fluorescent lamps. Both versions are available with internal and external ballast. TLED is the result of years of studying in AEC technical department and laboratories: a LED luminaire designed for the interior zone of tunnels. The company presents a series of reliable and durable products, performing and technologically developed solutions. In order to guarantee the best efficiency, AEC proposes a telemanagement system able to control the luminous flux regulation and to occur internal equipment failures.
PRODUCT RANGE

TLED
36
54
72
90

TZERO
HID-AS-ES
HID-S-ES
HID-AS-IN
HID-S-IN
FLU-S-IN
FLU-S-IN-2X
1 ACCESS ZONE:
Part of the road immediately outside the tunnel in which an approaching driver must be able to recognize a possible obstacle; its length is equal to the stopping distance.

2 THRESHOLD ZONE:
First part of the tunnel immediately after the portal. Its length is at least equal to the stopping distance. The difference between the luminance in the threshold zone and in the access zone should be as small as possible. The driver has to be able to recognize an obstacle from the stopping distance.

3 TRANSITION ZONE:
Part of the tunnel following the threshold zone. Luminance levels decrease slowly in order to allow the adaptation of the driver’s eyes to the lower lighting levels featuring the interior zone.

4 INTERIOR ZONE:
Part located between the transition zone and the exit zone. Luminance levels should guarantee a safe drive.

5 EXIT ZONE:
Terminal part of the tunnel where the visibility is influenced by the external brightness. In some cases an adaptive lighting can be required.
1 FIXING SYSTEM
PRESSED AND BENT STAINLESS STEEL. LASER WELDING. INSULATED FROM THE HEAT-SINK IN ORDER TO PREVENT GALVANIC CORROSION.

2 HEAT-SINK AND FRAME
ONE HOUSING IN EXTRUDED, WELDED AND ANODISED ALUMINIUM. LIGHT AND HANDY STRUCTURE.

3 CABLE CLAMP
TECHNOPOLYMER IP68.

4 SCREEN
FLAT TEMPERED GLASS WITH SERIGRAPHY. CLOSURE IN SILICONE.

5 OPTIC
HIGH EFFICIENCY OPTIC MADE OF METALIZED POLYCARBONATE.

6 LED
HIGH INTENSITY AND HIGH EFFICIENCY WHITE LED.

7 SAFETY CLIP FOR GLASS
EXTRUDED ALUMINIUM.

8 POWER SUPPLY CABLE
INTEGRATED WITH THE UNIT. MINIMIZED WIRING OPERATIONS.
1 **FIXING FLANGE**  
Guarantees the correct inclination respect to the street level.

2 **FIXING SYSTEM**  
A double hook with security blocking guarantees a secure and reliable fixing system. Easy and fast assembly.

3 **HEAT-SINK**  
In aluminium in order to maximize heat dissipation and LED life.

4 **GLASS CLOSING CLIPS**  
In extruded aluminium: guarantee the optic compartment IP protection degree.

5 **CABLE CLAMP**  
Guarantees the IP66 protection degree of power supply compartment.

6 **CONNEXION CABLE (RS485 VERSION)**
PHOTOBIOLOGICAL SAFETY
THE LUMINAIRE HAS BEEN TESTED IN COMPLIANCE TO STANDARD EN 60825-1 IN ORDER TO AVOID HARMFUL EFFECTS TO THE HUMAN RETINA.

IP66 PROTECTION DEGREE
THE LUMINAIRE HAS BEEN TESTED IN LABORATORY IN ORDER TO GUARANTEE THE HIGH PROTECTION DEGREE AGAINST SOLID AND LIQUID BODIES INTRUSION.

THERMAL DESIGN
LUMINAIRE HAS BEEN DESIGNED BY MEANS OF THERMAL SIMULATION TOOLS IN ORDER TO VERIFY AND MAINTAIN THE JUNCTION TEMPERATURE AND MAXIMIZE LED LIFE.

HIGH EFFICIENCY POWER SUPPLY UNIT
TLED IS EQUIPPED WITH A HIGH EFFICIENCY AND LONG LIFE DEDICATED POWER SUPPLY UNIT IN CLASS II, ABLE TO MAINTAIN THE STABLE INTENSITY OF LED LUMINOUS FLUX.

ELECTRICAL SAFETY AND EMC
CLASS II INSULATION GUARANTEES THE MAXIMUM SAFETY DURING INSTALLATION, ORDINARY USE AND MAINTENANCE PROCESSES. EMC COMPLIANCE ENSURES THE COMPATIBILITY WITH OTHER ELECTRONIC EQUIPMENTS.

MAINTENANCE FREE
LONG LED LIFE, POWER SUPPLY ELECTRONICS AND PROTECTION DEGREE ALLOW TO LIMIT THE MAINTENANCE OPERATIONS TO THE MERE CLEANING OF THE GLASS.
QUALITY INSTALLATION PARAMETERS: Ti: 3.77 - UL 0.86 - LAV 2.95 - UO 0.45

OBSERVER 1 LUMINANCE

OBSERVER 2 LUMINANCE
AEC proposes a TelemAnAgEmEnT sysTEm for TLed LuminAirE. ThE BALLAsT in EACh LuminAirE COMMunicATES wiTh A Control moduLE insTALLEd in ThE TunnEL ConTroL CEnTEr. ThE CONVEyED wAvEs COMMunicATion OCCurs ALong ThE mAins wiring wiThouT ThE usE of AddiTionAL CABLEs. iT is possiBLE to REGULATE ThE gradUAtion of ThE Luminous flux ACCording To sET periODs or Through ExTErnAL orDEr givEn To ThE Control moduLE. ThE sysTEm ALLows To CHECK ThE sTATus of EvEry singLE LuminAirE AND To noTify possiBLE internal failures. ThE informATion CAn BE ExChAngEd from Control moduLE wiTh oThER suPeRviSion sysTEms Through sERiAL inTErfACE or LAN wiTh modBus, hTTp or XML/sOAp protoCOls.

1 LUMINAIREs
ThE LUMINAIREs ARE ConnECTEd To ThE sAMe powEr LinE And sHAre ThE sAMe CONVEyED wAvEs COMMunicATion ChAnNeL.

2 CONTROL MODULE
In ThE TunnEL ConTroL CEnTEr A CONVEyED wAvEs COMMunicATion moduLE is insTALLEd (PLM). ThIS moduLE IS ABLE To ConTroL ThE Luminous flux REGULATION Of EvEry singLE LuminAirE AND To OCCUR internal equipment failures.

3 TERMINAL CONTROL DEVICE
With A TERMINAL CONTROL DEVICE iT IS possiBLE To CHECK ThE LinE sTATus And To ConTroL ThE opErATion Of EACh fiTTIng.

RS-485 sERIAL sysTEm OFfIOn
it IS also AVAIlABLE A COMMunicATion sysTEm throuGh RS-485 sERIAL LinE wiTh modBus protoCOl. ThE informATion ExChAngE OCCurs Along A dEdiCATEd COMMunicATion CABLE, instALLEd in EACh LuminAirE. ThE CABLE is ConNetED dIrectly To ThE suPeRviSion sysTEm.
TECHNICAL INFORMATION

36 LED

54 LED
MATERIALS

**FIXING SYSTEM**

STAINLESS STEEL AISI 304 FLANGE INSULATED FROM THE BODY IN ORDER TO AVOID GALVANIC CORROSION. (OTHER FIXING SYSTEM UPON REQUEST)

**FRAME**

EXTRUDED, WELDED AND ANODIZED ALUMINIUM

**OPTIC**

HIGH EFFICIENCY REFLECTOR IN METALIZED POLYCARBONATE

**SCREEN**

FLAT TEMPERED GLASS WITH SERIGRAPHY, 4mm THICKNESS, CLOSURE IN SILICONE

**SAFETY CLIPS FOR GLASS**

EXTRUDED ALUMINIUM

**HEAT-SINK**

DIRECTLY MANUFACTURED IN THE BODY

**CABLE CLAMP**

M20x1,5mm PLASTIC

GENERAL CHARACTERISTICS

**APPLICATIONS**

INTERIOR ZONE TUNNEL LIGHTING

**OPTIC**

SOLID STATE OPTIC COMPOSED BY 36-54-72-90 LED LUMINAIRE INITIAL FLUX: 36 LED (3300 lm), 54 LED (5100 lm), 72 LED (6700 lm), 90 LED (8400 lm)

OPTICAL EFFICIENCY: 90%

COLOUR TEMPERATURE 6000° K

CRI >= 75

**RATED POWER**

36 LED (46 W), 54 LED (68 W), 72 LED (91 W), 90 LED (114 W)

**INSULATION CLASS**

II

**PROTECTION DEGREE**

IP66

**MAIN REFERENCE STANDARDS**

EN 60598-1, EN 60598-2-3, EN 60598-2-5, EN 61347-1

EN 61347-2-13, EN 60825-1, EN 60950, EN 55015, EN 61547, EN 61000-3-2, EN 61000-3-3

ELECTRICAL CHARACTERISTICS

**RATED VOLTAGE**

220-240V

**FREQUENCY**

50-60 Hz

**POWER FACTOR**

>0.98

**LUMINOUS FLUX REGULATION (OPTIONAL)**

REGULATION IN CONTINUOUS CURVE

**CONTROL DEVICE (OPTIONAL)**

TELEMANAGEMENT THROUGH CONVEYED WAVES (PLM MODE) OR RS-485 SERIAL SYSTEM

**CONNECTIONS**

CABLES, PLUGS AND OTHER TYPES OF CONNECTIONS AVAILABLE UPON REQUEST

**EXPECTED LIFE-TIME**

> 90.000 hr @ Ta=25°C, LM 80%, If=350mA

>150.000 hr @ Ta=25°C, LM 70%, If=350mA

103

INCLINATION UPON REQUEST
TZERO
HID-AS-ES
ASYMMETRICAL LIGHTING
WITH EXTERNAL BALLAST
MATERIALS

FRAME
STAINLESS STEEL AISI 316L
1mm THICKNESS
(1.2mm UPON REQUEST)

SAFETY CLIPS FOR GLASS
STAINLESS STEEL AISI 316L

HOOK AND FIXING FLANGE
STAINLESS STEEL AISI 304

OPTIC
99.85% METALIZED ALUMINIUM

SCREEN
FLAT TEMPERED GLASS
5mm THICKNESS

CLOSING SCREEN
CLOSURE IN SILICONE

LAMP HOLDER
CERAMIC

GENERAL CHARACTERISTICS

APPLICATIONS
ACCESS AND EXIT ZONE TUNNEL LIGHTING

OPTIC
ASYMMETRICAL (COUNTER BEAM)

LAMP WATTAGE
70 - 100 - 150 - 250 - 400 - 600W

LAMP TYPE
HIGH PRESSURE SODIUM

LAMP BASE
E27/E40

INSULATION CLASS
II

PROTECTION DEGREE
IP66

FIXING SYSTEM
2 MANUAL CLOSING HOOKS WITH SECURITY BLOCKING SYSTEM

LAMP REPLACEMENT
LAMP HOLDER SUPPORT REMOVAL WITHOUT USE OF TOOLS

DIMENSIONS
558x430x185mm

MAIN REFERENCE STANDARDS
EN 60598-1, EN 60598-2-3

POWER SUPPLY UNIT CHARACTERISTICS

RATED VOLTAGE
230V

FREQUENCY
50Hz

POWER
70 – 100 – 150 – 250 – 400 – 600W

INSULATION CLASS
II

PROTECTION DEGREE
IP65

CABLE CLAMP
2xM20x1.5mm PLASTIC IP68

FIXING SYSTEM
FLANGE IN STAINLESS STEEL AISI 304

CONNECTIONS
CABLES, PLUGS AND OTHER TYPES OF CONNECTIONS AVAILABLE UPON REQUEST

Coordinate system C-Gamma, cartesian graph.
T ZERO
HID-S-ES
SYMMETRICAL LIGHTING WITH EXTERNAL BALLAST
**MATERIALS**

- **Frame**: Stainless steel AISI 316L, thickness 1mm (1.2mm upon request)
- **Safety clips for glass**: Stainless steel AISI 316L
- **Hook and fixing flange**: Stainless steel AISI 304
- **Optic**: 99.85% metalized aluminium
- **Screen**: Flat tempered glass, 5mm thickness
- **Closing screen**: Closure in silicone
- **Lamp holder**: Ceramic

**GENERAL CHARACTERISTICS**

- **Applications**: Interior zone tunnel lighting
- **Optic**: Symmetrical
- **Lamp power**: 70 - 100 - 150 - 250 - 400 - 600W
- **Lamp type**: High pressure sodium
- **Lamp base**: E27/E40
- **Insulation class**: II
- **Protection degree**: IP66
- **Fixing system**: 2 manual closing hooks with security blocking system
- **Lamp replacement**: Lamp holder support removal without use of tools
- **Dimensions**: 430x400x145mm
- **Main reference standards**: EN 60598-1, EN 60598-2-3

**POWER SUPPLY UNIT CHARACTERISTICS**

- **Rated voltage**: 230V
- **Frequency**: 50Hz
- **Power**: 70 - 100 - 150 - 250 - 400 - 600W
- **Insulation class**: II
- **Protection degree**: IP65
- **Cable clamp**: 2xM20x1.5mm plastic IP68
- **Fixing system**: Flange in stainless steel AISI 304
- **Connections**: Cables, plugs and other types of connections available upon request

**POWER SUPPLY UNIT CHARACTERISTICS**

- **Rated voltage**: 230V
- **Frequency**: 50Hz
- **Power**: 70 - 100 - 150 - 250 - 400 - 600W
- **Insulation class**: II
- **Protection degree**: IP65
- **Cable clamp**: 2xM20x1.5mm plastic IP68
- **Fixing system**: Flange in stainless steel AISI 304
- **Connections**: Cables, plugs and other types of connections available upon request
MATERIALS

<table>
<thead>
<tr>
<th>FRAME</th>
<th>STAINLESS STEEL AISI 316L THICKNESS 1.2mm (OTHERS UPON REQUEST)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAFETY CLIPS FOR GLASS</td>
<td>STAINLESS STEEL AISI 316L</td>
</tr>
<tr>
<td>FIXING PLATES</td>
<td>STAINLESS STEEL AISI 316L</td>
</tr>
<tr>
<td>OPTIC</td>
<td>99.85% METALIZED ALUMINIUM</td>
</tr>
<tr>
<td>SCREEN</td>
<td>FLAT TEMPERED GLASS, 6mm THICKNESS</td>
</tr>
<tr>
<td>CLOSING SCREEN</td>
<td>GASKET IN SILICONE</td>
</tr>
<tr>
<td>LAMP HOLDER</td>
<td>CERAMIC</td>
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GENERAL CHARACTERISTICS

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<th>APPLICATIONS</th>
<th>ACCESS AND EXIT ZONE TUNNEL LIGHTING</th>
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<tr>
<td>OPTIC</td>
<td>ASYMMETRICAL (COUNTER BEAM)</td>
</tr>
<tr>
<td>LAMP POWER</td>
<td>70 - 100 - 150 - 250 - 400W</td>
</tr>
<tr>
<td>LAMP TYPE</td>
<td>HIGH PRESSURE SODIUM</td>
</tr>
<tr>
<td>LAMP BASE</td>
<td>E27/E40</td>
</tr>
<tr>
<td>INSULATION CLASS</td>
<td>I</td>
</tr>
<tr>
<td>PROTECTION DEGREE</td>
<td>IP66</td>
</tr>
<tr>
<td>FIXING SYSTEM</td>
<td>BY METALLIC PLATE AND SCREWS</td>
</tr>
<tr>
<td>GEAR TRAY UNIT REMOVAL</td>
<td>WITHOUT USE OF TOOLS</td>
</tr>
<tr>
<td>LAMP REPLACEMENT</td>
<td>WITHOUT USE OF TOOLS</td>
</tr>
<tr>
<td>DIMENSIONS</td>
<td>656x460x173mm</td>
</tr>
<tr>
<td>MAIN REFERENCE STANDARDS</td>
<td>EN 60598-1, EN 60598-2-3</td>
</tr>
</tbody>
</table>

ELECTRICAL CHARACTERISTICS

| RATED VOLTAGE                 | 230V                                                            |
| FREQUENCY                     | 50Hz                                                           |
| INTERNAL WIRING               | HALOGEN FREE, IN SILICONE, DOUBLE INSULATION, 1mm²             |
| IGNITOR                       | SUPERIMPOSED IGNITOR (WITH TIMER OR DIGITAL UPON REQUEST)       |
| CONNECTIONS                   | PASS THROUGH | BRANCH |
| CABLE CLAMP (TYPES OF CABLE CLAMPS UPON REQUEST) | 2xM32x1,5mm PLASTIC | 1xM32x1,5mm PLASTIC |
| TERMINAL BOARD                | 5 POLES IN DIN GUIDE 10mm² (16mm² UPON REQUEST) | 3 POLES 6mm² (CERAMIC UPON REQUEST) |
| MCB                           | 1P+NEUTRAL, 10A, C-CURVE (UPON REQUEST)                         |
MATERIALS

- Frame: Stainless Steel AISI 316L
  Thickness: 1.2mm (Others upon request)
- Safety clips for glass: Stainless Steel AISI 316L
- Fixing plates: Stainless Steel AISI 316L
- Optic: 99.85% Metalized Aluminium
- Screen: Flat Tempered Glass, 6mm Thickness
- Closing screen: Gasket in Silicone
- Lamp holder: Ceramic

GENERAL CHARACTERISTICS

- Applications: Interior Zone Tunnel Lighting
- Optic: Symmetrical
- Lamp power: 70 - 100 - 150 - 250 - 400W
- Lamp type: High Pressure Sodium
- Lamp base: E27/E40
- Insulation class: I
- Protection degree: IP66
- Fixing system: By metallic plate and screws
- Gear tray unit removal: Without use of tools
- Lamp replacement: Without use of tools
- Dimensions: 566x460x173mm
- Main reference standards: EN 60598-1, EN 60598-2-3

ELECTRICAL CHARACTERISTICS

- Rated voltage: 230V
- Frequency: 50Hz
- Internal wiring: Halogen free, in silicone, double insulation, 1mm²
- Ignitor: Superimposed ignitor (with timer or digital upon request)
- Connections: Pass Through
  - Cable clamp (types of cable clamps upon request): 2xM32x1.5mm Plastic
  - Terminal board: 5 poles in DIN guide 10mm²
    (16mm² upon request)
  - MCB: 1P+Neutral, 10A, C-Curve (upon request)
T ZERO
FLU-S-IN
SYMMETRICAL LIGHTING
**MATERIALS**

**FRAME**
STAINLESS STEEL AISI 316L
THICKNESS 1.2mm
(Others upon request)

**SAFETY CLIPS FOR GLASS**
STAINLESS STEEL AISI 316L

**FIXING PLATES**
STAINLESS STEEL AISI 316L

**OPTIC**
99.9% METALIZED ALUMINIUM

**SCREEN**
FLAT TEMPERED GLASS, 6mm THICKNESS

**CLOSING SCREEN**
GASKET IN SILICONE

**LAMP HOLDER**
PLASTIC

**GENERAL CHARACTERISTICS**

**APPLICATIONS**
INTERIOR ZONE TUNNEL LIGHTING

**OPTIC**
SYMMETRICAL

**LAMP POWER**
1x58W T8

**LAMP TYPE**
LINEAR FLUORESCENT

**LAMP BASE**
G13

**INSULATION CLASS**
i

**PROTECTION DEGREE**
IP66

**FIXING SYSTEM**
BY METALLIC PLATE AND SCREWS

**GEAR TRAY UNIT REMOVAL**
WITHOUT USE OF TOOLS

**LAMP REPLACEMENT**
WITHOUT USE OF TOOLS

**DIMENSIONS**
1740x207x91mm

**MAIN REFERENCE STANDARDS**
EN 60598-1, EN 60598-2-3

**ELECTRICAL CHARACTERISTICS**

**RATED VOLTAGE**
230V

**FREQUENCY**
50Hz

**INTERNAL WIRING**
HALOGEN FREE, IN SILICONE, DOUBLE INSULATION, 1mm²

**IGNITOR**
ELECTRONIC (EEI=A2) LONG LIFE

**CONNECTIONS**

<table>
<thead>
<tr>
<th>PASS THROUGH</th>
<th>BRANCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>2xM32x1,5mm PLASTIC</td>
<td>1xM32x1,5mm PLASTIC</td>
</tr>
<tr>
<td>5 POLES IN DIN GUIDE 10mm² (16mm² upon request)</td>
<td>3 POLES 6mm² (CERAMIC UPON REQUEST)</td>
</tr>
</tbody>
</table>

**MCB**
1P+NEUTRAL, 10A, C-CURVE (UPON REQUEST)
## GENERAL CHARACTERISTICS

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<th>INTERIOR ZONE TUNNEL LIGHTING</th>
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<td>LAMP POWER</td>
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<tr>
<td>DIMENSIONS</td>
<td>1740x243x91mm</td>
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<tr>
<td>MAIN REFERENCE STANDARDS</td>
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</tbody>
</table>

## MATERIALS

- **FRAME**: STAINLESS STEEL AISI 316L, THICKNESS 1.2mm (OTHERS UPON REQUEST)
- **SAFETY CLIPS FOR GLASS**: STAINLESS STEEL AISI 316L
- **FIXING PLATES**: STAINLESS STEEL AISI 316L
- **OPTIC**: 99.9% METALIZED ALUMINIUM
- **SCREEN**: FLAT TEMPERED GLASS, 6mm THICKNESS
- **CLOSING SCREEN**: GASKET IN SILICONE
- **LAMP HOLDER**: PLASTIC

## ELECTRICAL CHARACTERISTICS

- **RATED VOLTAGE**: 230V
- **FREQUENCY**: 50Hz
- **INTERNAL WIRING**: HALOGEN FREE, IN SILICONE, DOUBLE INSULATION, 1mm²
- **IGNITOR**: ELECTRONIC (EEI=AA2) LONG LIFE ABSORBED POWER: 2x54W
- **CONNECTIONS**: PASS THROUGH | BRANCH
  - CABLE CLAMP (TYPES OF CABLE CLAMPS UPON REQUEST): 2xM32x1,5mm PLASTIC | 1xM32x1,5mm PLASTIC
  - TERMINAL BOARD: 5 POLES IN DIN GUIDE 10mm² (16mm² UPON REQUEST) | 3 POLES 6mm² (CERAMIC UPON REQUEST)
  - MCB: 1P+N+NEUTRAL, 10A, T-CURVE (UPON REQUEST)