



raSMi UK

LED Tunnel Lighting

Table of Contents

1. Objectives

2. Tunnel Lighting Design

2-1. Tunnel lighting control

2-2. Tunnel lighting Criteria

2-3. Types of tunnel lighting

3. Products

3-1. R&D and Manufacture

3-2. Details

4. Project Undertaken

4-1. Luminaire Details

4-2. Product Testing

4-3. Product Inspection

Objectives of LED Tunnel Lighting



For Drivers

To ensure adequate safety conditions when entering and exiting the tunnel

To allow a quick visual adaptation of a driver without reducing speed

To provide comfort and guidance while passing through the tunnel



For Power Authority

To provide the most effective and cost-efficient solution through reduction of energy consumption

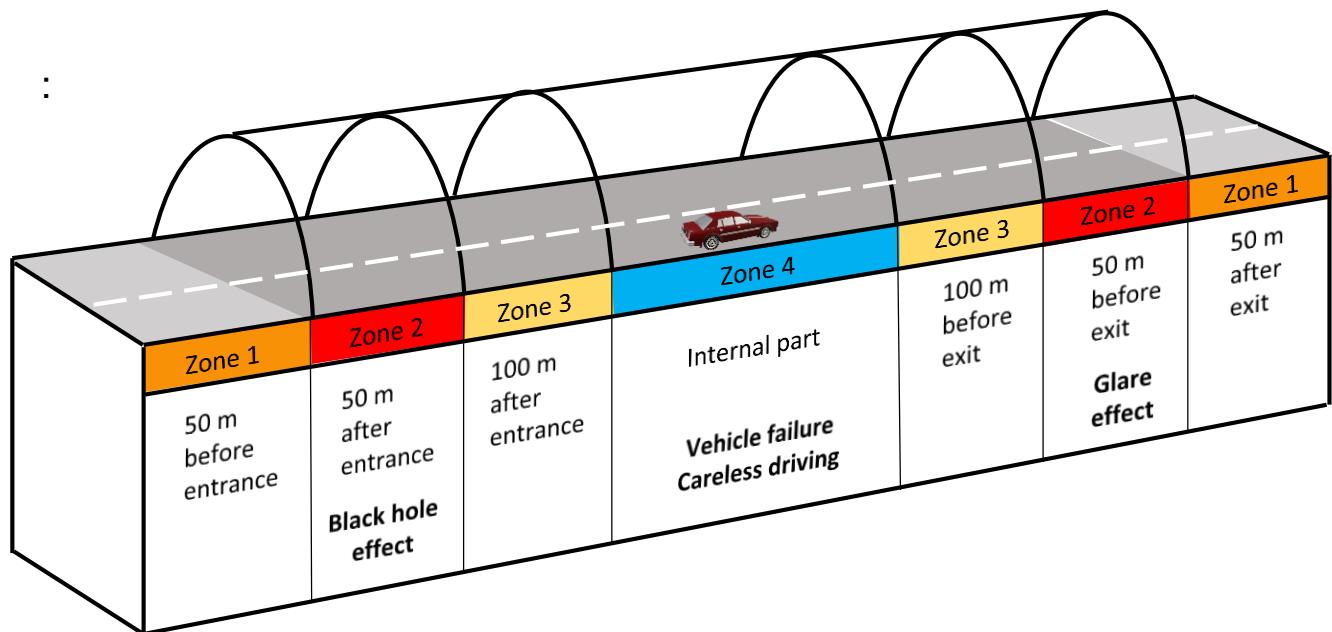
To provide the most reliable method which will only require minimum operation of maintenance



Tunnel Light Design

Tunnel Lighting Control

Lighting of a tunnel must be carefully designed to guarantee the safety of the drivers while entering, travelling, and exiting the tunnel. It must take into account the frequency of accidents varies depending on the sections of a tunnel. The illustration below demonstrates this concept.



Frequency of Accidents: ■ Very High ■ High ■ Medium ■ Low

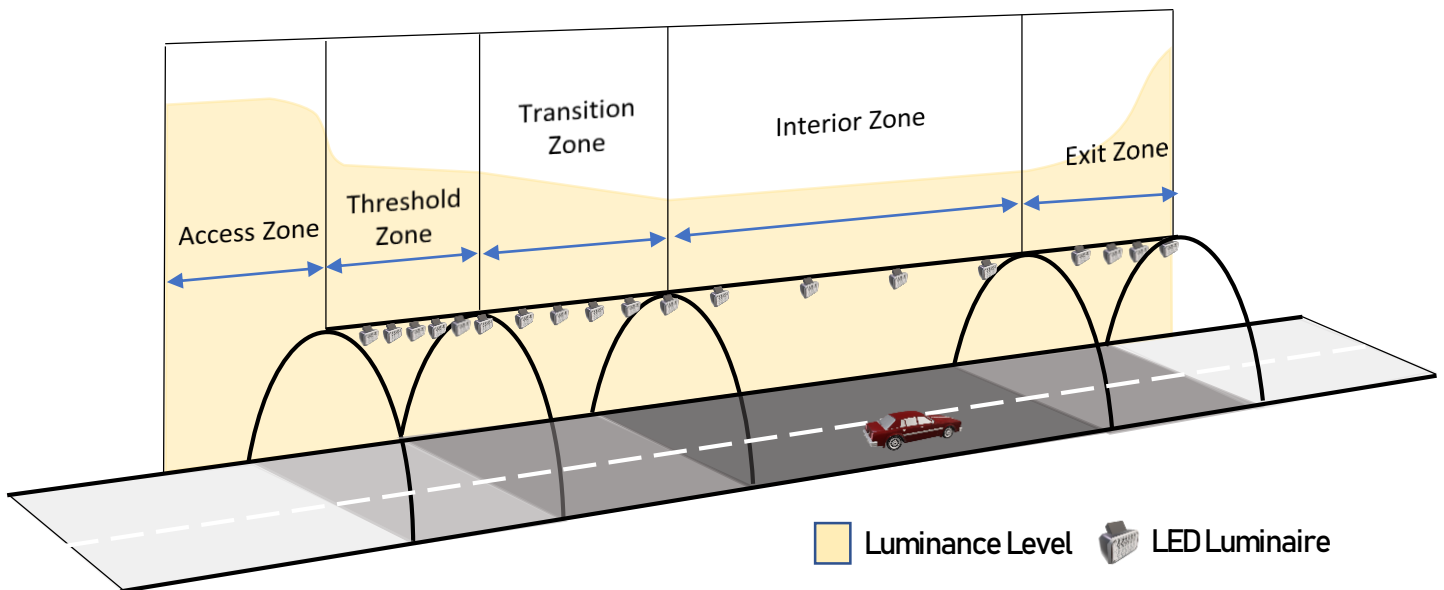
As shown above, entrance and the exit areas can be dangerous due to the black hole effect and the glare effect. **The Black hole effect** is defined as “sharp lighting transitions in tunnel entrance zones causing difficulties for drivers in observing the conditions at entrances of tunnels.” **The glare effect (GE)** is an illusion in which a white region appears self-luminous when surrounded by linearly decreasing luminance ramps.

Under any circumstances and conditions, Rasmi meets the tunnel lighting criteria to cautiously adjust the level of luminance and the quantity of LED lights in accordance with the frequency of accidents inside a tunnel.

Tunnel Lighting Criteria

Rasmi strictly abides by the guidelines of the tunnel lighting criteria to ensure safety of the motorists inside a tunnel. In particular, CIE guidance (CIE 88 -2004) states that the amount of light required within a tunnel is dependent on the level of light outside and on the point inside the tunnel at which visual adaptation of the user must occur.

To comply with this guideline, 5 zones must be considered when planning the lighting of a tunnel :



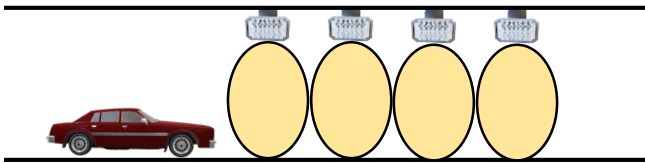
Type	Description
Access zone	Part of the road outside the tunnel leading to its entrance. Drivers must be able to recognize possible obstacles
Threshold zone	First part of the tunnel and its length equals the stopping distance. In this zone, the luminance level must remain constant and similar to the luminance of the access zone. At the end of the zone, the luminance level can be dropped to 40% of the initial value
Transition zone	Part of the tunnel following the threshold zone and the luminance level continues to decrease for the driver's vision to adapt to the level of luminance in the interior zone
Interior zone	Often the longest part of the tunnel in which luminance levels are linked to the speed and the density of traffic and must guarantee safety
Exit zone	Last part of the tunnel in which a driver's vision is influenced by the external bright during day time.

Types of Tunnel Lighting

There are 2 types of tunnel lighting : 1. Symmetric 2. Asymmetric

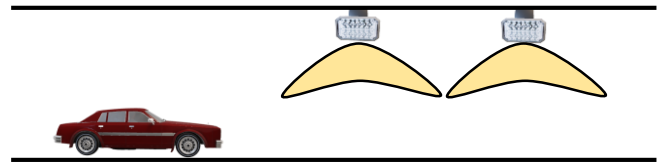
Symmetrical lighting is mainly used for entrance, transition, and interior zones of a tunnel.

Transverse Lighting



- Radiated at right angles to the axis of the tunnel
- Uniform luminance throughout the interior
- Low contrast values
- Good visual guidance
- Minimum glare

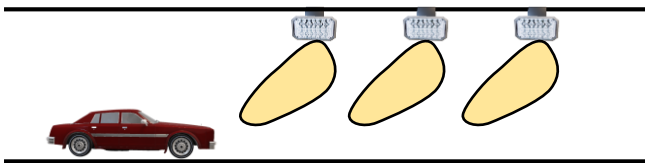
Axial Lighting



- Radiated parallel to the tunnel axis
- Uniform luminance throughout the interior
- Low contrast values
- High efficiency
- Wide Luminaire spacing
- Occasional shadowing

Asymmetrical lighting is used for entrance when high contrast values are necessary or the tunnel length is not too long

Counter-beam Lighting



- Radiated parallel to the tunnel axis against the direction of the traffic flow
- Uniform luminance throughout the interior
- Improved contrast values
- High efficiency
- Minimum glare



Product

R&D and Manufacture

Rasmi strives to research and develop tunnel LED lighting systems manufactured in the UK that are built and tested to meet or exceed industry standards.

R&D

- Rasmi photometric testing facilities include a 2m integrating sphere with a high speed spectroradiometer detector and a 10m goniophotometer chamber.
- The integrating sphere measures the total light output (flux or lumens) of a lamp or luminaire as well as the colour spectrum emitted.
- The goniophotometer allows accurate beam pattern measurement of a luminaire by rotating the luminaire about its axes and recording beam intensity.
- Extensive tests are made on new designs to check housing temperature rise and LED junction temperature to minimize color shift and lumen depreciation over time. Mechanical aspects are tightly controlled to ensure finished products meet design intention and criteria.
- Our engineers have a long history of producing high performance solutions from inception to final production realization. This coupled with advances in component manufacture and computer aided design mean we can produce affordable custom solutions faster than ever before.

Manufacture

- At Rasmi we have the machinery and equipment to fully realize product manufacture from beginning to end.
- Our team of 30 highly skilled production operators are based at our manufacturing sites in the UK
- All production is subject to rigorous in-process test and verification.
- Our production process is ISO9001:2008, BS EN ISO14001:2004 and OHSAS 18001:2007 accredited



Product Details

PROFESSIONAL LED LINEAR TUNNEL LIGHT

140LM/1W RA>80



LED LINEAR HIGH BAY LIGHT/TUNNEL LIGHT



ANTI-GLARE

Professional-grade optical design for more uniform light exposure and effective reduction of glare. With the linear lamp structure, the lamp body is more suitable for installation in the tunnel/warehouse. Large-scale factory The elliptical spot makes it more efficient in light utilization.



PROFESSIONAL LIGHTING DESIGN

This section has a lamp lens to choose from a variety of angles, can meet the application requirements of different occasions. 30° / 60° / 90° / 90°*120°.



ADVANCED COOLING

Combined with the type of lighting fixtures, the professional heat dissipation structure design with AL6063 high thermal conductivity aluminum profile reduces lamp bulb light attenuation and improves lamp life.



OUTDOOR INDUSTRIAL LIGHTING

This series of linear high bay light has an efficient light output (140lm/1w cri>70 oct 5700k) Meet the lighting needs of outdoor scenes and indoor high-bay scenes.



HIGH DEGREE OF PROTECTION

It adopts silicone ring waterproof structure design, waterproof grade IP65, better guarantees the airtightness of LED, suitable for outdoor harsh environment.

QUALITY PROMISE

This range comes with a 5 year extended warranty.



LED LINEAR TUNNEL LIGHT



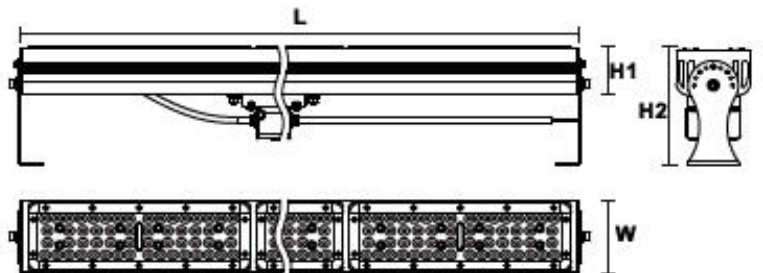
- Model No.: RAS-LTL06-80WXXK RAS-LTL09-120WXXK RAS-LTL12-160W40K RAS-LTL15-200W40K
- Power: 80W/120W/160W/200W
- The "XX" represents Color temperature.



MODEL NO	POWER	P F	LUMINOUS FLUX	BEAM ANGLE	CCT	CRI	SURGE VOLTAGE
RAS-LTL06-80W	80W	≥0.95	10400LM	30°/60°/90°/90°x120°	3000-6000K	Ra:80/70	> 4KV
RAS-LTL09-120W	120W	≥0.95	16300LM	30°/60°/90°/90°x120°	3000-6000K	Ra:80/70	> 4KV
RAS-LTL12-160W	160W	≥0.95	21600LM	30°/60°/90°/90°x120°	3000-6000K	Ra:80/70	> 4KV
RAS-LTL15-200W	200W	≥0.95	28500LM	30°/60°/90°/90°x120°	3000-6000K	Ra:80/70	> 4KV

DIMENSIONS

MODEL NO	L(mm)	W(mm)	H1(mm)	H2(mm)
RAS-LTL06-80W	552	86	53	135
RAS-LTL09-120W	824	86	53	135
RAS-LTL12-160W	1096	86	53	135
RAS-LTL15-200W	1368	86	53	135



LED LINEAR TUNNEL LIGHT



- Model No.: RAS-LTL06-80WXXK RAS-LTL09-120WXXK RAS-LTL12-160W40K RAS-LTL15-200W40K
- Power: 80W/120W/160W/200W
- The "XX" represents Color temperature.

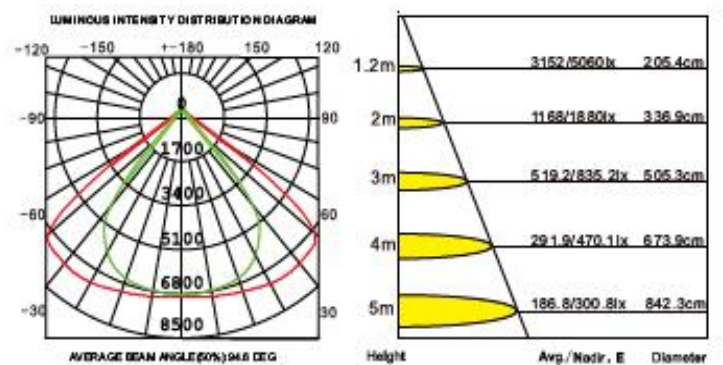
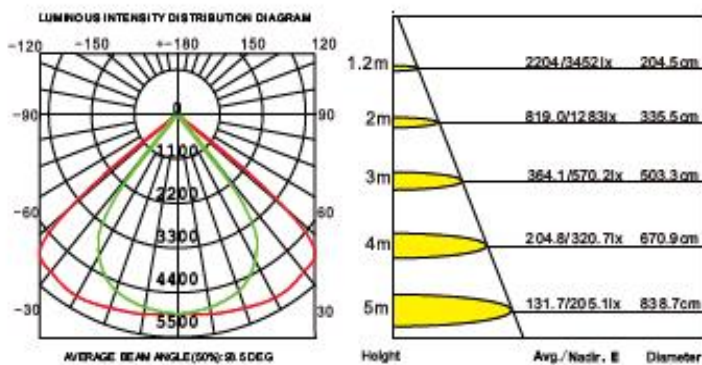


Tunnel installation diagram

Refer to the picture, please adjust the installation method according to the actual site.

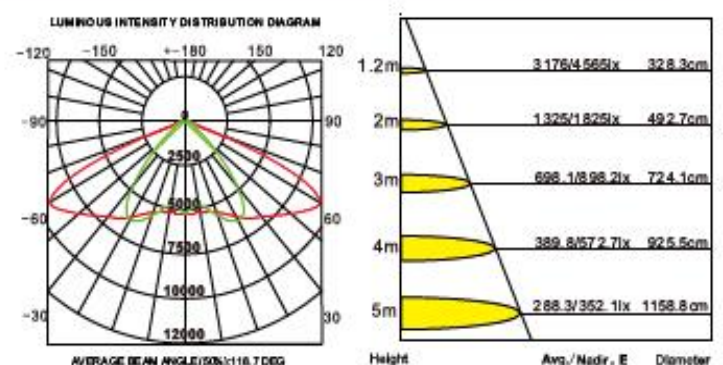
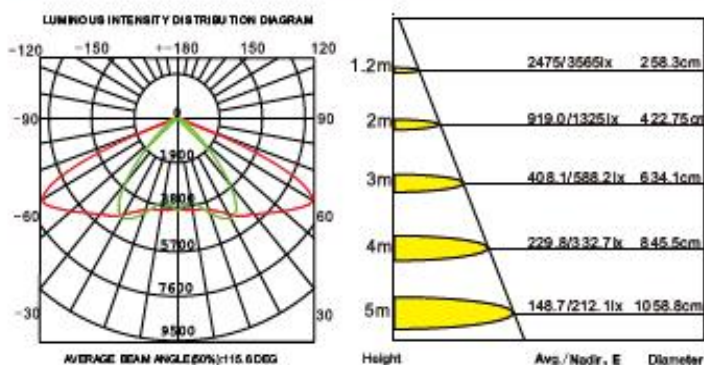
RAS-LTL06-80W -4000K Ra80 /90° x 120°

RAS-LTL09-120W -4000K Ra80 /90° x 120°



RAS-LTL12-160W -4000K Ra80 /90° x 120°

RAS-LTL15-200W -4000K Ra80 /90° x 120°





Project Undertaken

Sharjah-Khor Fakkan Road Tunnels, UAE



4,500 Rasmi LED tunnel lights supplied to 5 sets of tunnels (10 tunnels in total) of the New Sharjah-Khor Fakkan road

Inaugurated on April 13th, 2019 by H.H. Dr. Sheikh Sultan bin Muhammad Al Qasimi, Supreme Council Member and Ruler of Sharjah, and H.H. Sheikh Saud bin Saqr Al Qasimi, Supreme Council Member and Ruler of Ras Al Khaimah, in the presence of H.H. Sheikh Sultan bin Mohammed bin Sultan Al Qasimi, Crown Prince and Deputy Ruler of Sharjah.



An 89km Sharjah-Khor Fakkan Road passing through the Hajar Mountains was built at a cost of Dh5.5 billion and is expected to reduce the travel time by 45 minutes.

The first part of the road, with a total length of 65km, is dual carriageway, with two 7.4 meter lanes on each side, divided by a 10 meter wide central reservation. There are 14 intersections, seven underpasses and several slipways to allow for the drainage of water.



The second, shorter section, running for 24km and with two lanes, passes through the mountains to Khor Fakkan. This section includes 5 sets of tunnels (10 tunnels in total) → 1st: Al Raugh Tunnel (1.3km) 2nd: Al Ghazeer Tunnel (900m) 3rd: Al Multaqa Tunnel (2.7km) 4th: Al Saha Tunnel (300Lm) 5th: Al Suqub Tunnel (1.4km)

Al Multaqa Tunnel is the longest tunnel in the middle east.

Luminaire Details



LED Linear Tunnel Light (RAS-LTL09-120W40k)

Country of Origin : United Kingdom

Luminaire system watts : 120 W

Total Lumens: 15600Lm

Dimension: L:895mm X W:86mm X H:53mm

Beam Angle : 90° x 140°

Body Material : Aluminum

Body / Trim Finish: Black powder coat

Diffuser / Reflector: Polycarbonate Flame retardant UL 94V-0

Color temperature : 4000K

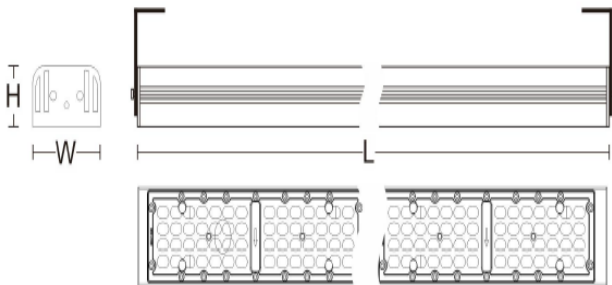
Degree of protection : IP 65

LED Chip Details : CREE-3030-1.5W-140LM/pc

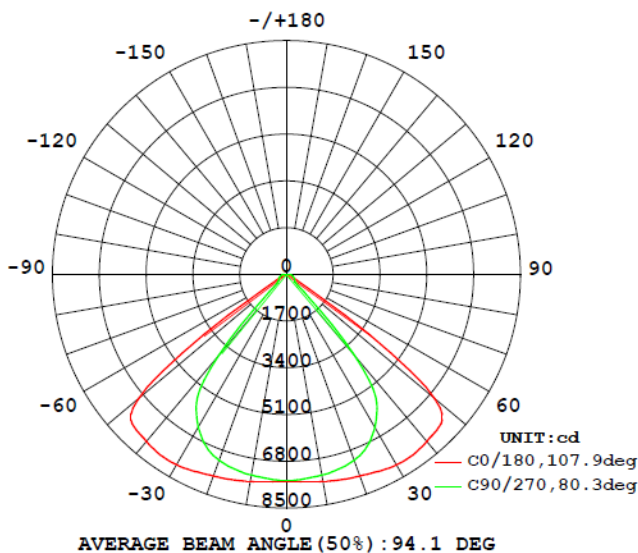
CRI ≥ 80

LED Driver : MEANWELL ELG-150-42A

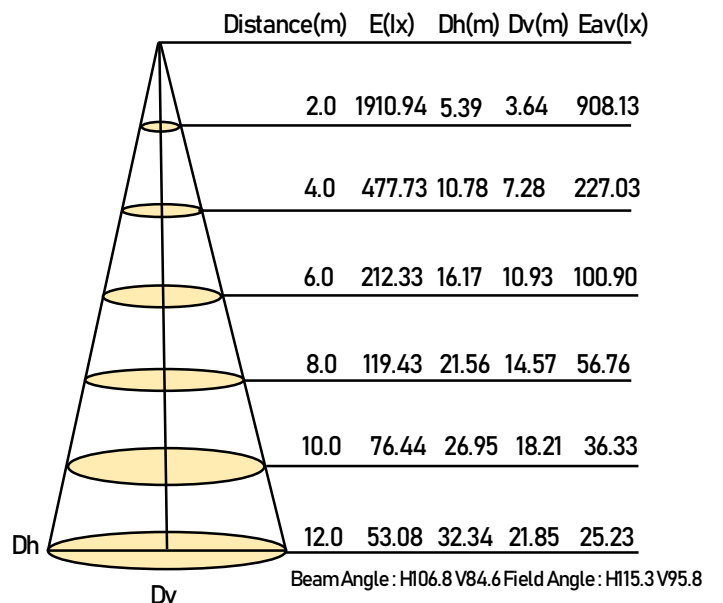
5 year warranty



LUMINOUS INTENSITY DISTRIBUTION DIAGRAM



Illuminance at a Distance



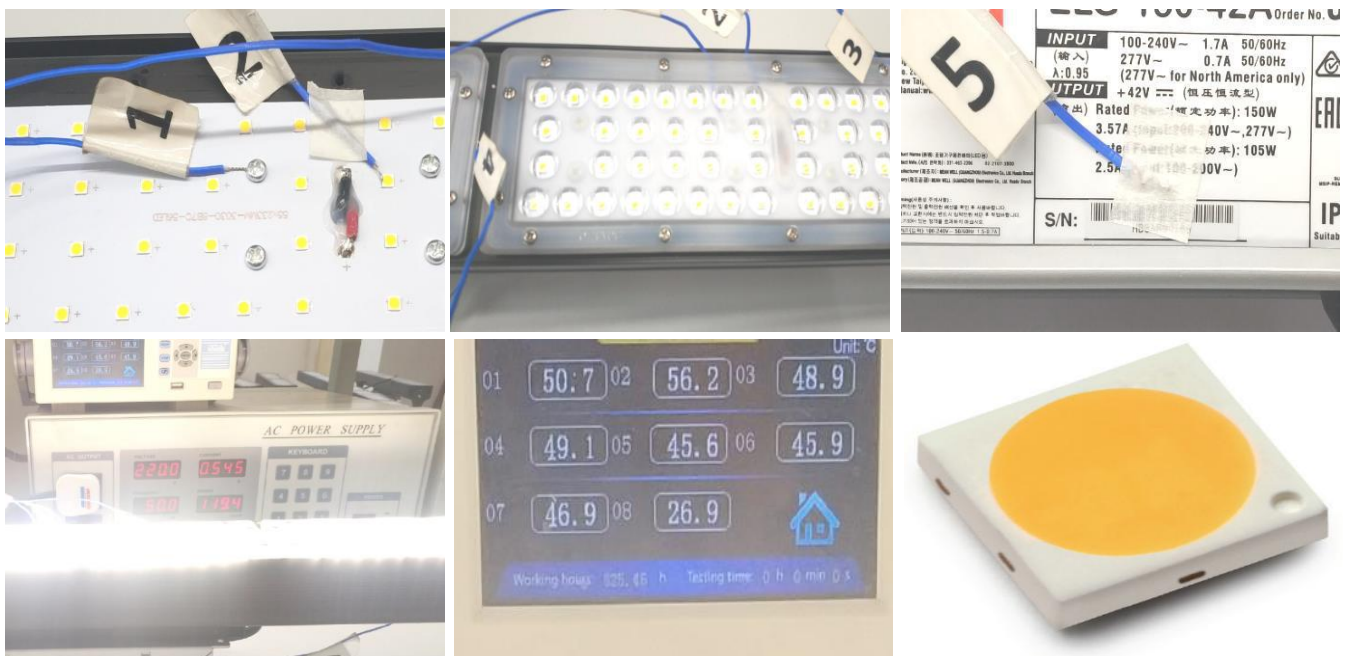
Product Testing

Luminaires were fully tested for the assessment of assembly and thermal performance to ensure safety and endurance of the products.

Thermal Testing

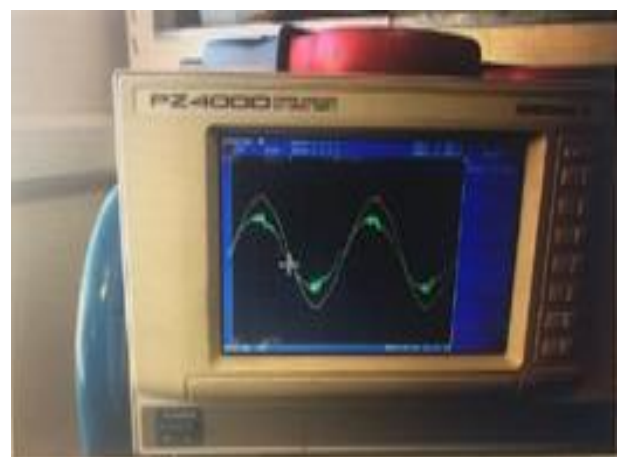
For Evaluating the stable running temperature rise of the LED chips and driver. The fitting temperature rise and maximum expected ambient temperature when installed are compared with the LED manufacturer's L70 and LM-80 documents to ensure maximum possible LED life is obtained.

Using information provided by CREE, Rasmi has designed the tunnel lighting to maintain 80% of original lumen in excess of 36,000 hours (approx. 5 years). Additionally, with the use of high MTBF Meanwell drivers, Rasmi confidently guarantees the fittings for 5 years.



Harmonic Testing

Using a laboratory power analyser to check the quality of the LED driver and any mains disturbance caused by it. Running current, power factor and mains current harmonics were shown.



Production testing

Current tuning of the LED drivers to the correct running wattage, before assembly to the mounting brackets and body extrusion. This ensures that all fittings run at equal power and emit equal light.



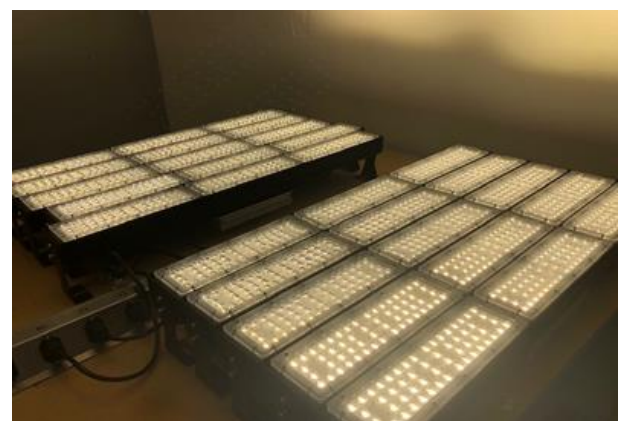
Low current checking of the PCB/extrusion sub-assembly to ensure all LED chips are functioning and that DC cable polarity is correct on all PCBs.



End of assembly, brief full power test to check running wattage is correct. This confirms correct electrical assembly before the final aging test.



Final ageing test, extended full power test including on/off cycling



Product Inspection



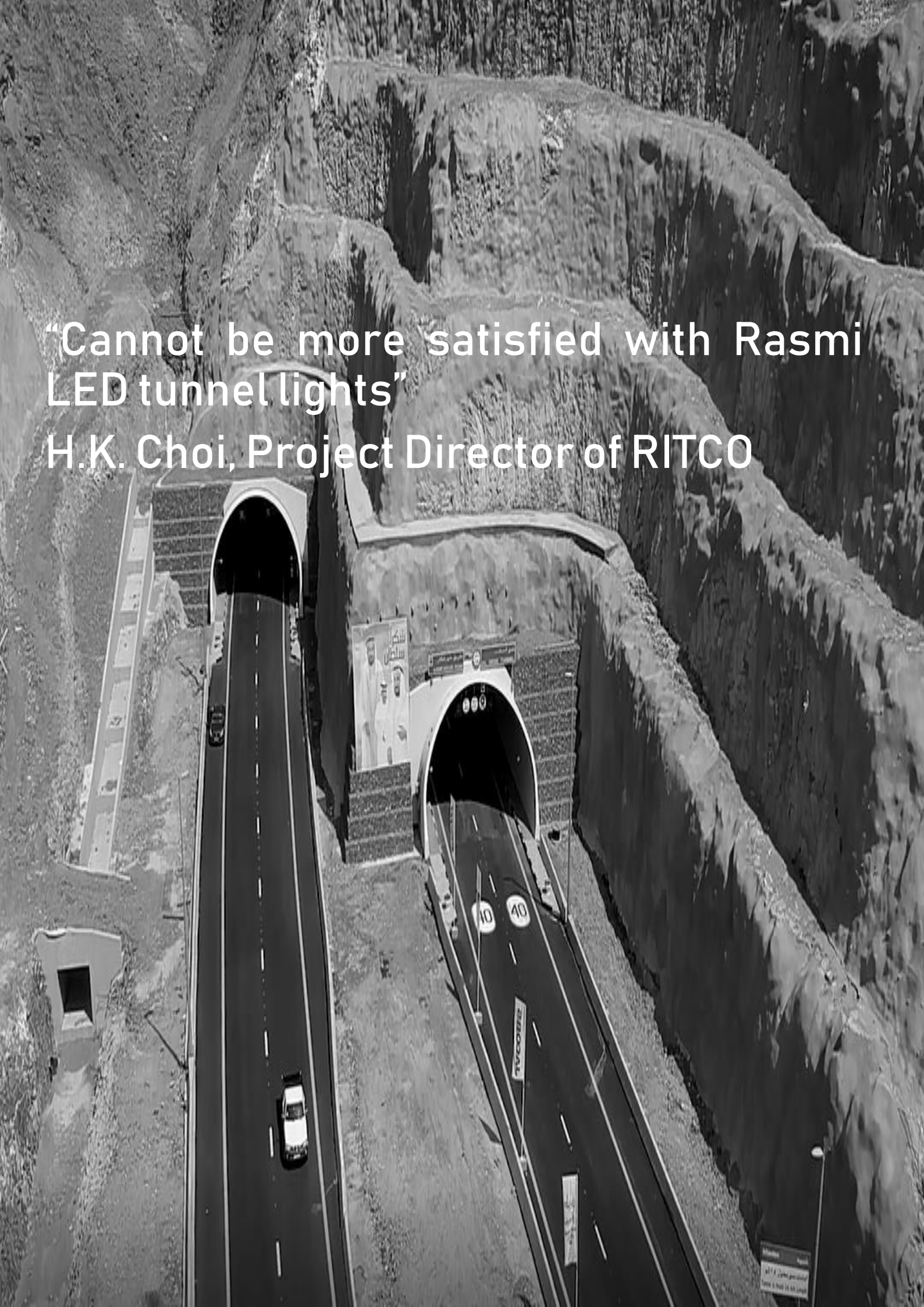
هيئة كهرباء ومياه الشارقة
Sharjah Electricity & Water Authority

SEWA engineers attended the premises of Rasmi LED Lighting Ltd in Stanley, Co. Durham, U.K. with the purpose of conducting a Factory Acceptance Inspection and product tests of the LED Linear tunnel lights.

The purpose of this visit was to inspect the design and manufacturing facilities of Rasmi LED lighting Ltd as the custom-designed and manufactured linear LED luminaires originated from Rasmi UK facilities.



“Cannot be more satisfied with Rasmi
LED tunnel lights”
H.K. Choi, Project Director of RITCO





raSmi UK