

Transportation Lighting

**TR**



PROJECT: FDOT - Port of Miami Tunnel  
LOCATION: Miami, FL  
SPECIFIER: Jacobs Engineering

## Demand Kenall for Tunnel Lighting

Your goal when lighting a tunnel is to safely support the drivers' comfort and visual perceptions. Tunnel lighting ranks among the most challenging of lighting applications. Not only does the intricate topology of a tunnel, with its "Black Hole" effect and critical transition zones require painstaking attention to detail, but also the tough, corrosive atmosphere caused by a combination of pollutants, moisture, chemicals, and galvanic couple differences (electrolytic ionization) add to the challenge.

Luminaires installed in this type of environment can deteriorate rapidly causing unsafe tunnel conditions. Reliable lighting designed to last for many years is critical, especially in an area where access is restricted and minimal maintenance is a must.

For these reasons, Kenall tunnel luminaires have been designed with your needs in mind, including stainless steel housings that last for decades and optimal light levels to ensure the safe flow of traffic throughout the tunnel.

Our new LuxTran™ LED luminaires are more powerful than their predecessors with lumen outputs ranging from 8,531 to 90,295—more than enough to obliterate the "Black Hole" effect—and LED life times up to 150,000 hours.

Because tunnel lighting must endure the most challenging environmental conditions, Kenall has applied over 50 years experience in designing, testing and manufacturing luminaires to meet and exceed the highest industry standards, including ANSI, CSI and NEMA, so you can specify Kenall tunnel luminaires with complete confidence.

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- Over 50 years of expertise in developing stainless steel housings
- Lighting performance that meets and exceeds industry standards
- Optical control provides visual acuity for comfort and safety
- LED luminaires for increased energy savings and less maintenance

## *Challenging Applications... Demand Kenall™*

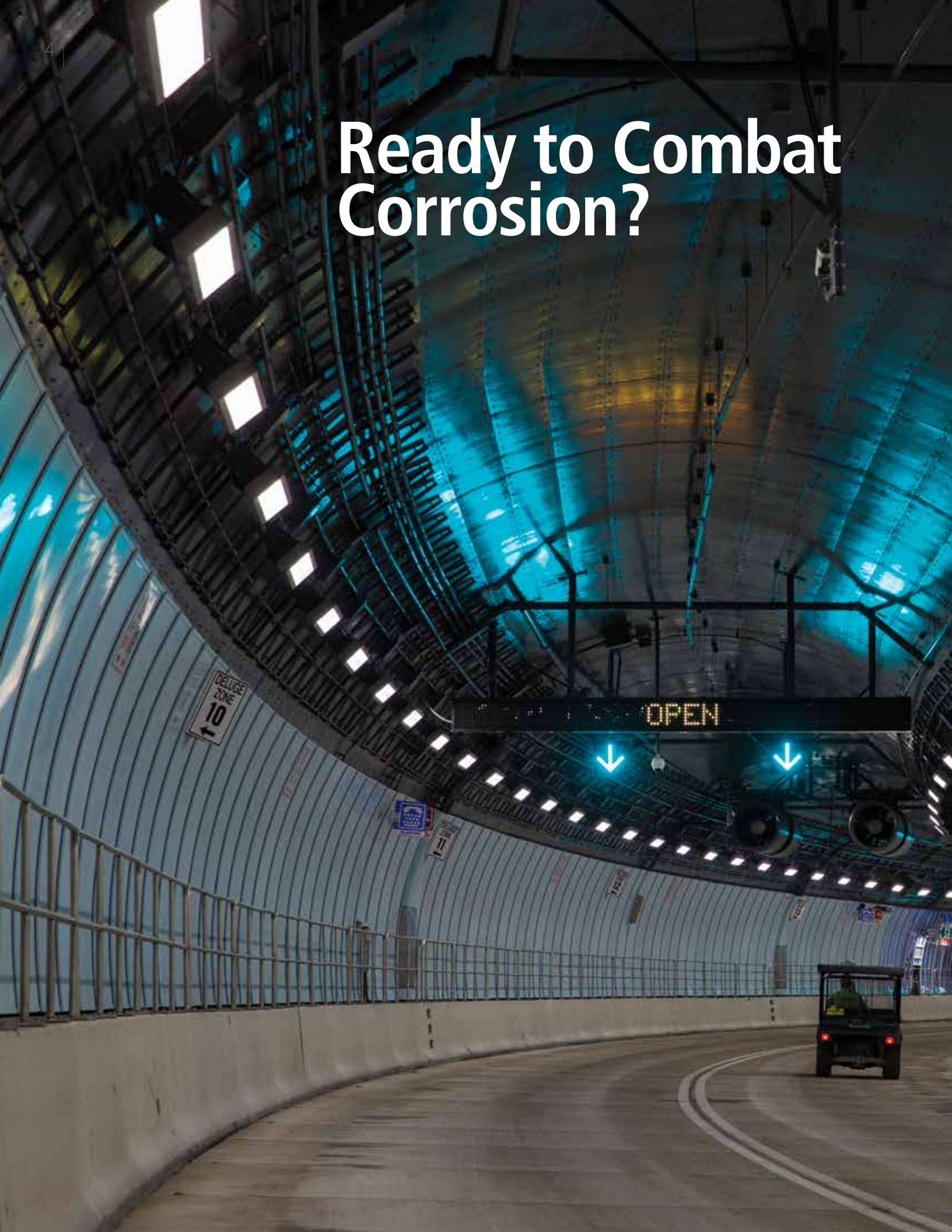


## Custom Products. Expert Service.

Because each tunnel has its own unique characteristics, Kenall specializes in customized tunnel lighting to meet your exact specifications and industry standards. Our expertise in service and support addresses the many complexities and challenges of lighting a tunnel. From clearly defined project objectives to product selection, design and layout assistance, our tunnel experts are available when you need them. Then, once your luminaires are ready for delivery, sequenced, palletized shipments with simple instructions support a flawless installation. The Kenall team is committed to taking the complexities out of tunnel lighting.



# Ready to Combat Corrosion?



# Kenall's LuxTran is Up to the Challenge

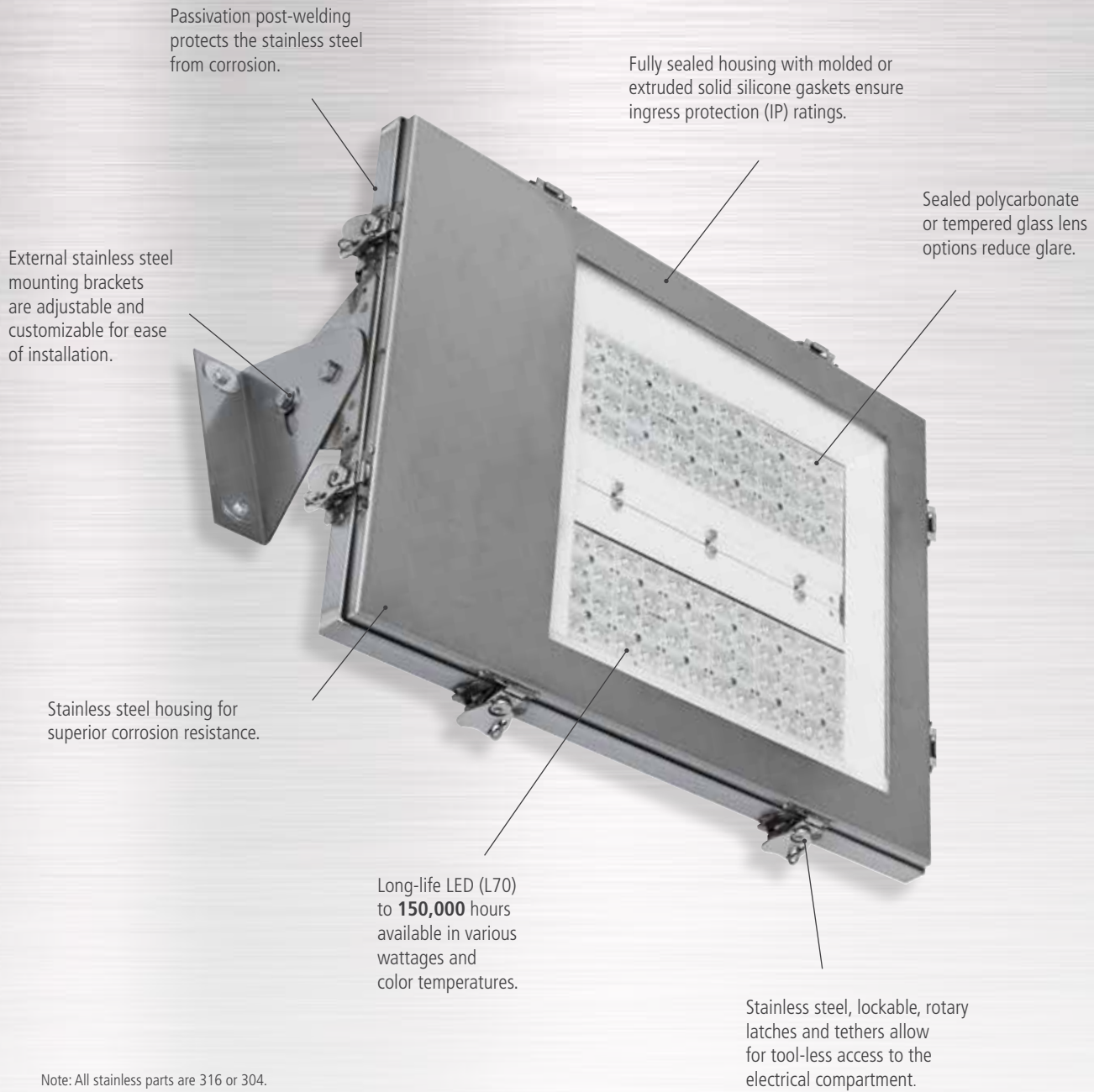
Tunnel lighting prepared to resist corrosion for decades

*"The lighting provided for the Port of Miami Tunnel has met all of the performance requirements of the demanding specification prepared by the project designer and approved by the Florida Department of Transportation."*

— Steven Dusseault, P.E.  
CEI Resident Engineer, Florida Dept. of Transportation,  
Port of Miami Tunnel project

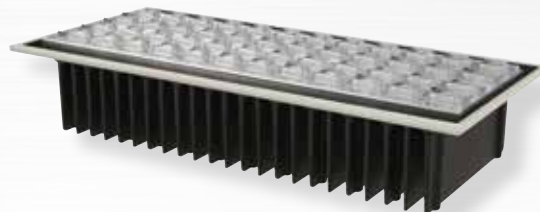
**PROJECT:** FDOT - Port of Miami Tunnel  
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Read the entire case study at [www.kenall.com](http://www.kenall.com)

# Products Designed to Last for Decades



## LuxTran™ Heat Sinks

LEDs are housed in an isolated aluminum heat sink to eliminate the possibility of dissimilar metal corrosion. Double sealed using a 5,000 hour salt spray electrodisposition coating and powder coating, the heat sink is designed to last the lifetime of the LEDs.



# Built & Tested to Exceed Industry Standards

Kenall delivers tough tunnel lighting systems designed and manufactured in the USA that are built and tested to meet or exceed industry standards.

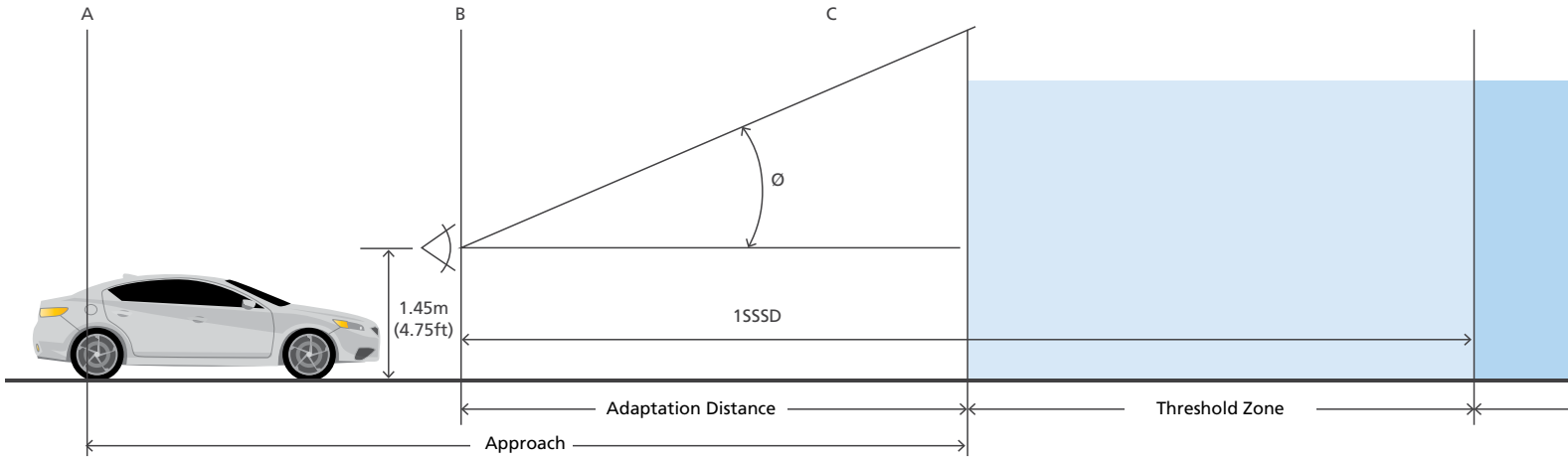
- Stainless Steel**  
 Kenall's LuxTran™ series is specifically designed and manufactured to eliminate corrosion and last for decades. Using only 316 and 304 stainless steel, typically used in marine environments, our tunnel products resist corrosion, rust and staining.
- Passivated Welds**  
 With forming and fabrication being two of our key competencies, Kenall ensures that all welds on LuxTran products are passivated; restoring a uniform chromium oxide film on the material's surface to eliminate the potential for corrosion or rouging.
- Custom Mounting Bracketry**  
 Unlike many products in the industry, mounting brackets on Kenall's LuxTran products can be customized to your unique tunnel characteristics.
- Minimal Maintenance**  
 Kenall's LuxTran LED luminaires provide longer L70 life times — up to 150,000 hours — lasting 5x longer than traditional tunnel luminaires for reduced operating cost and maintenance.
- Tested to Meet Certified Performance Standards**  
 Kenall LuxTran luminaires go through many rigorous testing procedures to meet the following industry standards: ANSI C136.27-2012 temperature cycling/100 PSI water test, C136.31 vibration testing, UL1598/A, CSA22.2, NEMA 4X rating, IP66 rating per IEC 60598, as well as IESNA LM-79-08 standard photometry testing. See page 18 for a list of Kenall's standard testing procedures.



# Understanding the Science of the Space

The human eye requires more time to adapt from brightness to darkness than the reverse. For this reason, tunnel lighting must gradually transition to interior light levels. During nighttime hours, the area outside the tunnel is dark, whereas interior levels

## Tunnel Topology



### Fixation

The point from which the driver fixates on the opening of the tunnel to identify tunnel roadway hazards. This is the point where adaptation begins.

### Approach

During daytime hours, drivers' eyes may have to adapt from over 10,000 footcandles to less than 1% of that level very quickly, while traveling at a high rate of speed. To facilitate this, the design must include the approach, which extends from the point that the tunnel opening becomes the principal feature in the driver's field of vision (also known as the adaptation point), to the actual entrance of the tunnel.

### Adaptation Distance

The adaptation distance is the distance between the adaptation point and the portal. (The portal is the plane of entrance into the tunnel, where the roadway changes from uncovered to covered.)

### Threshold Zone

The first phase of visual adaptation occurs in the Threshold Zone as the driver enters the tunnel. The lighting levels in this zone are specified in CIE 88 2004, and depend upon the length of the tunnel, the Average Annual Daily Traffic (AADT), wall reflectances and whether cyclists are present or the exit is visible.

Definition of tunnel topology reference: ANSI/IES RP-22-11, Section 2.0.

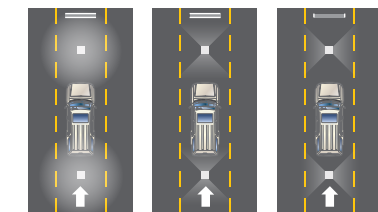
## Types of Tunnel Lighting: Symmetrical Light Distributions for Tunnels

### Transverse Lighting



Symmetric

Light that radiates at right angles to the axis of the tunnel, directing it evenly to the walls



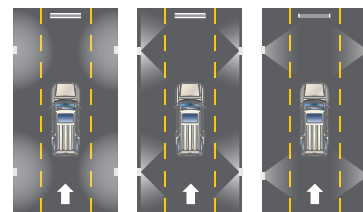
- Uniform luminance throughout tunnel interior
- Generally low contrast values
- Maximizes wall luminances
- Maximizes candlepower to walls

### Axial Lighting



Symmetric

Light that radiates parallel to the axis of the tunnel, distributing it parallel to the traffic flow



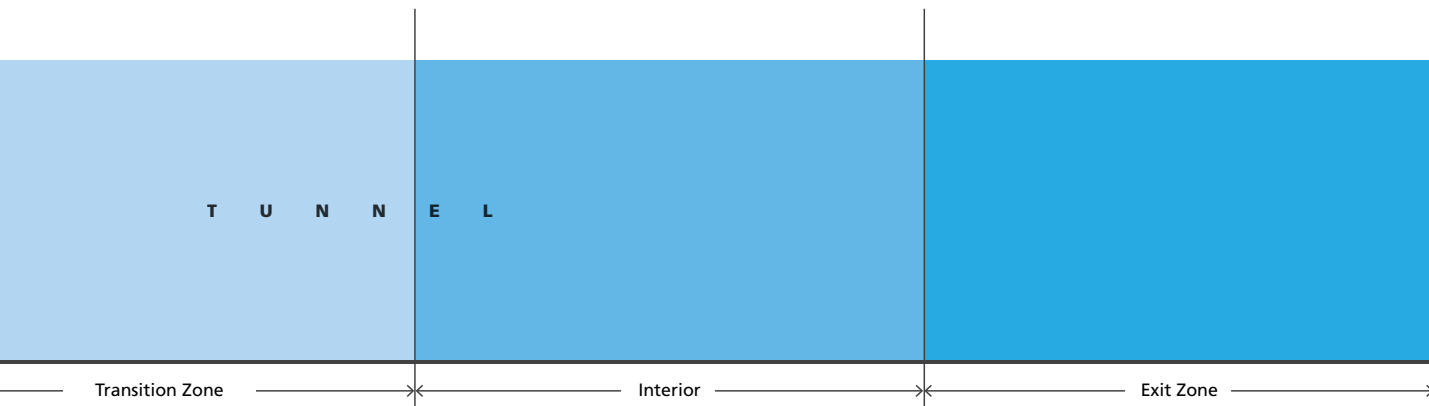
- Uniform luminance throughout tunnel interior
- Generally low contrast values
- Maximizes flux parallel to traffic flow
- Maximizes candlepower to vehicle

Refer to ANSI/IES RP-22-11, Section 7.0 for complete lighting application techniques.



# Tunnel Lighting Best Practices

are similar to those of an illuminated open roadway; making the transition minimal. Tunnel lighting is comprised of distinct zones, each with unique lighting needs as illustrated below. For a detailed explanation, refer to ANSI/IES RP-22-11, Section 2.0.



## Transition Zone

The second zone inside the tunnel is the transition zone, in which ambient illumination decreases from the relatively high levels found in the Threshold Zone to the lower levels found in the Interior Zone. In this zone, the light levels are decreased in stages, allowing the driver's eyes time to adapt. The total length of the Transition Zone may be equivalent to 25 seconds of travel time.

## Interior

The Interior Zone is comprised of the light level required for the remainder of the tunnel, once eye adaptation has been completed in the preceding Transition Zone.

## Exit Zone

The Exit Zone is not a requirement as per ANSI/IES RP-22-11. The eye's ability to adapt from dark to light occurs very quickly, although higher light levels are sometimes specified to help adapt back to higher exterior illuminance levels. Exit Zone lighting may or may not be required depending on local codes and practices.

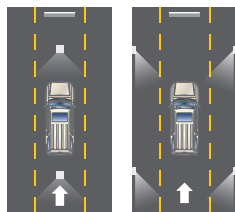
## Types of Tunnel Lighting: Asymmetrical Light Distributions for Tunnels

### Negative Contrast (Counter-Beam)



Counter Beam

Light that radiates parallel to the tunnel axis and against the directional flow of traffic



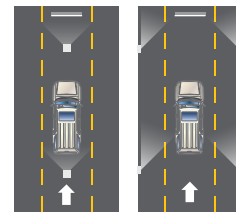
- Predominantly distributed towards the driver, but in a controlled manner to reduce glare
- Provides high pavement luminance and low object luminance to enhance negative contrast
- Light above 45° must be strictly controlled

### Positive Contrast (Pro-Beam)



Pro Beam

Light that radiates parallel to the tunnel axis with the directional flow of traffic



- Minimal glare towards the driver
- Primary disruption is in direction of traffic flow
- Provides high object luminance and low pavement luminance to create positive contrast



# What's New in **LED** Tunnel Lighting?

Kenall has expanded its family of tunnel luminaires to address a range of specialized needs to meet your specific tunnel applications. New LED lamp options not only provide maintenance-friendly choices, but also provide additional energy savings.

## LuxTran™ Drivers

- Developed specifically for tunnel lighting
- Anodized aluminum extruded case
- 277-480 VAC topology
- 92% efficiency
- 200,000 hr MTBF (Telecordia standard)
- Sensitive components contained directly on heat sink compartment
- Driver placed on luminaire heat sink to create a direct path to cooling air
- Flicker-free dimming down to 1%; dim-to-dark (turn luminaires off via 0-10 vdc dimming)
- Aluminum heat sink galvanically isolated from stainless steel enclosure by a single piece 1/8" thick Dow Corning Xiameter White Duro silicone gasket
- 90° Celsius maximum case temperature
- 100W, 200W, 300W, and 400W output level options



Single piece 1/8" thick Dow Corning Xiameter White Duro silicone gasket

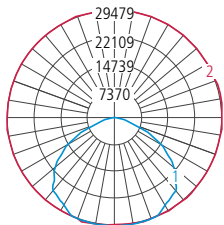
## LTSI Series

- Powered by integral driver
- Suitable for interior and exterior supplemental lighting in all zones
- Corrosion resistant, one-piece, type 304 or 316 stainless steel housing; one-piece, seam-welded construction
- Stainless steel doorframe secured to housing with lockable stainless steel rotary latches
- Clear tempered glass or polycarbonate lens
- Lumen range 27,434 – 90,295
- Type II, III, IV, IV-Narrow and V-Square distributions
- Customizable mounting brackets for ease of installation
- Vibration tested to ANSI C136.31
- Water tested to ANSI C136.27-2012 (100 PSI water test)



ANSI C136.27

Nominal Size	11" x 24"; 20" x 33"; 33" x 35"
Installation Types	Surface - Ceiling or wall mount
Lamp Type	LED
Wattages	300W, 390W, 396W, 600W, 780W



- Highest output
- Type V Narrow Round
- 60° cut off
- Excellent in transitional applications over pedestrian or service locations



# of LED's	Lumens	Watts	Efficacy	Color*	CRI
96	27,434 - 43,836	215 - 426	86 - 128	4000 - 5700K	70
192	56,509 - 90,295	429 - 853	89 - 132	4000 - 5700K	70

\*4000K also available in 80 CRI

For additional performance data consult spec sheets at [www.kenall.com](http://www.kenall.com)



# New **LED** Lighting with Remote Driver Option

Kenall's LTL and LTS are maintenance friendly. Powered by a remote driver installed at arms reach, the system is designed to facilitate ease of servicing. See pages 12 and 13 for additional information.

## LTL Series

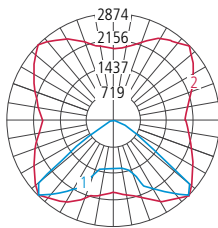
- Suitable for continuous row mounting in all zones
- Powered by RD700 distributed DC driver system; remotely located for servicing convenience
- Corrosion resistant, one-piece, type 304 or 316 stainless steel housing; one-piece, seam-welded construction
- Stainless steel doorframe secured to housing with lockable stainless steel rotary latches
- Clear tempered glass or polycarbonate lens
- Lumen range 10,901 – 12,420
- Type II, Pro-Beam, Type V-Narrow Round and Type V-Square distributions
- Customizable mounting brackets for ease of installation
- Vibration tested to ANSI C136.31
- Water tested to ANSI C136.27-2012 (100 PSI water test)
- NEMA 4X Rated



**100  
PSI**

ANSI C136.27

Nominal Size	10" × 96"
Installation Types	Surface - Ceiling or wall mount
Lamp Type	LED
Wattages	100W



- Highest output
- Type V Square
- 45° cut off
- Excellent in all zones



# of LED's	Lumens	Watts	Efficacy	Color	CRI
96	10,901-12,420	118	72-105	4000 - 5700K	65

## LTS Series

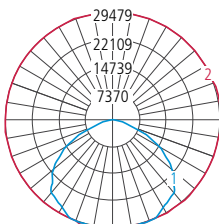
- Suitable for supplemental lighting in transition zones
- Powered by RD700 distributed DC driver system; remotely located for servicing convenience
- Corrosion resistant, one-piece, type 304 or 316 stainless steel housing; one-piece, seam-welded construction
- Stainless steel doorframe secured to housing with lockable stainless steel rotary latches
- Clear tempered glass or polycarbonate lens
- Lumen range 27,434 – 90,295
- Type II, Pro-Beam, Type V-Narrow Round and Type V-Square distributions
- Customizable mounting brackets for ease of installation
- Vibration tested to ANSI C136.31
- Water tested to ANSI C136.27-2012 (100 PSI water test)
- NEMA 4X Rated



**100  
PSI**

ANSI C136.27

Nominal Size	10" × 19"; 18" × 19"; 18" × 34"
Installation Types	Surface - Ceiling or wall mount
Lamp Type	LED
Wattages	300W, 390W, 396W, 600W, 780W



- Highest output
- Type V Narrow Round
- 60° cut off
- Excellent in transitional applications over pedestrian or service locations



# of LED's	Lumens	Watts	Efficacy	Color*	CRI
96	27,434 - 43,836	215 - 426	86 - 128	4000 - 5700K	70
192	56,509 - 90,295	429 - 853	89 - 132	4000 - 5700K	70

\*4000K also available in 80 CRI

For additional performance data consult spec sheets at [www.kenall.com](http://www.kenall.com)



[www.kenall.com](http://www.kenall.com)

P: 800-4-Kenall

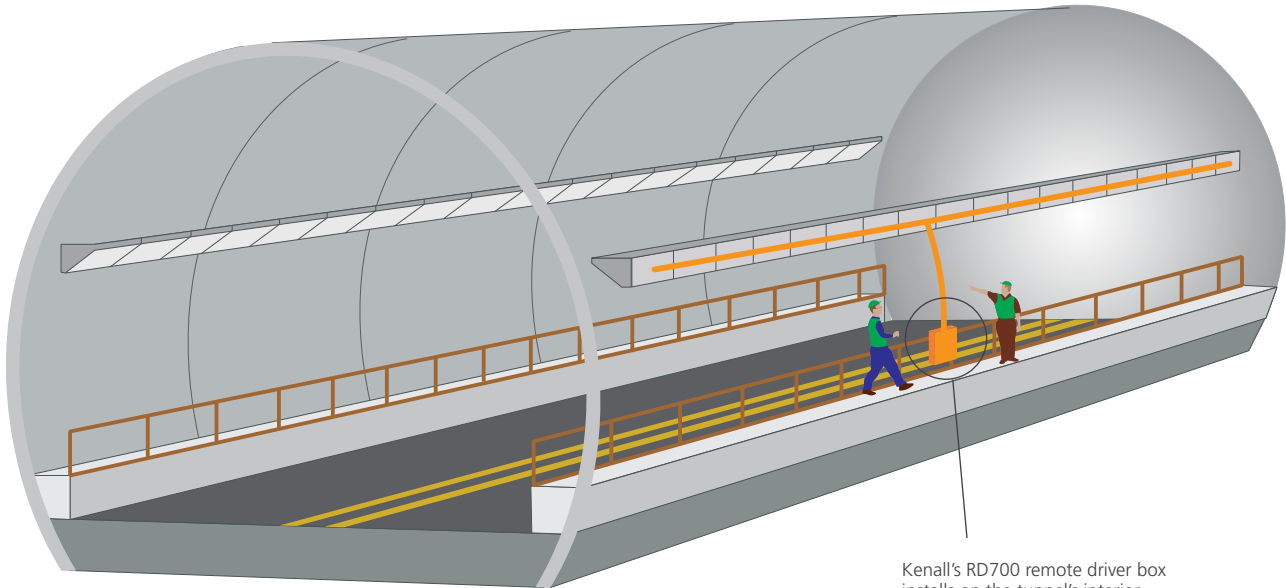
F: 262-891-9701

10200 55th Street Kenosha, Wisconsin 53144, USA

These products comply with the Buy American Act and may be covered by patents found at [www.kenall.com/patents](http://www.kenall.com/patents). Product specifications are subject to change; please consult [www.kenall.com](http://www.kenall.com) for current product details.

# Remote LED Driver Adds Convenient Servicing...

The RD700 Remote Driver powers Kenall's LuxTran™ LTL and LTS Series LED luminaires for ease of serviceability. Hot-swappable drivers can be simply removed or replaced without shutting the system down. A patent-pending, tool-less, quick-release mechanism also makes servicing the drivers easy.



Kenall's RD700 remote driver box installs on the tunnel's interior wall for convenient servicing of luminaires.

## RD700 Series

- Remotely powers Kenall LTL and LTS Series LED luminaires via constant-current DC
- Hot-swappable; service drivers without shutting down the power
- Simplified servicing of drivers via patent-pending tool-less, quick-release mechanism
- Corrosion resistant, one-piece, type 316 or 304 stainless steel housing; one-piece, seam-welded construction
- High-efficiency (>90%) drivers with dedicated heat sinks and 20kV built-in surge suppression for long-life operation
- UL Certified IP66 per IEC 60598



Nominal Size	42" x 48"
Installation Types	Surface - Wall mount
Lamp Types	LED



Kenall's patent-pending quick-release mechanism makes servicing the RD700 easy.



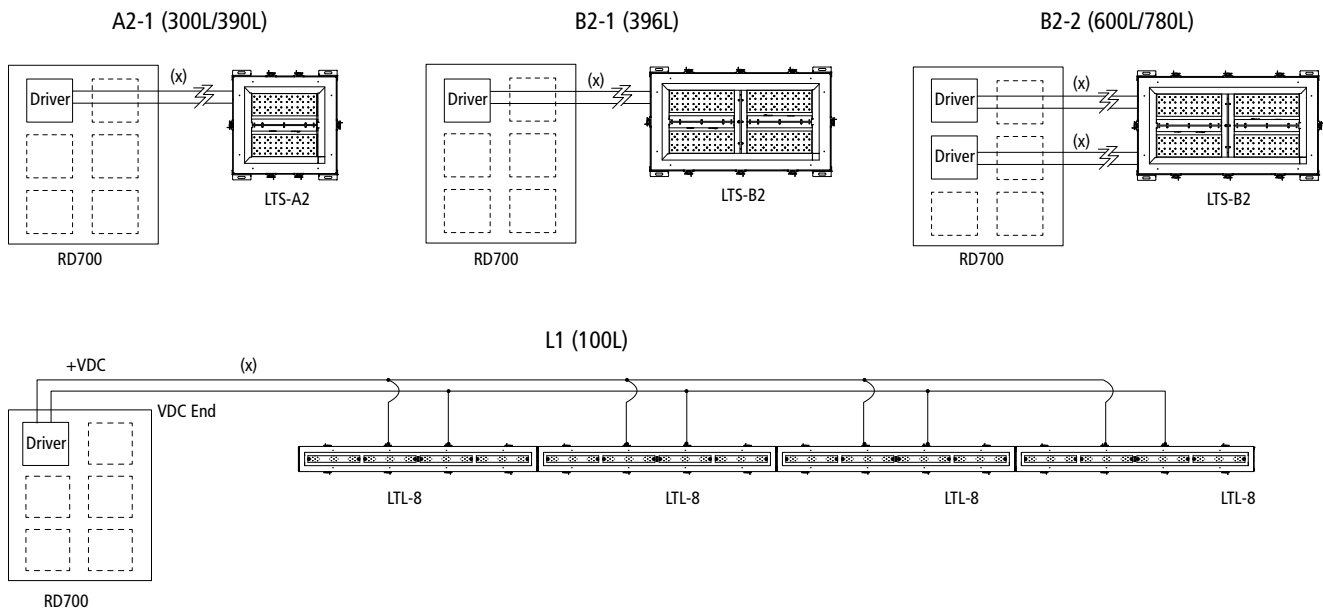
# ...Without Shutting Down the Tunnel

With Kenall's LuxTran™ RD700 remote driver, you no longer have to shut down the tunnel to service luminaires. The remote driver is installed low on the interior wall to facilitate ease of maintenance.



Maintenance personnel walk along the catwalk toward the remote driver for easy servicing. Wires are run along the wall from the box to the luminaires to connect the remote driver to Kenall's LuxTran™ LTL and LTS LED tunnel luminaires as shown in the wiring schematics below. Various wiring configurations are dependent on the type and amount of lighting fixtures installed.

## Wiring Schematic



## Electrical Characteristics

Product Compatibility	Driver Qty	Driver Output (per Driver)		Max. Input Current (per Driver)			Max. Input Power per Driver	Max. Total Input Power
		Output Current	Output Voltage	277 VAC	347 VAC	480 VAC		
LTS	4	1050 mA	240-320 VDC	1.39 A	1.11 A	0.80 A	385 W	1540 W
LTS	6	1050 mA	240-320 VDC	1.39 A	1.11 A	0.80 A	385 W	2310 W
LTS/LTL	4	1400 mA	240-320 VDC	1.86 A	1.48 A	1.07 A	514 W	2056 W
LTS/LTL	6	1400 mA	240-320 VDC	1.86 A	1.48 A	1.07 A	514 W	3084 W



*“Lighting five lanes of roadway from the wall was a challenge which was met by the [LuxTran] wall fixture provided by Kenall.”*

— Randy Walker  
Director of Electrical Engineering  
Jacobs Global



# Powerful Performance

**PROJECT:** TXDOT - Woodall Rodgers Tunnel

**LOCATION:** Dallas, TX

**SPECIFIER:** Jacobs Engineering

Read the entire case study at [www.kenall.com](http://www.kenall.com)

16 | **LuxTran™** Tunnel Lighting  
**LuxTran™** Family of Tunnel Lighting

**WFT Series**

- Corrosion resistant, one-piece, stainless steel, seam-welded housing
- Detachable doorframe with stainless steel spring loaded release hinges and stainless steel latches
- Clear tempered glass lens sealed to doorframe
- Type III or IV distributions
- Removable gear tray for ease of maintenance
- UL Certified IP66 per IEC 60598



Nominal Size	12.5" x 21"
Installation Types	Surface - Wall mount
Lamp Types	HPS, MH
Wattages	100W, 150W



**CFT Series**

- Corrosion resistant, one-piece, stainless steel housing; seam-welded construction
- Detachable doorframe with stainless steel spring loaded release hinges and stainless steel latches
- Clear tempered glass lens sealed to doorframe
- Type III or IV distributions; forward throw option
- Tool-less access to ballast compartment for ease of maintenance
- External mounting brackets for ease of installation
- UL Certified IP66 per IEC 60598



Nominal Size	12.5" x 21"; 12" x 28"
Installation Types	Surface - Ceiling mount
Lamp Types	HPS, MH
Wattages	100W, 150W, 250W, 400W



**LTD14 Series**

- Corrosion resistant, one-piece, stainless steel housing; seam-welded construction
- Doorframe secured to housing with stainless steel cam latches for ease of maintenance
- Clear tempered glass lens sealed to doorframe
- Symmetrical transverse distribution
- UL Certified IP66 per IEC 60598
- Vibration tested to ANSI C136.31
- Water tested to ANSI C136.27-2012 (100 PSI water test)
- NEMA 4X Rated



ANSI C136.27

Nominal size	12" x 48"
Installation types	Surface - Ceiling or wall mount
Lamp types	T5, T5HO
Wattages	T5 28W; T5HO 54W



# LuxTran™ Family of Tunnel Lighting

## TSQD Series

- One-piece, cold rolled steel, corrosion resistant stainless steel or marine-grade, aluminum housing available
- One-piece doorframe sealed to housing with closed cell neoprene gasket and fasteners
- Type V distribution
- External mounting brackets for ease of installation
- Available in a variety of lens types
- Vibration tested to ANSI C136.31



Nominal Size	20" x 20"
Installation Types	Surface - Ceiling mount
Lamp Types	HPS, MH, Induction Fluorescent
Wattages	HPS 100W, 150W, 250W; MH 250W; IND 150W



## LTD1224 Series

- Aluminum alloy housing; anodized finish
- Isolated, external stainless steel hardware for corrosion resistance
- One-piece, seam-welded doorframe with rotary pull latches for ease of maintenance
- Clear tempered glass lens
- Symmetrical axial distribution
- Vibration tested to ANSI C136.31
- UL Certified IP65 per IEC 60598



Nominal Size	12" x 24"
Installation Types	Surface - Wall or ceiling mount
Lamp Types	HPS
Wattages	200W, 400W



## LTD2424 Series

- Corrosion resistant, one-piece, stainless steel housing; seam-welded construction
- Doorframe secured to housing with stainless steel cam latches for ease of maintenance
- Clear tempered glass lens sealed to doorframe
- Probeam and counter beam asymmetric distribution
- UL Certified IP66 per IEC 60598
- Vibration tested ANSI C136.31
- Water tested to ANSI C136.27-2012 (100 PSI water test)
- NEMA 4X Rated



ANSI C136.27

Nominal Size	24" x 24"
Installation Types	Surface - Wall or ceiling mount
Lamp Types	HPS, MH
Wattages	100W, 250W, 400W



# Ordering Information

Sample Ordering Information (Ex: LTSI-A2-C-SM-2-8-390L50K-DCC-CV-316-5KF)

Model	Size Configuration	Mounting	Mounting Design	Dist. Type	Lens Type	Lamp Power	Lamp Color	Driver Type	Voltage	Housing Mtrl	Heat Sink Finish	Options
<b>LTSI</b>												

<b>LTSI</b>				<b>DCC</b>			
<b>Size Configuration</b>				<b>Lens Type</b>			
<b>A2</b>	1x2 Module Array			<b>8</b>	.188" (.48 cm) Tempered Glass Lens		
<b>B2</b>	2x2 Module Array			<b>7</b>	.187" (.47 cm) Clear Polycarbonate		
<b>Mounting</b>				<b>Lamp Power - A2 Configuration</b>			
<b>C</b>	Ceiling			<b>192L</b>	192 Watt LED		
<b>W</b>	Wall			<b>295L</b>	295 Watt LED		
<b>Mounting Design Detail</b>				<b>Lamp Power - B2 Configuration</b>			
<b>SM</b>	Standard Mounting Detail (as shown)			<b>300L*</b>	300 Watt LED		
<b>CM</b>	Custom/Project-Specific Mounting (consult factory)			<b>390L*</b>	390 Watt LED		
<b>Distribution Type</b>				<b>Lamp Color</b>			
<b>2</b>	Type II			<b>40K8</b>	4000K / 80 CRI min.		
<b>2A</b>	Type II A			<b>40K7</b>	4000K / 70 CRI min.		
<b>PB</b>	Pro-Beam			<b>50K7</b>	5000K / 70 CRI min.		
<b>4</b>	Type IV – Forward Throw			<b>57K7</b>	5700K / 70 CRI min.		
<b>5N</b>	Type V – Narrow Round						
<b>5S</b>	Type V – Square						
				<b>Driver Type</b>			
				<b>DCC</b>	Dimming Constant Current		
				<b>Voltage</b>			
				<b>DV</b>	120-277 VAC Nominal Range		
				<b>CV</b>	277-480 VAC Nominal Range		
				<b>Housing Material</b>			
				<b>304</b>	Type 304 Stainless Steel		
				<b>316</b>	Type 316 Stainless Steel		
				<b>Heat Sink Finish</b>			
				<b>1KF</b>	1,000 Hour Finish		
				<b>5KF</b>	5,000 Hour Finish		
				<b>Options</b>			
				<b>FS</b>	Single Fuse and Holder		
				<b>CO</b>	1/2" Conduit Connection		

\* Available with Type PB Optic only

## Testing

Whether testing for Ingress Protection or stringent vibration testing, Kenall is equipped, with a state-of-the-art certified safety laboratory, to provide the following testing capabilities:

- Certified for safety testing by Underwriters Laboratory and Intertek Testing Laboratories for Incandescent, Fluorescent and HID Luminaires (UL 1598), LED Luminaires (UL 8750) Hazardous Locations (UL 844, Class I Div II, Class II Div II, Class III), and Emergency Lighting (UL 924).
- Ingress Protection testing (dust and water chambers)
- Highly Accelerated Stress Screening (-50°C to 150°C Environmental Chamber)
- MIL-STD-461F- Conducted electromagnetic interference (EMI)
- 25°C and 40°C thermal testing rooms
- LM-79 accredited photometric laboratory—including a Type C goniophotometer and 2-meter integrating sphere with spectroradiometer—providing credentials for the Department of Energy's Lighting Facts® listings and DesignLight Consortium® approvals.
- Select Kenall LuxTran™ luminaires are independently tested for vibration, wind and shock according to ANSI standard C136.31 ensuring their ability to withstand the environmental challenges of tunnels.
- Select Kenall LuxTran luminaires are independently tested to ANSI standard C136.27-2012 (100 PSI water test) ensuring their ability to withstand extreme hosedown procedures in tunnels.
- Because it is inherently robust, stainless steel is exempt from the salt spray test.



Particle Testing



100 PSI Water Test



Photometric Testing



# Listings, Certifications and Warranty

Fixtures designed for use in tunnel applications must satisfy a large number of demanding lighting and environmental requirements. Listings applicable to tunnel luminaires are shown below. Please refer to the product descriptions within each section of this guide to determine specific product listings.



**UL/CUL Listed**—The UL symbol signifies that Underwriter’s Laboratory (UL) has determined that a manufacturer has demonstrated the ability to produce a product complying with UL’s requirements with respect to specific risk, performance under specific conditions, compliance with regulatory codes and specified standards, or any other conditions as determined by UL.



**ETL**—Products bearing the ETL Listed mark is determined to have met the minimum requirements of prescribed product safety standards as certified by a Nationally Recognized Testing Laboratory (NRTL). The mark also indicates that the manufacturer’s production site conforms to a range of compliance measures and is subject to periodic follow-up inspections to verify continued conformance.



**IP65**—UL Certified IP65 per IEC 60598 ensures that the enclosure is dust-tight and protected against jet streams of water from any direction without any harmful effects.



**IP66**—UL Certified IP66 per IEC 60598 ensures that the enclosure is dust tight and protected against water projected in powerful jets without any harmful effects.



**ADA Compliant**—Although ADA is not specific to lighting, it does impact fixture design by creating standards for wall sconce projection space and hanging light clearance. Section 4.4 of the ADA states that “objects projecting from walls with their leading edges between 27” and 80” above the finished floor shall protrude no more than 4” into walks, halls, corridors, passageways or aisles.”



**3G**—Products bearing the 3G listing are independently tested for vibration, wind and shock according to ANSI Standard C136.31 ensuring their ability to withstand the environmental challenges of tunnels.



**NEMA 4X**—Products bearing the NEMA 4X rating mark are enclosures constructed for either indoor or outdoor use to provide a degree of protection to personnel against access to hazardous parts; to provide a degree of protection of the equipment inside the enclosure against ingress of solid foreign objects (windblown dust); to provide a degree of protection with respect to harmful effects on the equipment due to the ingress of water (rain, sleet, snow, splashing water, and hose directed water); that provides an additional level of protection against corrosion; and that will be undamaged by the external formation of ice on the enclosure.



**100 PSI**—Products bearing the 100 PSI listing are independently tested for temperature cycling and 100 PSI water spray according to ANSI Standard C136.27-2012; ensuring the luminaires ability to withstand extreme hosedown procedures in tunnels.

## 10-Year Limited Product Warranty

Kenall promises to stand behind our tunnel luminaires. Our commitment to excellence enables us to offer a 10-year limited product warranty. For detailed, product specific warranty information, please visit our website at [www.kenall.com](http://www.kenall.com).





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