



## IMPORTANT CONSIDERATIONS WHEN SELECTING HARSH ENVIRONMENT LUMINAIRES

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### LED Lighting Engineered for Applications Where Corrosive Elements are Present

- Safety First
- An Ounce of Prevention
- An Impenetrable Envelope
- Environmental Protection
- Thermal Management for Sealed Fixtures

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### Introduction

Facility managers, business owners, distributors, and contractors are sometimes faced with selecting luminaires for harsh chemical environments. These environments can include:

- Car washes (sodium hydroxide pre-soaks, detergents)
- Food processing (detergents, disinfectants)
- Animal agriculture (ammonia, detergents)
- Waste water treatment (ammonia, detergents)
- Dairy barns (ammonia, detergents)
- Natatoriums - Indoor Pools (chlorine, high humidity)
- Outdoor coastal (salt water)

All of the applications above also happen to be high humidity or spray wash environments. Average luminaires won't survive long in these applications and will quickly create problems.

### Safety First

The wrong fixtures in harsh environments can even become fire and electric shock hazards if the fixtures aren't certified for wet environments. Be sure to select luminaires that are certified by a nationally recognized testing laboratory (NRTL, i.e. UL, CSA, ETL, TÜV-SÜD) for wet environments. This is even more important than durability. Safety first.

### An Ounce of Prevention

In harsh chemical environments, the best deal isn't the lowest price fixture. The best deal is the reasonably priced fixture that will survive and perform well, with little to no maintenance. Lowest total cost of ownership, in these settings, means avoiding the hassle and considerable expense of replacing fixtures due to premature failure. There are many ways that fixtures can fail, if they're not properly designed for chemical resistance. To protect your money and luminaire investment, do your research and only select chemical resistant luminaires that will survive your demanding application.

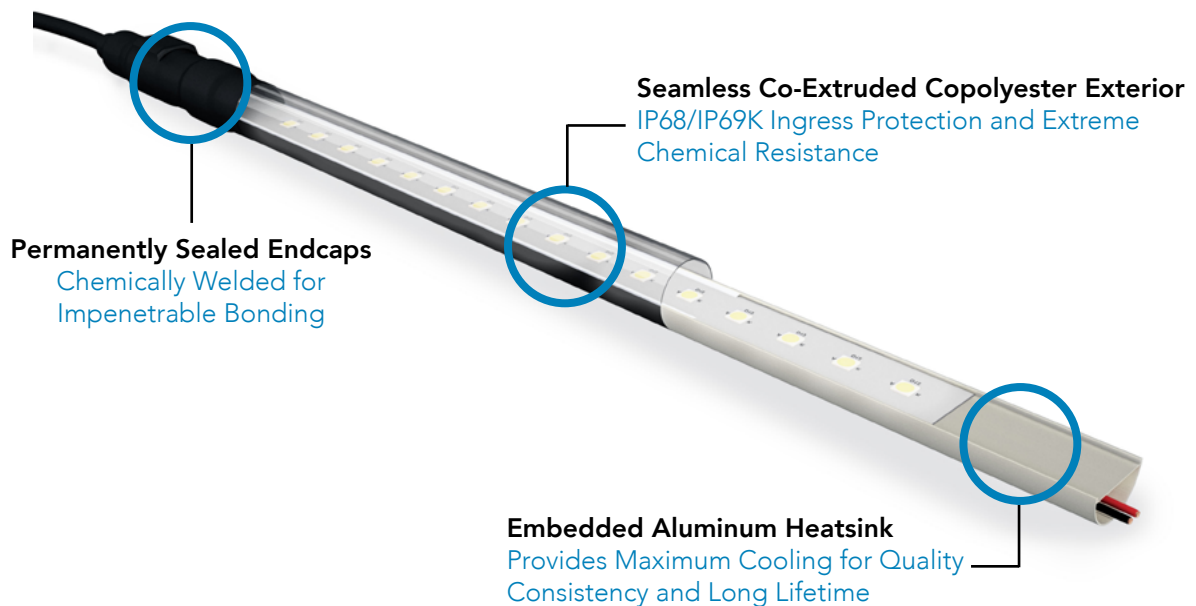
Low to no maintenance requirements are equally important in keeping down the total cost of ownership. Avoid luminaires utilizing legacy bulb technologies. Replacing bulbs is inconvenient, costly, and worst of all might shut down critical operations in your facility. Look for integrated LED technology with a long-rated lifetime. High IP rated fixtures that keep out dust and water will also eliminate the cost and disruption of having to clean inside a lens. High IP rated fixtures will also permit fast and easy spray cleaning, should the outside of the fixtures get dirty. A high IK impact rating will also reduce the risk of breakage from impacts, preventing costly maintenance or early replacement.

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### An Impenetrable Envelope

Many traditional style vapor tights are designed using gaskets and clips to seal the fixture, requiring assembly and often leaving multiple fail points that render it susceptible to intrusion. When searching for an impervious solution that can withstand prolonged exposure to harsh environments, it is important to consider the construction of the housing to mitigate risks in the long term. For linear fixtures, this means looking for continuous extrusions, without seams. Even better is co-extruded polymer and aluminum. The right polymer as the outside extrusion provides the chemical resistance, while the inner aluminum extrusion provides mechanical strength and thermal management for the LED and power components. The potential weak link in an extruded housing is at the end caps. Seek permanently welded end caps, to insure impenetrable bonding of the housing and end cap materials.

Although widely used, both polycarbonate (PC) and acrylic (PMMA) are known to succumb to harsh chemical environments. Chemical exposure can create small cracks in polycarbonate and acrylic that grow larger over time. Stresses within the material or impacts from outside eventually compromise the ability of these materials to keep out dust and liquids, creating potential fixture failures or even safety issues. Another problem with polycarbonate and acrylic diffusers is clouding of the diffuser, reducing light output from the fixtures. A modern alternative to these legacy polymers, copolyester (PETA) is a very durable polymer, commonly found in Nalgene bottles, and commercial bar-ware, is designed to withstand frequent commercial washing and rough handling. Seek luminaires with housing and lenses that avoid polycarbonate and acrylic resins, and look instead for copolyester polymer that can withstand harsh chemical exposures.



**STRONG.**

**SIMPLE.**

**COMPACT.**

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### Environmental Protection

IP69K is the highest ingress protection rating available, on the IP rating scale. The first digit in '69' represents the level of protection against solids, dirt, and dust. The highest level of protection for the first digit is a 6, representing no ingress of dust. The second digit is protection from liquid ingress, including water. The highest value is a 9, which is protection against steam-jet cleaning. The 'K' specifically represents ingress protection against high temperatures and high pressures. Look for IP69K for your most demanding applications.

If your new luminaire cracks from an impact, it's probably no longer chemical resistant. Seek luminaires with an IK impact rating of at least IK07. The highest impact rating is IK10. IK10 protects against the impact of a 5 kg (~ 11 lbs) mass dropped from 200 mm (~ 8 inches) above the impacted surface. This represents a 20 joules impact. Ignoring the IK rating means your new fixture could become compromised with its first impact.

Corrosion resistance is one form of chemical resistance. Corrosion resistance is how well a substance (especially a metal) can withstand damage caused by oxidization or other chemical reactions. Preventing rust or other oxidation of metals is an important aspect of chemical resistance. A copolyester, fully-sealed co-extrusion protects any internal metals, such as aluminum, solder, and metal fasteners, from oxidation or rust.

### IP Ratings Explained

#### First # Protection Against Solid Objects

- 0 No protection
- 1 Protected against solid objects over 50mm (ie accidental touch by hands)
- 2 Protected against solid objects over 12mm (ie fingers)
- 3 Protected against solid objects over 2.5 mm (ie tools & wires)
- 4 Protected against solid objects over 1mm (ie tools, small wires)
- 5 Protected against dust - limited ingress (no harmful deposit)
- 6 Totally protected against dust

#### Second # Protection Against Liquids

- 0 No protection
- 1 Protected against vertically falling drops of water
- 2 Protected against direct sprays up to 15° from the vertical
- 3 Protected against direct sprays up to 60° from vertical
- 4 Protected against sprays from all directions - limited ingress
- 5 Protected against low pressure jets if water from all directions - limited ingress permitted
- 6 Protected against strong jets of water (ie for use on shipdecks - limited ingress permitted)
- 7 Protected against the effects of temporary immersion between 15cm and 1m. Duration of test 30 min.
- 8 Protected against long periods of immersion under pressure
- 69K Protected against close-range, powerful, high temperature water jets

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### Thermal Management for Sealed Fixtures

Completely sealing up a fixture to keep out dust, water, and chemicals also has the potential to trap more heat from the LEDs and power electronics. A quality luminaire design will utilize conduction of heat as a strategy to move heat out of a sealed luminaire. This can be accomplished with the aluminum + polymer co-extrusion. Aluminum is an excellent conductor of heat, and much better than steel. It's also possible for the copolyester polymer to have carbon fillers added to increase its thermal conductance and protect all of the LED and power electronics from heat buildup. Make sure any manufacturer that you consider has thought through the thermal management implications of a highly-sealed luminaire, and has optimized conductive heat flow out of the fixture.

### Conclusion

Make a list of the various chemical, dust, dirt, and liquid exposures that your new fixtures will be subjected to. This cataloging of expected chemical exposures is one of the most important steps that you can do to select the right fixture for your harsh chemical environment.

Carefully consider all of the issues raised, above, before you select your next chemical resistant fixtures. Decide which points apply to your application, make a check list, and require that any fixtures meet all of your requirements, before you purchase them.

If you have questions, contact G&G Industrial Lighting for assistance. G&G Industrial Lighting specializes in chemical resistant fixtures for: car washes, food processing, animal agriculture, waste water treatment, natatoriums, outdoor coastal, and more.

G&G's LED luminaires are ideal chemical resistant linear fixtures. They provide:

- Low-profile, co-extruded copolyester and aluminum
- Chemically welded end caps
- UL Wet Location listing
- Zero seams
- The highest IP69K rating
- IK07 impact rating on the WPX & IK10 on the FPX
- Carbon filler in the copolyester to increase thermal conductivity, along with the aluminum co-extruded heat sink, to ensure superior thermal management
- No exposed metal parts to corrode
- Fully-integrated LED light engines to avoid lamp replacements
- Very low maintenance and lowest total cost of ownership.

For more information, email [sales@ggled.net](mailto:sales@ggled.net), or visit: [www.ggled.net](http://www.ggled.net) .