

Lighting Requirements for Food Processing

VALUABLE INSIGHTS INTO SELECTING AND
MAINTAINING LIGHTING SOLUTIONS
TAILORED TO THE UNIQUE CHALLENGES OF
MEAT AND POULTRY PROCESSING



Table of Contents

Overview of Lighting in Meat Processing	02
Total Cost of Ownership Considerations	03
Food Safety Requirements: NSF	04
Food Safety Requirements: FDA, USDA, FSIS	05
Built to Survive: Environmental Factors	06
Engineered to Thrive: Washdown Ready	07
Summary	08
G&G's Solutions	09



Meat Processors Require Tougher, Better Lighting

Food processing applications can be extremely challenging for light fixtures. They can require luminaires to:

- Withstand rigorous cleaning and hose-down protocols
- Contain no toxic materials
- Be highly resistant to corrosion
- Prevent contaminants from entering the processing area from the plenum or the luminaire
- Have wet location safety listing
- Have stringent third-party certifications,
- Perform long-term, in the cold temperatures within freezers
- Meet specific illumination requirements



In this comprehensive guide, we focus on the need for rugged, purpose-built lighting, comprehensive fixture selection considerations, total cost of ownership, and navigating compliance to ensure proper illumination in meat processing facilities.



Total Cost of Ownership Considerations

Before specifying or selecting any luminaires for food processing locations, consider the following issues, and not just the first costs of the fixtures:

1. Prevent early failures.

Only select luminaires that have the highest IP-rated enclosures to prevent early failures. Proper thermal management is more challenging within sealed fixtures, but is critical to prevent early failure of LED fixtures. Chemical and corrosion resistance is also imperative to avoid early failures, in harsh cleaning and hose-down applications.

2. Minimize maintenance costs for cleaning, repairs, and relamping.

Highly-sealed enclosures prevent labor-intensive cleaning of the inside of fixture lenses. Chemical and corrosion resistant luminaires prevent costly repairs, as does a high impact rating on luminaires. Choose hardwired LED sources within luminaires to prevent the maintenance costs of repeatedly replacing lamps. Remember that cleaning inside the fixture, repairs, and relamping can all halt production & processing operations, which can be very costly.

3. Minimize energy costs.

The right LED technology can reduce electricity costs by up to 75% compared to HID luminaires, and by up to 50% compared to fluorescent, even T5HO fixtures.

4. Reduce the number of fixtures required.

In the cold temperatures of refrigeration and freezer locations, fluorescent light output can drop by as much as 80% when compared to equivalent output LED fixtures. LED typically achieves even higher light output in freezers than at room temperature. Fluorescent lumen depreciation in cold temperatures requires additional fixtures to compensate for the significantly reduced light output. Therefore, choose high performing LED luminaires to reduce the number of fixtures required in these cold spaces.



Food Safety Requirements



NSF International develops public health standards and certification programs for food safety. NSF/ANSI Standard 2 (NSF2) establishes minimum requirements for food equipment, including lighting. The standard defines three types of areas (zones):

Non-Food Zone: These include kitchens, food storage, dry process areas, and damp process areas.

Splash Zone: Including wet or damp process areas, high-pressure purging or decontamination used, and areas using hose wash-downs.

Food Zone: Areas in direct contact with food products, where full sanitation is required.

There are many requirements in NSF2 designed to prevent food contamination, including corrosion resistance, cleanability and the ability of exposed material to withstand normal wear.



Food Safety Requirements



The US Department of Agriculture, the Food & Drug, and the Illumination Engineering Society are all involved in establishing the levels of illumination required in food processing facilities. The amount of light required, in both foot-candles and uniformity, vary greatly based on the tasks performed and types of meat, dairy, and other foods being processed.

The importance of adequate lighting is clearly expressed in USDA regulations (§416.2(c) Light):

“Adequate lighting is essential to maintain a sanitary environment for slaughter and processing operations. Without adequate lighting, insanitary conditions are difficult to see and correct. Similarly, contaminants cannot be easily avoided or removed if they cannot be seen.”

The greatest light levels are required by the Food Safety and Inspection Service (FSIS), which is an arm of the USDA, for inspection areas within food processing facilities. **These inspection areas can require 200 foot-candles of shadow-free light, with a color rendering index of at least 85.**





Built to Survive

**IK10
IMPACT
CERTIFIED**



IK10 Rating

The highest impact rating on the IK scale 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.

Shatterproof / Glass-Free

This is critical to prevent broken glass or other luminaire materials from contaminating the food processing facility. NSF establishes requirements to prevent glass breakage. A high IK rating, like IK10, also demonstrates protection against breakage due to impacts.



**CHEMICAL
RESISTANT**

Chemical Resistance

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 chemically-welded end caps, to insure impenetrable bonding of the housing and end cap materials. For more information on chemical and corrosion resistant luminaires, see the G&G white paper, Important Considerations When Selecting Harsh Environment Luminaires.





Built to Thrive in Daily Washdown



IP68/69K 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.

UL Wet Location is a strongly recommended safety certification ensuring that the product is electrically safe to utilize in a wet location environment.

IP Ratings Explained

First #	Protection Against Solid Objects	Second #	Protection Against Liquids
0	No protection	0	No protection
1	Protected against solid objects over 50mm (ie accidental touch by hands)	1	Protected against vertically falling drops of water
2	Protected against solid objects over 12mm (ie fingers)	2	Protected against direct sprays up to 15° from the vertical
3	Protected against solid objects over 2.5 mm (ie tools & wires)	3	Protected against direct sprays up to 60° from vertical
4	Protected against solid objects over 1mm (ie tools, small wires)	4	Protected against sprays from all directions - limited ingress
5	Protected against dust - limited ingress (no harmful deposit)	5	Protected against low pressure jets if water from all directions - limited ingress permitted
6	Totally protected against dust	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
		9K	Protected against close-range, powerful, high temperature water jets



In Summary...

Selecting luminaires for food processing applications can be complex, due to all of the different performance requirements, that can include:

- Withstanding rigorous cleaning and hose-down protocols
- Containing no toxic materials
- High resistance to corrosion

Preventing contaminants from entering the processing area from the plenum or the luminaire

- Wet location safety listing
- Stringent third-party certifications
- Performing well in the cold temperatures of freezers

There are different lighting requirements for the different locations within food processing facilities. Additionally, there are FDA, USDA, and IES regulations and illumination levels to maintain food safety.

You can simplify fixture selection by choosing luminaires with the highest ratings, thereby qualifying for most if not all food processing task areas. Seek out luminaires with a UL Wet Location safety listing, NSF certification, IP69K ingress protection, and IK10 impact rating. These certifications will both minimize your total cost of ownership and simplify your fixture selection for a wide range of food processing production areas.



G&G's LEDs for Meat & Poultry Processing

FROM DAILY HIGH-PRESSURE WASHDOWNS AND CORROSIVE CLEANING CHEMICALS TO SUB-ZERO TEMPERATURES AND THERMAL SHOCK FROM STEAM AND GREASE SPLATTER, G&G'S LINEAR LED LIGHTING SOLUTIONS ARE BUILT TO THRIVE IN FOOD PROCESSING FACILITIES.



G&G's FPX is a linear washdown LED luminaire for task lighting in meat & poultry processing. It is the most rugged, most efficient LED luminaire engineered specifically for task lighting applications in food processing facilities. With a low profile at less than 2.5", the seamless extruded housing is NSF and IP69K rated, making it impenetrable during the wash down sanitation process while meeting stringent USDA lighting requirements.



These high efficiency LED lighting solutions reduce energy consumption by up to 70% in comparison with conventional lighting products and boast extra-long lifetimes of up to 100,000 hours, drastically reducing the need for ongoing maintenance labor. G&G's lighting products meet safety and processing standards specific to the food processing industry, such as NSF (National Sanitation Foundation), IP69K for high pressure wash down and exceeds illumination requirements set forth by the FDA.

