

FOOD PROCESSING LIGHTING GUIDE



HOLOPHANE[®]
LEADER IN LIGHTING SOLUTIONS

experience
lighting's
best.



FOOD PROCESSING

FOOD PROCESSING ENVIRONMENTS OFTEN INVOLVE GREASE, OIL, SMOKE, DUST, OR STEAM WHICH CAN DECREASE A LUMINAIRE'S EFFICIENCY. USING THE LATEST IN OPTICAL, ELECTRONIC, AND THERMAL MANAGEMENT TECHNOLOGIES, HOLOPHANE HAS DESIGNED LUMINAIRES SPECIFICALLY FOR FOOD PROCESSING ENVIRONMENTS. THESE LUMINAIRES HELP TO CREATE SAFE, SANITARY, USABLE ENVIRONMENTS WHILE PROVIDING EFFECTIVE AND ENERGY EFFICIENT SOLUTIONS FOR OUR FOOD PROCESSING CUSTOMERS.



Across the nation, energy costs continue to rapidly rise while the increasingly competitive Food Processing industry requires an overall reduction in operating costs from each facility. Consequently, illumination requirements unique to the demands of each distinctive processing area make selecting the proper luminaire a challenge. Many individuals often make the mistake of believing the Food Processing industry requires only luminaires that are wet location rated or hose down capable for all areas of the facility. This results in luminaires that are often over designed (and over priced) for areas that don't need those requirements.

Most processing facilities have areas requiring luminaires that are NSF Certified (Splash Zone and Non-Food Zone areas) as well as Warehousing/ Staging/Distribution areas (Cold Storage and Non-Conditioned Storage) offices, lobbies, corridors, restrooms and outdoor areas each having their own unique lighting equipment requirements. While all facilities are subject to stringent inspections, especially for wash down areas, selection of the proper light fixtures for each area can lead to increased profits for your company.

Holophane indoor and outdoor luminaires are designed for longevity and performance. In most applications, fewer luminaires or lower wattage can be used when designing your space than if competitors' fixtures are employed.

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LIGHTING CONSIDERATIONS

HIGH VISIBILITY AND WELL-DISTRIBUTED LIGHTING IS REQUIRED IN ALL FOOD PROCESSING FACILITIES. VERY FEW INDUSTRIES, IF ANY, HAVE MORE STRINGENT LIGHTING REQUIREMENTS THAN THE FOOD AND BEVERAGE PROCESSING INDUSTRY. THE MAIN CHALLENGE IS THAT FOOD AND BEVERAGE PROCESSING OPERATIONS MUST HAVE LUMINAIRES THAT CAN WITHSTAND THE DAILY WASH DOWNS REQUIRED TO PREVENT BACTERIA GROWTH OR HARBORAGE OF OTHER CONTAMINANTS.



UNIFORMITY

Lighting uniformity is essential for good visibility within a Food Processing facility and for exterior areas. An evenly illuminated space is bright and inviting. People feel comfortable because they can see other people and can discern detail without the hindrances represented by shadows and glare.

In an outdoor setting, a uniform lighting environment helps create the feeling of daylight after dark. Drivers can safely maneuver their vehicles because they can see what is ahead of them, behind them and to the sides. Pedestrians feel secure because they can recognize shapes, landmarks and other people.

Uniform lighting in a Food Processing facility allows workers on the floor to see product as it travels anywhere in the facility. In a uniformly lighted facility, employees can see visual cues from across the room and still have plenty of light to perform their specific tasks in a safe, efficient and productive manner.

Additionally, caustic cleaning solutions and agents are typically used requiring luminaires that can endure the corrosive effects of a cleaning solution. And because specific areas of a processing facility are often refrigerated, luminaires must be able to turn on at sub-zero temperatures and more importantly deliver the appropriate light levels.

Many factors contribute to uniform lighting, including direct illumination that shines downward from a luminaire and indirect or 'bounce' light that reflects off the ceiling and other surfaces. Holophane optical systems control the light so it reaches all areas within a space without spilling over into other areas where illumination is not desired.



Photo Courtesy of Nilfisk-ALTO





COLORS AND COLOR RENDERING

The use of color in food processing plants is not new, yet in today's world of colored lighting and colored materials, having the ability to determine the exact color of an object may be more important in some processing areas than in others. Color is a wonderful tool used in food processing plants to enhance sanitation, sort various grades of product, minimize the potential for contamination, dispose of waste and make cleaning more efficient and effective.

Color rendering is the ability of a light source (the lamp) to represent the true colors of an object. The closer the color rendering index (CRI) is to 100, the more natural the colors will appear. A metal halide lamp, which casts a whitish light, can have a CRI as high as 90. A high pressure sodium lamp, which imparts a yellowish color, typically has a CRI of 20. Therefore a metal halide source will be more appropriate for color sensitive areas even though a high pressure sodium lamp may be more efficient by providing greater lumens per watt. More food processing plants are now using white walls and ceilings rather than bare metal. White surfaces reflect more light than bare metal, usually have less glare and provide greater vertical footcandles, and help keep the work areas bright. There are also studies that show people (including inspectors) associate white with cleanliness. In fact, a white processing environment may subconsciously remind the workforce to keep the area clean.



VERTICAL ILLUMINATION

Vertical illumination is the light that falls upon vertical surfaces such as instruments on a machine, labels on a storage rack, signs on a wall, product traveling on hanging conveyors, and the narrow space between two buildings. Horizontal illumination is the light that shines on horizontal surfaces such as product traveling on rolling conveyors, aisles in a warehouse, tabletops in a manufacturing or processing area, walkways in an outdoor space, and floors in a marked staging area.

A quality lighting system will provide sufficient levels of vertical and horizontal illumination. Generally, the vertical illumination level should be half that of the horizontal level. Vertical and horizontal illumination is measured in footcandles. Therefore if an inspection area is designed for 100 horizontal footcandles, the minimum vertical footcandles should measure 50 footcandles.



DURABILITY AND MAINTENANCE

A quality lighting system constructed of high performance materials will last longer and require less maintenance. Design features such as interchangeable parts, a quick disconnect and hinged door assembly will simplify maintenance and reduce the time required to make repairs or change out lamps.

In applications where glass is allowed, Holophane's glass optical systems never become discolored and will not attract dust and dirt, which reduces cleaning requirements. Low copper aluminum alloys used for fixture housings are corrosion resistant and meet UL requirements for marine type environments - making the luminaires particularly beneficial for areas where salt or other chemicals present a maintenance challenge.

All Holophane products are finished with polyester powder paints. We use a seven stage pretreatment process that assures proper paint adhesion and allows our finishes to meet or exceed all applicable American Society for Tests and Measurements (ASTM) requirements.



SPECIAL CEILINGS

The design, construction and the materials used in ceilings play an important part in food processing plants. Ceilings and equipment mounted in or on the ceiling surface within a food processing plant can be a source of contamination and therefore are often designed and constructed to prevent the adulteration of food products physically, chemically or microbiologically, as to render food products unsafe for consumption.

Since sanitation is critical to the food processing industry, a great deal of time is spent washing and sanitizing ceilings and their accompanying lighting fixtures. It is therefore necessary for these fixtures to be water proof and capable of performing in a wet and damp environment while maintaining the design integrity of the ceiling itself.

The type of ceiling used in a particular plant depends on the nature of the food being prepared and/or manufactured. Furthermore, ceilings in food processing facilities are also used as a thermal barrier in cold storage areas, in blast freezers or in high temperature environments to minimize heat transfer and are subject to extreme expansion and contraction, especially when washed down with hot water. Walk-on suspended ceiling systems allows maintenance of services above the ceiling while production continues below in a bright, sanitary and hygienic environment. These extreme conditions require ceilings to be made thicker and with different materials than a typical ceiling. To that end, luminaires must be specifically designed to not only withstand the rigors of frequent washing and cleaning but also to maintain structural integrity and water resistance between the luminaire and the ceiling.





LIGHTING STANDARDS

FOOD PROCESSING LOCATIONS CAN BE A SAFE AND SANITARY PLACE TO WORK WHEN PROPER EQUIPMENT FOR THE ENVIRONMENT IS USED. HOLOPHANE HAS THE RESOURCES, EXPERTISE AND FLEXIBILITY TO MEET THE LUMINAIRE CONSTRUCTION AND ILLUMINATION REQUIREMENTS SET FORTH BY THE IESNA, USDA, FDA AND WHERE APPLICABLE NSF INTERNATIONAL

NSF CERTIFICATION

NSF International (NSF) is a not-for-profit, independent, third party certifier of products and systems for conformity with consensus and official regulations and specifications, industry standards, and product specific test protocols.

NSF requires that all materials, which could come in contact with food products, meet the stringent requirements of the Federal Food, Drug, and Cosmetic Act (FDA). In order to determine its suitability for use in food processing and food handling areas, the equipment and the manufacturer must pass a stringent series of tests. NSF performs all tests in their own laboratories and performs unannounced inspections and audits to ensure on going conformance.

Lighting equipment falls under the NSF C-2 listing procedure (Special Equipment and/or devices). The C-2 protocol analyzes the physical design of, the specific properties of each substance used in the manufacture of, and the fabrication of the fixture. In addition, NSF investigates the reliability of the manufacturer and the manufacturing process as it relates to the listed product.

Because sanitation is a critical part of the food processing industry, a thorough cleaning and sanitizing program must be incorporated into the food production process. High-pressure wash down with hot water and/or sanitation chemicals may approach 1000psi nozzle pressure. Lighting fixtures must be designed and manufactured so as not to leak, corrode, harbor bacteria, or cause fires or electrical problems. Lamps must be contained so that if they break, glass or other materials shall not contaminate the food production area.



Photo Courtesy of Food Engineering Magazine

NSF International has three certifiable locations for sanitation requirements of equipment used in storing, preparing or handling of food or beverage processing: Non-food Zone, Splash Zone and Food Zone. Only the first two categories are applicable to lighting fixtures. These zones are further defined in the NSF Table below.

Holophane luminaires developed for areas requiring NSF certification are expressly designed to assure that bacteria and molds have no crevices or recesses in which to thrive. Surfaces are constructed of a non-toxic material, and all openings are sealed and gasketed. Public health officials and other regulatory agencies recognize NSF's formally registered trademark. Holophane's NSF Certified models help make it easy to maintain sanitary conditions in your facility.



NSF Certification	Description Of Location / Use and Commentary	Typical Lighting Applications
NON-FOOD ZONE	Areas where direct contact with food products during normal operations would not be expected. Equipment is located outside the normal wash down area. There is a concern that the fixture will add contamination to the protected space or food product (i.e. cleanability - will the finish withstand cleaning, chipping paint, deteriorating paints or finishes, lens impact resistance, lamp glass breakage, etc.).	Kitchens; Food storage; Dry process areas; Damp process areas - no drip possibility.
SPLASH ZONE	Areas where direct contact with food products during normal operations would not be expected; however, the fixture may be situated such that liquids used in the processing or cleaning procedures, may splash, spill, or otherwise soil - either intentionally or inadvertently - the surface of the fixture. There then is the potential for dripping or draining onto other surfaces or even the process. Since these fixtures are often used in wash down areas, a Wet-Location listing is not sufficient. Fixtures must be tested to withstand high-pressure hose wash down. The concerns of Non-Food Zone also apply.	Wet or damp process areas; High Pressure purging or decontamination used in the process; Area using hose wash down.
FOOD ZONE	Areas where direct contact with food products is normally expected and surfaces from which the food may drip, drain, or splash back onto surfaces normally in contact with food. Equipment other than lighting fixtures typically requires this certification (i.e. work tables, cutting boards, other direct contact equipment).	Category not typically used for lighting.

UL/CUL/NEMA STANDARDS

UL, CUL AND NEMA STANDARDS

North America has traditionally adopted UL (Underwriters Laboratories) safety standards (the Canadian version is called CUL) as the source for their testing. IEC (International Electrotechnical Commission) safety standards are international standards that many European countries have adopted as their national standard.



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To promote and sell U.S. manufactured product in offshore markets, U.S. manufacturers began designing their products to IEC standards, but are finding them increasingly useful here in North America. The National Electrical Manufacturing Association (NEMA) has also created technical standards for rating degrees of protection for electrical enclosures.



IP65 Rated

Within the food processing industry, conditions exist where a luminaire requires a rating better than a UL 'Wet Location' listing which simulates an outdoor rain condition, but not as stringent as a NEMA '4' rating based on using a 1-inch diameter nozzle on a fire hose delivering 65 gallons per minute. These conditions typically exist in wash down applications where hose directed water or cleaning agents will be directed at the lighting fixture. In lieu of using NEMA standards, Holophane has chosen to adopt and comply with IEC standards and/or to provide the actual hose down pressure rating for each appropriate luminaire.



Thermal testing



High pressure hose down test

IEC STANDARDS

IEC STANDARDS

IEC standards separate the moisture rating and the particulate rating by using a 2 digit nomenclature in their ingress protection (IP) rating system. The first digit describes the degree of protection for solid matter and the second digit describes the degree of protection for liquid matter. For example, an IP solid rating of '6' (e.g. IP65) means the luminaire will be dust tight. The specified test requires the fixture be placed in a circulating talc atmosphere for 3 hours. The particle size of the talc is a range of 1-75 microns and the fixture is placed under negative pressure in an attempt to draw the talc into the luminaire. No talc shall be found inside the luminaire after this test. (see table 1)

The IEC applies an additional test criterion to determine the fixture's ability to exclude moisture. An IP moisture rating of '5' (e.g. IP65) described in IEC standard 529 (shown in the table below), provides the intermediate step between the UL 'Wet Location' listing rating and the NEMA '4' rating that is often needed within the food processing industry. It also provides an internationally accepted standard which can be used to evaluate fixtures or any other electrical equipment, and the test can be performed by an independent third party testing agency for verification. (see table 2)

Lighting manufacturers should have a hose down rating for their fixtures that can be confirmed and/or audited by an independent outside testing agency. Beware of statements such as 'tested to 75psi at 1 inch.' No reference is made to the volume of water that is leaving the nozzle and impacting the product. In fact, high nozzle pressures typically have low water volumes because the nozzle is restricting the flow of water causing the pressure in the hose to increase, minimizing the amount of water leaving the nozzle. Regardless of hose pressure, any water volume less than 3.3 gallons per minute is less severe than the IP_5 test. The most relevant characteristics are the diameter of the nozzle and the flow rate of the water. Upon request, Holophane can supply independent test results including the flow rate for its NSF Splash Zone rated luminaires.

Table 1: IP Ratings - Numeral Assignments & Explanations

IP65	Degrees of protection indicated by the <u>first</u> characteristic numeral		
	Numeral	Short Description	Brief details of objects which will be "excluded" from the enclosure
	0	Non-protected.	No special protection.
	1	Protected against solid objects greater than 50 mm.	A large surface of the body, such as a hand (but no protection against deliberate access). Solid objects exceeding 50 mm in diameter.
	2	Protected against solid objects greater than 12 mm.	Fingers or similar objects not exceeding 80 mm in length. Solid objects exceeding 12 mm in diameter.
	3	Protected against solid objects greater than 2.5 mm.	Tools, wires, etc., of diameter or thickness greater than 2.5 mm. Solid objects exceeding 2.5 mm in diameter.
	4	Protected against solid objects greater than 1.0 mm.	Wires or strips of thickness greater than 1.0 mm. Solid objects exceeding 1.0 mm in diameter.
	5	Dust-protected.	Ingress of dust is not totally prevented but dust does not enter in sufficient quantity to interfere with satisfactory operation of the equipment.
	6	Dust-tight.	No ingress of dust.

Table 2: IP Ratings - Numeral Assignments & Explanations

IP65	Degrees of protection indicated by the <u>second</u> characteristic numeral		
	Numeral	Short Description	Brief details of objects which will be "excluded" from the enclosure
	0	Non-protected.	No special protection.
	1	Protected against dripping water.	Dripping water (vertically falling drops) shall have no harmful effect.
	2	Protected against dripping water when tilted up to 15°.	Vertically dripping water shall have no harmful effect when the enclosure is tilted at any angle up to 15° from its normal position.
	3	Protected against spraying water.	Water falling as a spray at an angle up to 60° from the vertical shall have no harmful effect.
	4	Protected against splashing water.	Water splashed against the enclosure from any direction shall have no harmful effect.
	5	Protected against water jets.	Water projected by a nozzle against the enclosure from any direction shall have no harmful effects.
	6	Protected against heavy seas.	Water from heavy seas or water projected in powerful jets shall not enter the enclosure in harmful quantities.
	7	Protected against the effects of immersion.	Ingress of water in a harmful quantity shall not be possible when the enclosure is immersed in water under defined conditions of pressure and time.
	8	Protected against submersion.	The equipment is suitable for continuous submersion in water under conditions which shall be specified by the manufacturer. ¹

¹ Normally, this will mean that the equipment is hermetically sealed. However with certain types of equipment it can mean that water can enter but only in such a manner that it produces no harmful effects.

USDA REQUIREMENTS/NEC STANDARDS

USDA REQUIREMENTS

In addition to IESNA lighting recommendations, the United States Department of Agriculture (USDA) establishes minimum lighting requirements for food safety and minimum lighting recommendations for food security within and around a food processing facility. The following chart summarizes the USDA minimum lighting requirements for meat and poultry packing plants. Please consult your local inspector for the latest federal regulations regarding minimum lighting requirements for your particular application.

USDA Minimum Lighting Requirements		
Area	Meat	Poultry
General	30 fc	30 fc
Offal Cooler	30 fc	X
Carcass Coolers	30 fc	X
Freezers	30 fc	X
Dry Storage	30 fc	X
Ante-mortem Inspection	30 fc	30 fc
Suspect Pen Inspection	50 fc	X
Inspection Stations	50 fc	X
Inspection Stations (Traditional)	X	50 fc
Inspection Stations (NELS/SIS/NTI)	X	200 fc
Pre and Post chill Inspection	X	200 fc
Establishment Quality Control Inspection	50 fc	200 fc
Reconditioning and Reinspection	50 fc	200 fc
All other Areas	30 fc	30 fc

NEC HAZARDOUS STANDARDS

The National Electrical Code (NEC) identifies and classifies potentially hazardous materials and conditions. The identified and classified materials may or may not be hazardous in their own right, but can under certain conditions, violently explode. Types of hazardous materials and conditions are organized by Class (I, II and III); Divisions (1 and 2); and Groups (A, B, C, D, E, F and G).

Most food processing facilities will not have hazardous rated areas within their facility, however in certain types of facilities, especially grain processing plants, various areas use or produce chemicals or dusts that, given the correct catalyst, will set off a violent explosion. Therefore, the presence of flammable gases, vapors or liquids; combustible dusts; and ignitable fibers and flyings must be considered when determining the ultimate use of any area.

If there are any hazardous areas within a food processing facility, it will typically fall under Class II, Division 1 or 2 and Group G, but it is the responsibility of the local building or electrical inspector or the facility's insurance underwriter to classify an area as "Hazardous" in accordance with the definitions in the National Electrical Code. Additionally, the NEC specifically requires that

electrical equipment installed in a hazardous area be "approved" for use in that area by an impartial third party (e.g., UL -Underwriters Laboratories, FM-Factory Mutual, CSA- Canadian Standards Association, etc.). For a more detailed analysis of NEC Hazardous area classifications, please consult your local Holophane representative.



IESNA RECOMMENDATIONS



IESNA RECOMMENDATIONS

In addition to safety and sanitary standards mentioned previously, the Illuminating Engineering Society of North America (IESNA) has developed recommendations for lighting the various environments/tasks within the Food Processing industry. Holophane lighting systems are designed to meet or exceed these recommendations, providing the lighting uniformity necessary to promote high levels of visibility.

Lighting an industrial facility is successful only if it meets the users' needs. The lighting requirements for an inspection area, for example, must provide sufficient illumination for detailed analysis, whereas a staging or warehousing area is often concerned about reading labels on a vertical surface. When providing outdoor lighting for customer and/or employee parking lots, one must think about how to create a uniformly illuminated environment so employees and customers feel safe when walking to their cars. Yet, those safety concerns must be balanced with energy consumption, potential glare, initial costs and long term maintenance costs. With limited budgets, Food Processing facilities are demanding lighting systems that are reliable and energy efficient. The systems must be easy to maintain and require minimal maintenance over time.

Recommendations for Exterior Lighting (average maintained footcandles)

Task	Illuminance horizontal	Uniformity (max:min)
Sidewalks, Paths and Walkways	1-3	5:1
Buildings and Facades	5-15	N/A
General Area Lighting	0.5 - 2	4:1
Parking Garages	5-10	10:1
Parking Lots	0.5-3	15:1
Pedestrian Tunnels	4-5	4:1
Roadways	0.5-1	10:1
Emergency Outdoor	0.5-5	10:1
Building Entrances	5-30	N/A

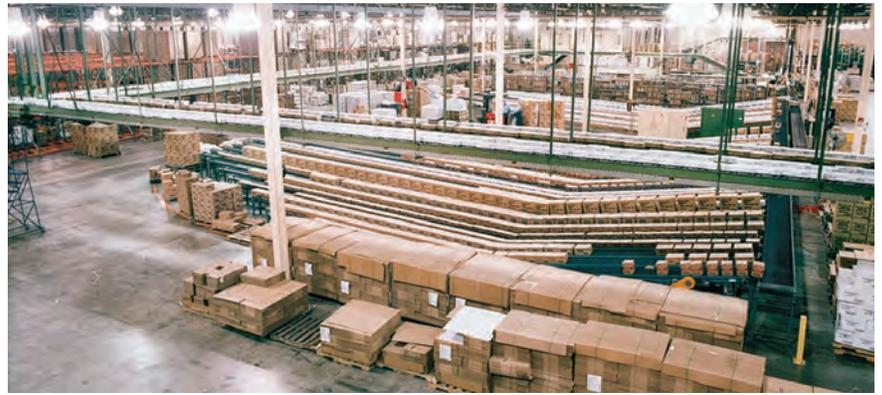
Recommendations for Interior Lighting (average maintained footcandles)

Task	Illuminance horizontal	Uniformity (max:min)
General Food and Beverage Manufacturing		
Loading Areas	10-20	10:1
Boiler Rooms	5-10	3:1
Food Storage	5	5:1
Control Areas	5-10	3:1
Catwalks and Platforms	2-5	4:1
Corridors	10-30	5:1
Food and Beverage Processing		
Raw Material Processing	10-100	3:1
Wrapping, Packaging, Labeling	5-30	10:1
Warehousing, Staging	30	10:1
Inspection	30-1000	3:1
Grading and Sorting	75-150	3:1
Boiling and Keg Washing	30	10:1
Color Grading	150	3:1
Canning	75	3:1
Bottling	30-75	3:1
Maintenance	50	3:1
Meat and Dairy		
Slaughtering	30	10:1
Cleaning, Cutting, Cooking, Grinding	30	10:1
Gauges, Meter Panels, Thermometers	75	3:1
Pasteurizers	30	10:1
Vats and Tanks	15-75	3:1
Feed Storage	3-7	5:1
Milking Operations	15-30	5:1
Milk handling	15-75	3:1
Flour Mills		
Rolling, Sifting, Purifying	75	3:1
Packing	30	10:1
Product Control	150	3:1
Poultry		
Brooding, Hatcheries	15	10:1
Egg Processing, Handling, Packing, Shipping	75	3:1
Fowl processing	75	3:1
Feed storage	15-30	5:1
Office Areas		
Meeting Rooms	30-100	3:1
Ramps and Stairs	10-30	10:1
Offices	30-80	3:1
Building Entrances and Lobby	3-30	20:1
Restrooms	30	10:1
Emergency	.5-5	10:1



INDOOR APPLICATIONS

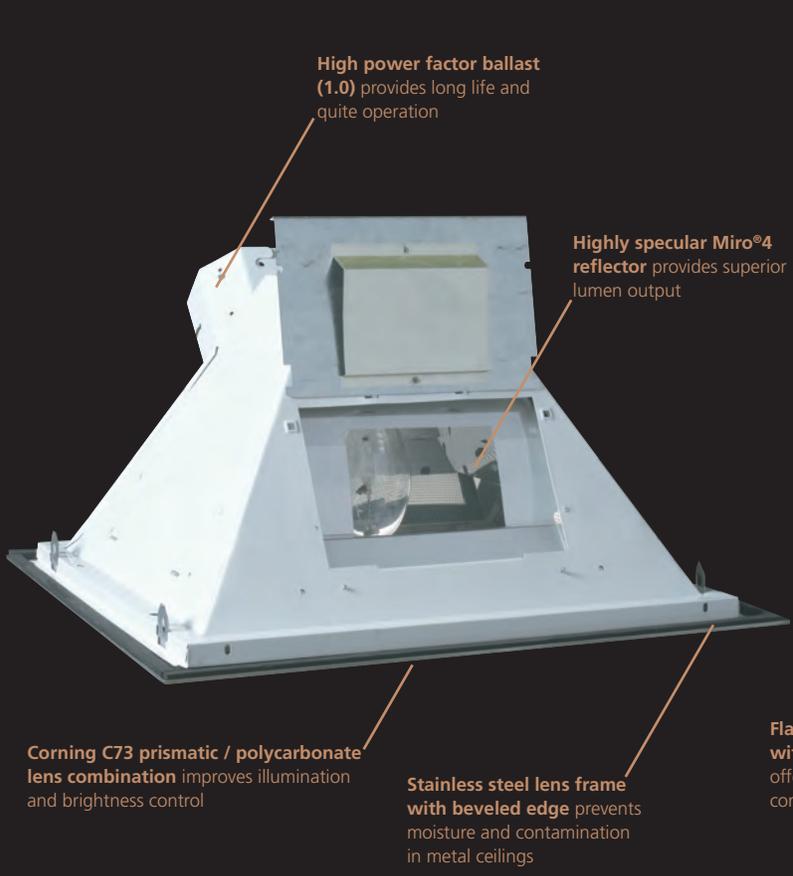
FOOD PROCESSING FACILITIES OFTEN HAVE WIDE, OPEN SPACES WITH BOTH HIGH AND LOW CEILINGS CRISSCROSSED BY SUPPORT BEAMS AND TRUSSES. THEY MAY ALSO HAVE PIPES AND LINES NEAR THE CEILING THAT BLOCK LIGHT AND KEEP IT FROM REACHING CRITICAL PIECES OF EQUIPMENT.



Processing facilities often require high levels of illumination with ample vertical footcandles so that employees can operate equipment, read gauges or monitors, perform speed sensitive tasks or discern colors. They also need quality illumination so they can see the parts to perform maintenance or make repairs on equipment. Poor quality lighting can be uncomfortable and possibly hazardous and can result in a measurable loss of seeing efficiency and undue fatigue. Because most food processing plants have wash down areas that are cleaned by spraying the area with hoses, luminaires used in these locations must be corrosion resistant and capable of standing up to the environment. Holophane is the only company that offers cost effective solutions and industry expertise to meet the demanding requirements for each area of your facility.

□ Indoor Classified Food Zones

- Splash Zone
- Non-Food Zone
- Hazardous
- Cold Storage
- Storage
- General Area, Office and Lobby
- Exit and Emergency



VANTAGE RTT

Miro® 4 is a Registered Trade Mark of Alanod

VANTAGE VA

INDOOR — SPLASH ZONE

NSF INTERNATIONAL SPLASH ZONE RATED





EMW



VANTAGE MINI

INDOOR — NON-FOOD ZONE NSF INTERNATIONAL NON-FOOD ZONE RATED



Vantage® ALT



HQ Series



WR Series



HES Series

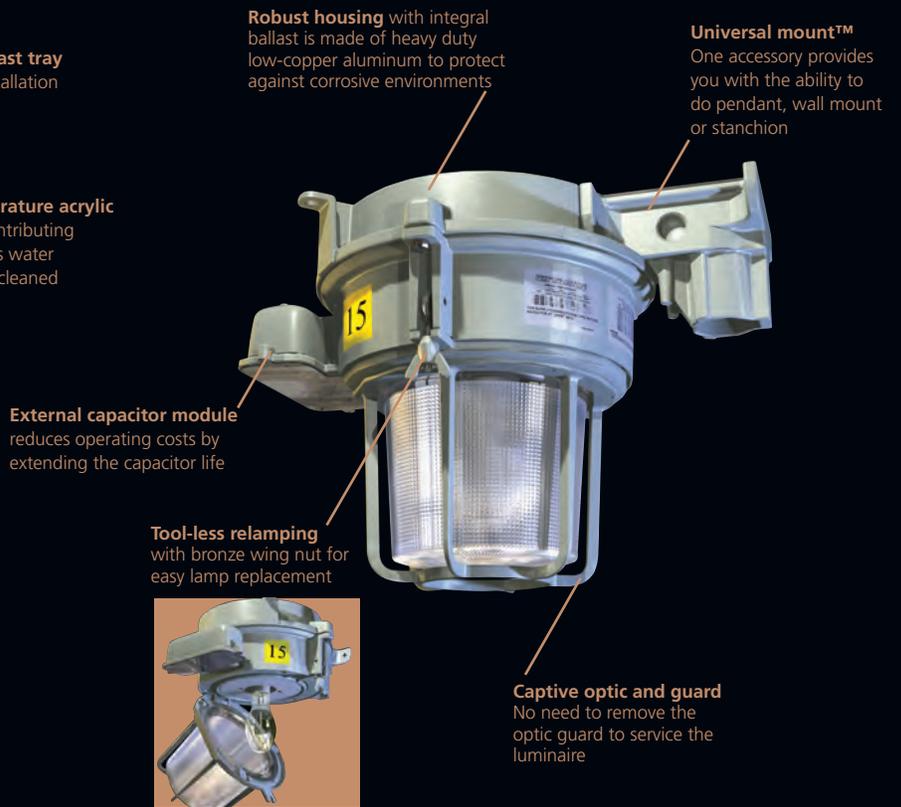


EMS, ENS

*Luminaires that are Splash Zone classified also qualify for Non-Food Zone



VANTAGE VH



PETROLUX III — SMALL PROFILE

INDOOR — HAZARDOUS

NEC HAZARDOUS RATINGS



Vantage® VH



Petrolux® III (P3S)
(Hazardous, Small)



Petrolux® III (P3M)
(Hazardous, Medium)



Petrolux® II (PETL)
(Hazardous, Large)



DeSoto® HR



Petrolume®



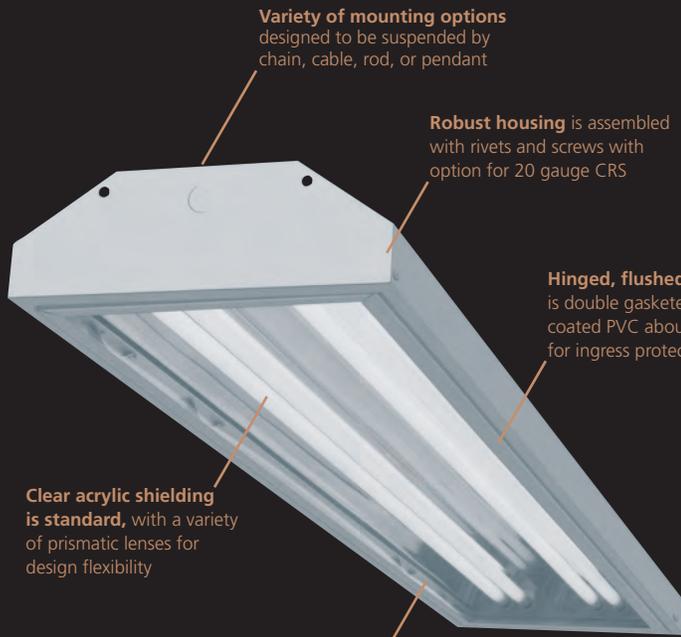
Predator®



HXP Series



HDX Series



Variety of mounting options designed to be suspended by chain, cable, rod, or pendant

Robust housing is assembled with rivets and screws with option for 20 gauge CRS

Hinged, flushed door frame is double gasketed with mylar-coated PVC about the perimeter for ingress protection

Clear acrylic shielding is standard, with a variety of prismatic lenses for design flexibility

One-piece, precision-formed segmented specular reflector, using Miro® 4 enhanced

Miro® 4 is a Registered Trademark of Alanod



Variety of mounting options available in ceiling, pendant, stanchion and wall mountings

Heavy duty ballast housing die cast alloy aluminum is pretreated and coated with polyester powder-paint

Superior optics minimize light lumen depreciation by reducing accumulated dirt on the inner surface of the reflector

Zinc plated steel rods and rings support and protect the glass reflector

HEF

BANTAM 2000

INDOOR — COLD STORAGE ZONE

NOT RATED



Enduralume® V



Lobay® V



Bantam® 2000



HEF Series

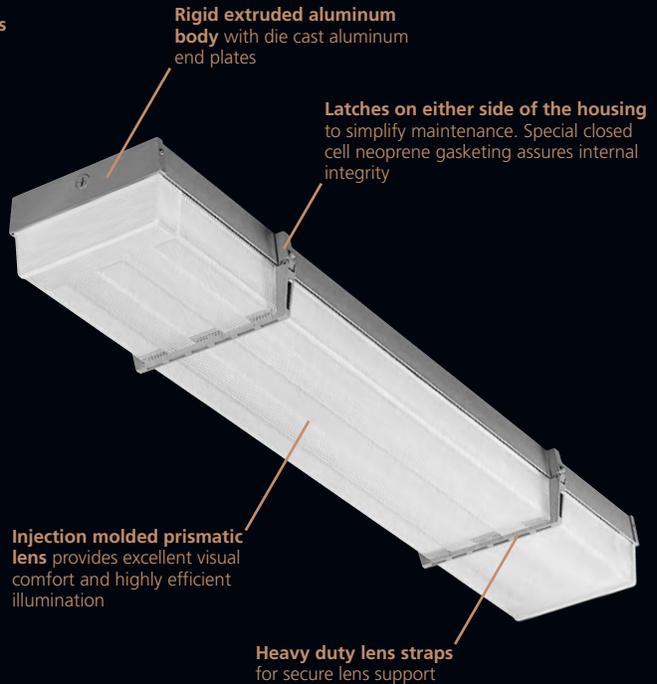


Electronic HID ballast provides dimming option, ease of maintenance and reduced energy costs

Concentric cooling fins allows a flow through ventilation providing thermal management

ISD SuperGlass® optics has superior uniformity and is available in a variety of light distributions

Steel rods and rings support and protect the glass reflector



Rigid extruded aluminum body with die cast aluminum end plates

Latches on either side of the housing to simplify maintenance. Special closed cell neoprene gasketing assures internal integrity

Injection molded prismatic lens provides excellent visual comfort and highly efficient illumination

Heavy duty lens straps for secure lens support

ENDURATRON

7200 PRISMATITE

INDOOR — STORAGE AREAS

NOT RATED



Enduratron®

Enduratron® Enclosed

Prismalume®

Prismalume® Enclosed

IntelliBay® and IntelliVue®

7200 Prismatite®

HFN

HB

HC



Electronic HID ballast
provides dimming option,
ease of maintenance and
reduced energy costs

Flow through ventilation
provides thermal management

ISD SuperGlass® optics
provides the most energy
efficient luminaire,
available in a variety of
light distributions



**Rugged yet timeless die cast
aluminum socket slotted
husks & steel rods** supports
the prismatic glass

Optics are available in
uncovered glass or with
an aluminum or copper
spun cover

Prismatic reflecting prisms
efficiently provides light where
needed

ILLUMIBAY

PGRL

INDOOR — GENERAL AREA, OFFICE AND LOBBY

NOT RATED



illuminaire®



02454



PGRL



PrismGlo®



Illumibay®



CrystalGlo®



Mirrolume®



120/277 VAC dual voltage input offers flexibility

Stainless steel hardware is standard for corrosion protection

Design meets NEMA 3, 4x and 12 classifications

Fiberglass reinforced polyester construction is impact resistance



Two head combo has fully adjustable Par 36 sealed beam lamps

120/277 VAC dual voltage input offers flexibility

Direct view LED's provide illumination

Watertight enclosure constructed of fiberglass reinforced polyester

DESOTO M60

DELEON NM

INDOOR — EXIT AND EMERGENCY

NSF INTERNATIONAL SPLASH ZONE RATED

NOT RATED



DeSoto® M40

DeSoto® M50

DeSoto® M60



Magellan® EC



DeLeon® HD

DeLeon® NM



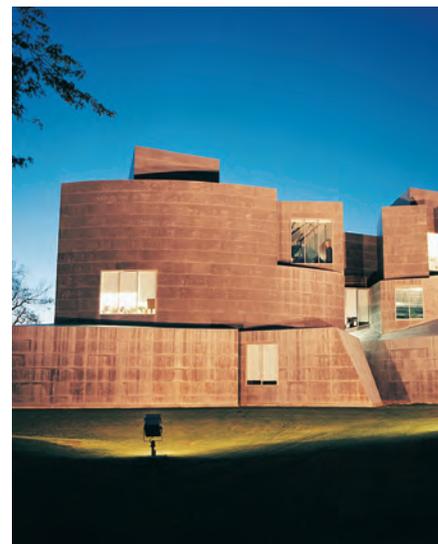
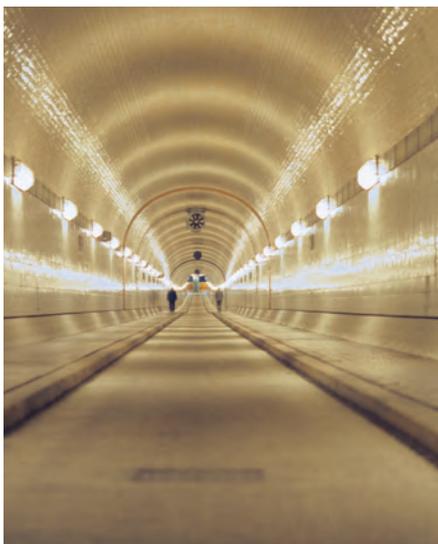
Cortez® A2



OUTDOOR APPLICATIONS

MANAGEMENT AND CORPORATE STAFF OF FOOD PROCESSING FACILITIES WANT EMPLOYEES AND CUSTOMERS TO FEEL SAFE ANY TIME THEY MOVE ABOUT THE FACILITY AFTER DARK.

INDUSTRIAL OUTDOOR LIGHTING SYSTEMS MAY BE USED TO ILLUMINATE A VARIETY OF SETTINGS INCLUDING PARKING LOTS, ROADWAYS AND SIDEWALKS, PEDESTRIAN TUNNELS, PARKS AND BUILDING FACADES.



In all of these areas, the light sources must provide sufficient illumination without glare to assure good visibility and enhance security. The luminaires must also provide reliable service since outages may result in a dark and even threatening environment.

Holophane understands how important it is to create a safe facility environment. Our luminaire optics throw light down the walkway or roadway, overlapping the light patterns to eliminate dark spots and pools of light. Holophane photometrics promote wider spacing between poles, eliminating the 'forest' of poles look that can mar the landscape. More importantly fewer light fixtures translate into lower installation, maintenance and operating costs. Holophane is the only company that offers cost effective solutions as well as industry expertise to meet the demanding requirements for each area of your facility - indoors and outdoors.

Outdoor Applications

- Parking Lots
- Roadways
- Sidewalks
- Pedestrian Tunnels
- Parks
- Building Facades

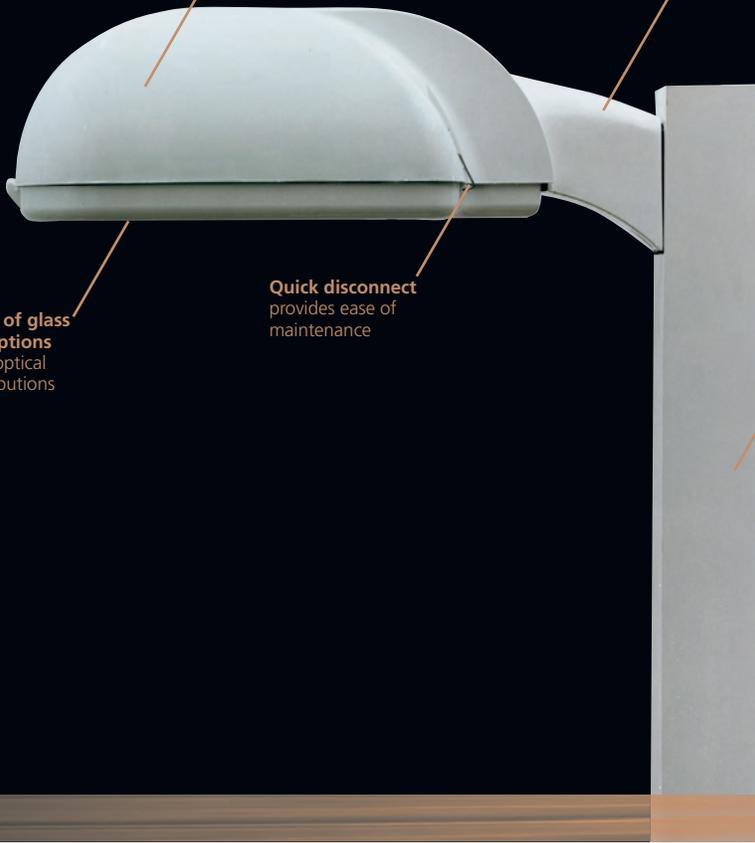
Heavy duty die cast ballast provides ease of maintenance and energy savings

A variety of mounting options offers versatile design choices

A Variety of glass and tilt options offers 14 optical light distributions

Quick disconnect provides ease of maintenance

Variety of pole choices fit any site architecture



OUTDOOR — POLE MOUNT



MirroStar®



Mongoose®



PoleStar® II



HMAO™ Series



HMSC



Lowering Devices



LMS Lowering Device Systems



Weathertight design for UL wet location listed

Weather shield permits air passage for reflector self-cleaning. It also prevents snow, ice or wind driven rain from entering the lamp/optical chamber

Terminal block provides for positive lead connection and is pre-wired to the quick disconnect

Ballast assembly is provided with quick disconnects for fast installation or removal. UL listing for 40°C ambients provides extended ballast and capacitor life

Sealed Optical System consists of spun on aluminum cover with high temperature silicone sealant at top and bottom. Hermetically seals reflecting prisms from all contaminants

Reflector/refractor prismatic borosilicate glass refractor and reflector combinations provide a variety of light distributions

Reflective specular panels improves luminaire efficiency



OUTDOOR — SURFACE MOUNT



Wallpack® IV



Parkpak®



Module® 600



Predator®



Prismbeam® II



Ultrak® Surveillance Camera

LIGHTING ECONOMICS

Initial cost or unit costs should not be the only consideration when examining the economics of a lighting system. A better gauge is how efficiently the entire lighting system will operate over time.

It is hard to place a dollar value on lighting deficiencies such as direct and reflected glare, shadows or uneven light distribution. However, experience shows that as the purchase price for a lighting system decreases within limits, operating costs go up. This is reasonable since a cheaper luminaire is often not as robustly designed and constructed as a more expensive system. In addition, cheaper luminaires usually are made of inferior quality materials. A lighting system's design, materials, and construction will dictate its usefulness, efficiency and durability. The final price however, will be determined by the lighting solution's performance and its short-term and long-term operating costs.

Holophane lighting solutions provide the best combination of lighting performance with low owning and operating costs. State-of-the-art optical systems promote energy efficiency and wider spacing between luminaires. Quality materials and a highly engineered design assure the luminaires provide reliable performance with minimal maintenance for many years.

SUMMARY

Holophane understands the exceptionally demanding lighting requirements within the Food Processing industry. Lack of proper lighting can cause increased returns of food and beverage products, lower productivity within the plant, less corporate profit and can invite the threat of possible operation shutdown. To remain competitive, food processing facilities must have lighting systems that are economical to operate and maintain. Holophane prides itself in manufacturing energy efficient, low maintenance products that are age-defying. Holophane's rugged indoor and outdoor industrial luminaires are designed with the highest quality materials to ensure long life in the toughest of environments and with strong mechanical attributes for ease of installation. Holophane luminaires are optically engineered to provide enhanced visibility through high vertical surface illumination required on processing equipment, signage. Consult your local Holophane factory sales representative to find the proper solution for your lighting needs.





HOLOPHANE[®]
LEADER IN LIGHTING SOLUTIONS

An **AcuityBrands** Company

Acuity Brands Lighting, Inc.

Holophane Headquarters, 3825 Columbus Road,
Granville, OH 43023

Holophane Canada, Inc. 9040 Leslie Street,
Suite 208, Richmond Hill, ON L4B 3M4

Holophane Europe Limited, Bond Ave.,
Milton Keynes MK1 1JG, England

Holophane, S.A. de C.V., Apartado Postal No. 986,
Naucalpan de Juarez, 53000 Edo. de Mexico

Contact your local Holophane factory sales representative for application assistance, and computer-aided design and cost studies. For information on other Holophane products and systems, call the Inside Sales Service Department at 866-759-1577. In Canada call 905-707-5830 or fax 905-707-5695.

Limited Warranty and Limitation of Liability
Refer to the Holophane limited material warranty and limitation of liability on this product, which are published in the "Terms and Conditions" section of the current Buyers Guide, and is available from your local Holophane sales representative.

Visit our web site at www.holophane.com

Certain airborne contaminants can diminish the integrity of acrylic. Please refer to the Acrylic Environmental Compatibility Chart (HL-2445) for suitable uses.

Luminaires may utilize fluorescent or high intensity discharge sources that contain small amounts of mercury. New disposal labeling for these lamps includes the mercury identifier shown on the left to indicate that the lamp contains mercury and should be disposed of in accordance with local requirements.



Information sources regarding lamp recycling and disposal are included on the packaging of most mercury-containing lamps and also can be located at www.lamprecycle.org.

Product specifications may change without notice. Please contact your local Holophane factory sales representative for the latest product information.



Buying products with the FSC label supports the growth of responsible forest management worldwide. The eco savings in the production of this brochure:

- 2 trees preserved for the future*
- 7 lbs water-borne waste not created*
- 1,007 gal wastewater flow saved*
- 111 lbs solid waste not generated*
- 219 lbs net greenhouse gases prevented*
- 1,678,495 BTUs energy not consumed*