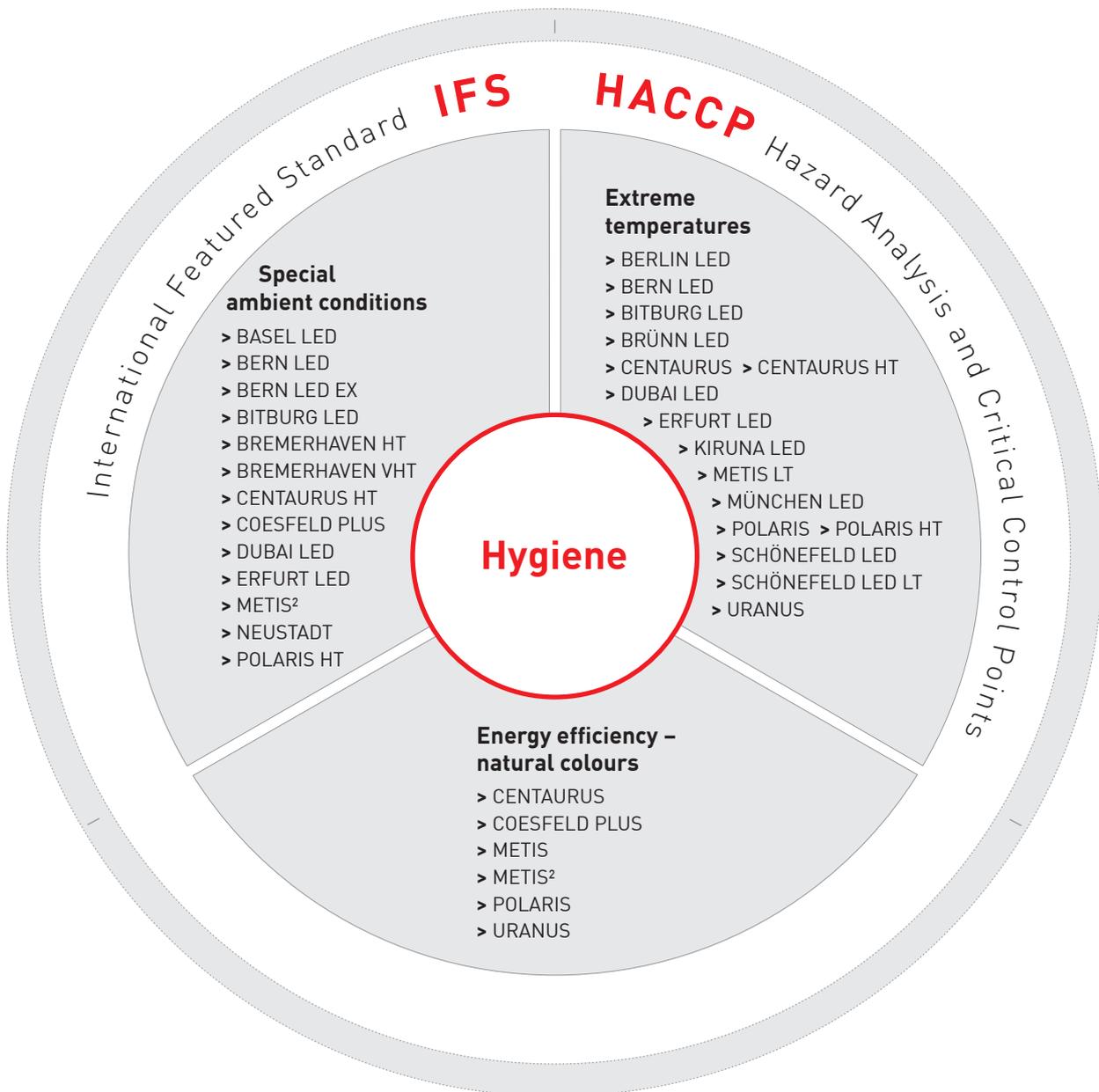


NORKA

**LIGHTING SOLUTIONS FOR THE
FOOD PROCESSING INDUSTRY**

OVERVIEW



For several decades, NORKA has been accompanying food producers with reliable luminaires for any application in the areas of production, storage and shipping. This always takes into account the entire process from manufacturing to cleaning.

NORKA luminaires comply with the strict requirements of IFS Food (International Featured Standard) and can therefore be integrated into the HACCP (Hazard Analysis and Critical Control Point) concept.

In addition to error-free work processes, the conscious use of energy savings is becoming increasingly important. A great number of applications in food production can already be illuminated with LED luminaires today. Modern LED luminaires already save more than 50 % of energy costs without compromising on comfort for lighting solutions.

This product brochure provides a detailed overview of the portfolio of our luminaires for the food and frozen food sector.

All luminaires shown comply with the principles of the IFS and can be certified to the HACCP concept as a system. They have been carefully evaluated and tested and meet all requirements, particularly with respect to shatter protection, captive small parts, contamination deposits and intensive hygiene cleaning using high-pressure cleaners.

Hygiene, high colour rendering, extreme temperatures, special ambient conditions such as humidity, dust and explosive atmospheres: Our luminaires are characterised by absolutely reliable functionality and great durability in these areas. More information about our products at our website www.norka.de.

ENERGY EFFICIENT – NATURAL COLOURS

COLOUR RENDERING AS A SIGN OF QUALITY

All types of food are subject to strict quality inspections before it is put onto the market. One aspect of these inspections is the visual evaluation of the products.

Colour evaluation plays a special role in this context. It can be a sign of quality for milking or meat processing, for example. Discolourations can indicate incorrect nutrition or even diseases in the animals. Fruit and vegetables are classified in different quality categories and degrees of ripeness depending on their colouring.

The colour impression of an object depends on the spectral distribution of the light source which illuminates it. The light source has to provide good colour rendering properties to allow neutral evaluation of the colour.

This is referred to as a high colour rendering index (abbreviated as R_a) or CRI (Colour Rendering Index).

Pure sunlight achieves the ideal colour rendering index with an R_a /CRI of 100.

NORKA LED High-CRI lamps already achieve R_a values between 95 - 97 today. This allows quality inspections to be

carried out with pure LED lighting and the detection of very fine colour nuances.

Particularly production facilities where permanent visual inspections have to be carried out, e.g. on a conveyor belt, can benefit from the advantages of LED technology. There is no maintenance work and therefore no production downtime. The luminaires can also be mounted in locations which are difficult to access and on moving machine parts as their functionality is hardly affected by vibrations.

QUALITY IS EFFICIENT

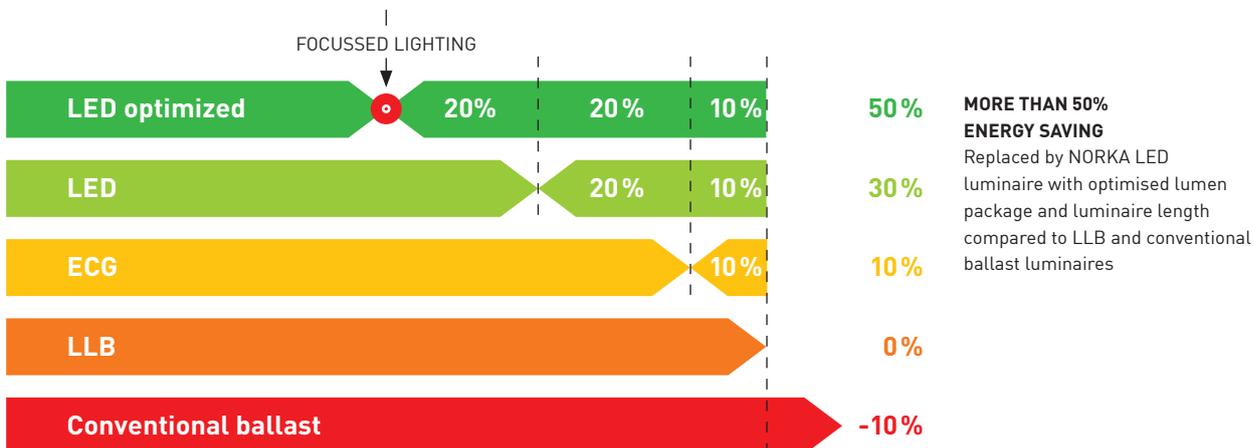
In areas with high requirements for ambient conditions, NORKA LED luminaires can replace conventional luminaires with T8 lamps with a high colour rendering index. The LED optimisation method "Focussed lighting" can save up to 50 % of energy costs with so-called High CRI LEDs.

Application	Illumination level	R_a	Special requirements	Suitable NORKA luminaires
Colour inspections	1000 lx	>90	Very good colour rendering $R_a > 90-100$ at 5000 K	CENTAURUS, POLARIS, URANUS, METIS, METIS ² , COESFELD PLUS
Meat inspection at check point	540 lx	>90	Very good colour rendering $R_a > 90-100$ at 5000 K	METIS, METIS ² , COESFELD PLUS
Garnishing, sorting, decorating	500 lx	>90	Very good colour rendering $R_a > 90-100$ at 5000 K	METIS, METIS ² , COESFELD PLUS
Production of delicatessen food	500 lx	>90	Very good colour rendering $R_a > 90-100$ at 5000 K	CENTAURUS, POLARIS, URANUS, METIS, METIS ² , COESFELD PLUS
Inspection of jars and bottles	500 lx	>80	Possibly very good colour rendering $R_a > 90-100$ at 5000 K	METIS, METIS ² , COESFELD PLUS
Laboratories	500 lx	>80	Possibly very good colour rendering $R_a > 90-100$ at 5000 K note chemical resistance if applicable	METIS, METIS ² , COESFELD PLUS
Product inspection	500 lx	>80	Possibly very good colour rendering	CENTAURUS, POLARIS, URANUS, METIS, METIS ² , COESFELD PLUS

ENERGY CONSUMPTION

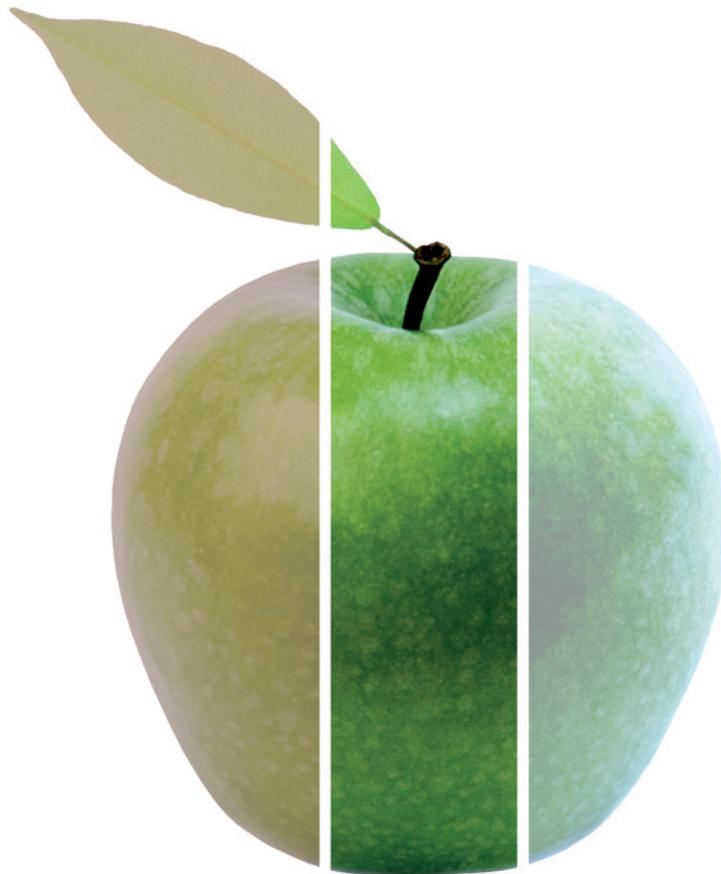
ENERGY SAVING

OVERALL SAVING



SO **GREEN** REALLY STAYS

GREEN



BEST COLOUR RENDERING QUALITY
WITH

50% ENERGY SAVING

METHODS FROM SPACE TRAVEL FOR MORE QUALITY

Hygiene has a lot to do with optics. A food processing operation should appear bright, tidy and clean. This positive appearance is being checked increasingly. IFS Food (International Food Standard) and EU regulations govern the production, treatment and sale of food.

In the 1960s, the first concept for comprehensive evaluation of food production was created in the USA. The background was the first manned space flight. The aim was to completely exclude contaminated food. With this task in mind, all steps of food production were analysed for hazards to identify any critical points.

This concept for the production of safe foodstuffs is known as HACCP (Hazard Analysis and Critical Control Point) today. It takes a key position after the FAO (Food and Agriculture Organization of the United Nations) / WHO (World Health Organization) Codex Alimentarius.

Certification is carried out by accredited institutes, e.g. in Germany by DQS, Bureau Veritas, TÜV, SGS etc.

In reality, there is a clear differentiation between "good hygiene practice in workplaces" and HACCP.

Good hygiene practice is the basis for an HACCP concept.

All employees within a company are responsible for the correct execution of the processes in their area of work and responsibility.

These include e.g. cleaning and disinfection measures, pest control, room ventilation, work hygiene and personal hygiene etc. HACCP only applies to the actual food.

It queries the origin and the composition of a certain product. It then uses these data to assess which hazards and which risks for consumers are to be expected in this specific case and at which points in the production process these hazards have to be controlled.

HACCP differentiates between three different hazard sources during the production process:

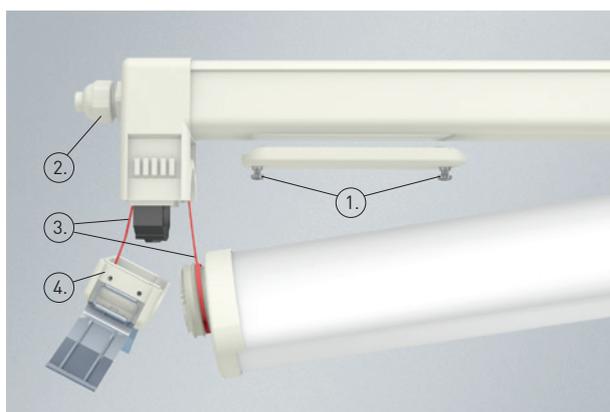
- > chemical hazards
- > microbiological hazards
- > physical hazards

Chemical hazards refer to contamination, e.g. with pesticides, environmental chemicals or heavy metals. NORKA has been specialised in the prevention of microbiological and physical hazards for many years.

All luminaires from the HACCP/IFS category are designed to facilitate the removal of contaminations or microorganisms such as bacteria, fungi or viruses through cleaning and disinfection processes. The luminaire housing is resistant to common cleaning agents.

The luminaires are equipped with captive screws, covers and lamps sockets to exclude any hazard of falling parts.

Special luminaire designs are suitable for permanently withstanding intensive cleaning processes with high-pressure cleaners in line with protection rating IP 69K.



PROTECTION AGAINST GLASS FRAGMENTS AND FALLING LUMINAIRE PARTS

For the highly sensitive areas of the food processing industry, NORKA uses polycarbonate (PC) reflector tubes.

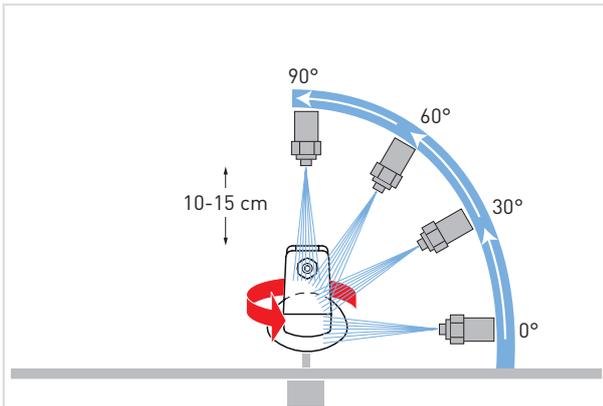
Luminaire components are captive, e.g. secured by arrester threads:

- ① Captive screws
- ② Cable gland resistant to pressurised water
- ③ Arrestor threads (one-man mounting)
- ④ Pressure caps with sealing clamps (tool-free opening)

IP 69K

HIGH PROTECTION RATING IP 69K AND RESISTANCE AGAINST CLEANING AGENTS

The high protection rating of the luminaires allows cleaning at high pressure up to 100 bar and with up to 80 °C hot water and a variety of cleaning agents, alongside good chemical resistance.



> Diagram of protection rating testing IP 69K



> High-pressure cleaning of housing cover with 100 bar



> NORKA BITBURG luminaires with IP 69K in the cold store of a slaughterhouse in Germany

EXTREME TEMPERATURES

Food production and storage consists of warm and cold production sections. The right lighting is required for each step to ensure hazard-free processes.

In warm ambient temperatures, e.g. in deep-frying and baking lines and on conveyor belts for cooling down food, the lighting system can be subject to temperatures up to +60 °C, in extreme cases even up to +90 °C.

The BREMERHAVEN HT and BREMERHAVEN VHT luminaires from NORKA are conventional luminaires with high-quality components. The lamp is protected by a heat-resistant silicate glass and the ballast is mounted externally. All plastic and sealing components are specially designed for high temperatures.

LED solutions from NORKA can be operated permanently at ambient temperatures up to +60 °C and +70 °C.

The DUBAI LED luminaire with an ambient temperature range of -45 °C to +60 °C achieves an average service life of 50,000 hours.

The POLARIS HT special luminaire can be used for projects up to +70 °C under special conditions.

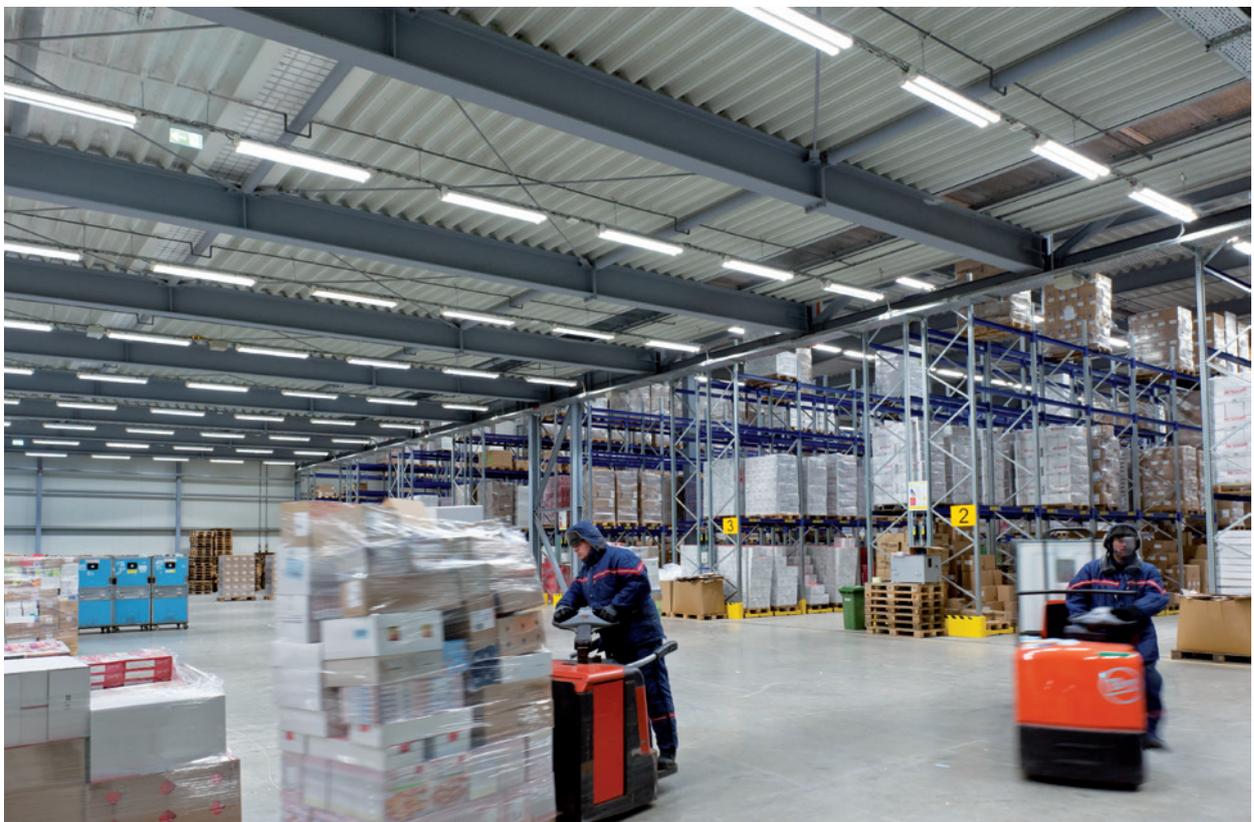
Cold ambient temperatures are particularly suitable for LED luminaires. Low temperatures improve the lumen package and achieve a longer service life.

SCHÖNEFELD LED LT, KIRUNA LED and METIS LT cover low temperatures of -40 °C, -45 °C and even -60 °C. The SCHÖNEFELD LED LT and METIS LT luminaires are then supplied by external ballasts.

“SAFE OPERATION”

The indicated service life of a NORKA luminaire always refers to the overall concept of the luminaire. If a luminaire is continuously operated at its indicated maximum ambient temperature of +30 °C it achieves a service life of 50,000 hours. These specifications refer to the LED and the ballast (except CENTAURUS HT and POLARIS HT).

For the yearly average, the luminaire should not be operated predominantly above the permitted ambient temperature range. If a luminaire is operated predominantly below its indicated maximum ambient temperature its service life will increase. Short-term excess temperatures, on the other hand, have no impact.



> NORKA luminaires for extreme temperature areas; here -25 °C in a cold storage

Application	Illumination level	R _a	Special requirements	Suitable NORKA luminaires
Delivery area	200 lx	>80	Motion-controlled, if required; Cold storage: Cold-resistant luminaires	DUBAI LED, ERFURT LED, KIRUNA LED, METIS ² , METIS LT, POLARIS, CENTAURUS, URANUS
Workstations and zones in breweries on malting floors	200 lx	>80		BERN LED, BITBURG LED, BRÜNN LED, ERFURT LED, MÜNCHEN LED
Workstations and zones in sugar factories	200 lx	>80		BERN LED, BITBURG LED, BRÜNN LED, ERFURT LED, MÜNCHEN LED
On filtering floors in sugar refineries	500 lx	>80		BERN LED, BITBURG LED, BRÜNN LED, ERFURT LED, MÜNCHEN LED
Loading and operation of conveyors and machines	200 lx	>80		BERN LED, BITBURG LED, BRÜNN LED, ERFURT LED, MÜNCHEN LED
Production of cigars and cigarettes	500 lx	>80		CENTAURUS, ERFURT LED, METIS ² , POLARIS, TALON, URANUS, ZUG LED
Cooking (e.g. in canning and chocolate factories)	200 lx	>80	Heat-resistant luminaires	DUBAI LED, POLARIS HT, CENTAURUS HT
Storage rooms	100 lx 200 lx if permanently occupied	>60	Motion-controlled, if required; Cold storage: Cold-resistant luminaires	BERLIN LED, BRÜNN LED, ERFURT LED, KIRUNA LED, METIS LT, MÜNCHEN LED, SCHÖNEFELD LED, SCHÖNEFELD LED LT
Storage rooms for same or large size items	50 lx	>60	Motion-controlled, if required; Cold storage: Cold-resistant luminaires	BERLIN LED, ERFURT LED, KIRUNA LED, METIS ² , METIS LT, SCHÖNEFELD LED, SCHÖNEFELD LED LT
Production in cold kitchen	500 lx	>80	Note chemical resistance if applicable	BITBURG LED, BRÜNN LED, COESFELD PLUS, ERFURT LED, MÜNCHEN LED
Production in hot kitchen	500 lx	>80	In exposed areas, e.g. frying: Heat-resistant luminaires Note chemical resistance if applicable	BITBURG LED, CENTAURUS HT, COESFELD PLUS, DUBAI LED, ERFURT LED, POLARIS HT
Dispatch and packaging areas	300 lx	>60		BERN LED, BITBURG LED, BRÜNN LED, ERFURT LED, MÜNCHEN LED
Preparation areas, e.g. fruit, meat	500 lx	>80		ERFURT LED, BITBURG LED, ZUG LED
Transport routes without personnel traffic	20 lx	>40	Motion-controlled, if required; Cold storage: Cold-resistant luminaires	BERLIN LED, ERFURT LED, KIRUNA LED, METIS LT, SCHÖNEFELD LED, SCHÖNEFELD LED LT, URANUS
Transport routes with personnel traffic	150 lx	>60	Motion-controlled, if required; Cold storage: Cold-resistant luminaires	BERLIN LED, BRÜNN LED, ERFURT LED, KIRUNA LED, METIS LT, MÜNCHEN LED, SCHÖNEFELD LED, SCHÖNEFELD LED LT, URANUS
Loading areas, loading platforms	150 lx	>40	Motion-controlled, if required; Cold storage: Cold-resistant luminaires	CENTAURUS, BRÜNN LED, ERFURT LED, KIRUNA LED, METIS ² , METIS LT, MÜNCHEN LED, POLARIS, SCHÖNEFELD LED, SCHÖNEFELD LED LT, URANUS
Workshop entrances	400 lx	>80	Motion-controlled, if required; Cold storage: Cold-resistant luminaires	CENTAURUS, ERFURT LED, KIRUNA LED, METIS, METIS ² , METIS LT, POLARIS, SCHÖNEFELD LED, SCHÖNEFELD LED LT, URANUS

SPECIAL AMBIENT CONDITIONS

Industrial lighting is used in various locations and often has to withstand particularly difficult ambient conditions. There are many sensitive and critical hazard areas in the food processing industry which require a special solution, particularly in production and processing.

SAFE LIGHTING FOR EXPLOSIVE ATMOSPHERES

The food processing industry has been working on the issue of explosion hazards for several years.

Flammable gases, fumes and especially dust are a hazard in production and work areas with processing plants.

Explosion-proof luminaires from NORKA are designed in line with current European Union ATEX guidelines and contribute demonstrably to protecting workers and technical facilities.

AMMONIA AND CHEMICAL RESISTANCE UNDER HIGH HUMIDITY

Vegetables are produced on large farms under artificial atmospheres.

This includes enriched fertile soil with natural or chemical fertilisers and artificially generated seasons to allow for best possible plant growth.

Mushrooms, for example, require soil consisting of approx. 90 % horse manure and 10 % chicken droppings. Best possible growth of the fruiting bodies starts in the first six days at approx. 25 °C and approx. 25 l of water per square metre. Before new fruiting bodies are moved in to the so-called cells, these are steamed at 70 °C for several hours. This special area of application is subject to permanently high humidity levels with added ammonia and strong short-term temperature fluctuations.

NORKA has been addressing these requirements for many decades with balanced thermal management within the

luminaire and a short sealing system made of age resistant, form retaining silicone/synthetic rubber. In addition to this, all materials are particularly resistant to aggressive atmospheres.

DISINFECTION WITH UV LIGHTING

The use of ultraviolet light is particular feature of the food processing industry.

NORKA luminaires are used for disinfecting air and water, for example. In other European countries, UV light is increasingly used for disinfecting food such as poultry and shellfish. On fruit and vegetables it slows down the germination process and kills or sterilises insects which could infect cereals, dried fruit or nuts. In Germany, the use of UV lights is currently limited to cleaning herbs, disinfecting and odour neutralisation of food conveyor belts as well as packaging materials. In agriculture, research is being conducted in the field of pest control with UV light.

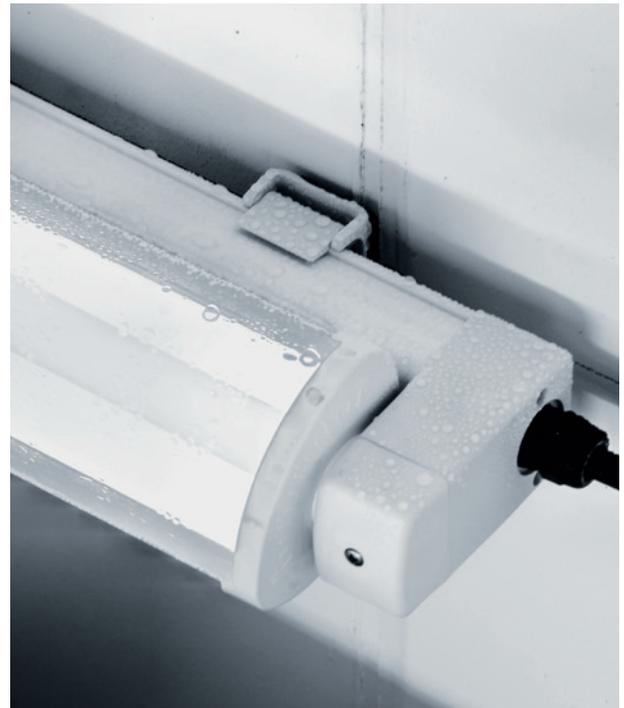
INTENSIVE CLEANING PROCESSES WITH HIGH-PRESSURE CLEANERS

In many food processing operations, workplaces become very dirty during production time. The fittings of the machines and other neighbouring objects are therefore cleaned daily.

This often involves the use of chemical cleaning agents which release contaminations and disinfect deep into the pores. NORKA luminaires can be sprayed with up to 100 bar water pressure from a distance of 10 - 15 cm. The high IP 69K rating of the luminaires allows cleaning with 80 °C hot water including the cleaning agents.



> NORKA luminaire NEUSTADT with T-UV-C lamp for disinfection in air filter system



> NORKA luminaires are extremely resistant to dust and moisture



> NORKA luminaires for special ambient conditions; here flour dust in a bakery

Application	Illumination level	R _a	Special requirements	Suitable NORKA luminaires
Workstations and critical zones in slaughterhouses	500 lx	>80	Luminaires suitable for cleaning with pressure washers, IP 69K, if required Note chemical resistance, if applicable	BERN LED, BITBURG LED
Laboratories	500 lx	>80	Possibly very good colour rendering R _a > 90-100 at 5000 K note chemical resistance, if applicable	COESFELD PLUS, METIS, METIS ²
Spaces for drying and fermenting of leaf tobacco, fermenting cellar	200 lx	>80	Heat-resistant luminaires, note explosion protection, if applicable	BASEL LED, BERN LED EX, BREMERHAVEN HT, BREMERHAVEN VHT, CENTAURUS HT, DUBAI LED, POLARIS HT
Production in cold kitchen	500 lx	>80	Note chemical resistance, if applicable	BITBURG LED, COESFELD PLUS, ERFURT LED
Production in hot kitchen	500 lx	>80	In exposed areas, e.g. frying: Heat-resistant luminaires Note chemical resistance, if applicable	BITBURG LED, CENTAURUS HT, COESFELD PLUS, DUBAI LED, ERFURT LED, POLARIS HT
Sorting and washing of products, milling, mixing and packing	300 lx	>80	Note chemical resistance, if applicable, note explosion protection, if applicable	BASEL LED, BERN LED EX, BITBURG LED, BRÜNN LED, COESFELD PLUS, ERFURT LED, MÜNCHEN LED
Rinsing rooms	500 lx	>80	Luminaires suitable for cleaning with pressure washers, IP 69K, if applicable, note chemical resistance, if applicable	BITBURG LED, COESFELD PLUS, ERFURT LED
Preparation and baking rooms	300 lx	>80	Luminaires suitable for cleaning with pressure washers, IP 69K, if required, note explosion protection, if applicable	BASEL LED, BERN LED, BERN LED EX, BITBURG LED
Washing, filling in to barrels	200 lx	>80	Note chemical resistance, if applicable	BITBURG LED, BRÜNN LED, COESFELD PLUS, ERFURT LED, MÜNCHEN LED

LUMINAIRE RANGE – OVERVIEW



All luminaires are suitable for IFS/HACCP certified operations. We recommend cover screens made of PC (polycarbonate) to ensure highest possible shatter protection. Additionally, many luminaires can be integrated in to DALI controls.

BASEL LED



- > Explosion protected surface-mounted ceiling luminaire with LEDs
- > For use in industrial applications with explosive atmospheres according to zone 2, 21 and 22
- > Application: Areas with high levels of fine particles (e.g. flour dust), explosive atmospheres

BERLIN LED



- > Ceiling and wall surface-mounted luminaire with LEDs
- > Compact design
- > Ambient temperatures between -25 °C and +35 °C
- > Replaces TC-SEL 11 W and TC-L/TC-D 18 W
- > Application: Cold cells, packaging and storage of raw products, storage of packaged finished products, changing rooms

BERN LED / BERN LED EX



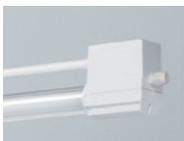
- > Tubular luminaire resistant to pressurised water Ø 60 mm with LEDs
- > IP 69K version for intensive cleaning processes, e.g. using pressure washers
- > Suitable for ambient temperatures between -30 °C and +40 °C
- > Application: Handling unpackaged products, as explosion protection variant in zones 2 and 22

BITBURG LED



- > Surface-mounted ceiling luminaire
- > Suitable for intensive cleaning processes using pressure cleaners due to high protection rating IP 69K
- > Application: Handling raw materials and unpackaged products, packaging and storage of raw materials, applications with frequent cleaning cycles

BREMERHAVEN HT / BREMERHAVEN VHT



- > Surface-mounted ceiling luminaire for T8 fluorescent lamps
- > Suitable for very high temperatures up to +60 °C
- > HT version suitable for very high temperatures up to +90°C
- > Application: Areas surrounding ovens, baking lines, deep fryers or deep frying lines

BRÜNN LED



- > Surface-mounted ceiling luminaire with LEDs and particularly flat housing
- > Ideal for mounting in continuous row systems
- > Captive end caps
- > Application: Packaging and storage rooms for raw products, storage of packaged finished products, changing rooms

CENTAURUS / CENTAURUS HT



- > Floodlight with LEDs
- > Replacement for HQL lamps up to 1000 W
- > Even lighting of large areas
- > Different lighting technologies
- > HT version for use with external ballast up to +55 °C
- > Application: Packaging and storage of raw materials, storage of packaged finished goods, high workshops, installation on cranes, ambient temperature up to -35 °C

COESFELD PLUS



- > Ammonia-resistant surface-mounted ceiling luminaire with high colour rendering
- > 4 kV (protection against transient overvoltage)
- > IP 69K version for intensive cleaning processes, e.g. using pressure washers
- > Application: Quality inspection with high requirements for colour rendering quality, applications with frequent cleaning cycles

DUBAI LED



- > Heat-resistant surface-mounted ceiling luminaire
- > For use in areas with great temperature fluctuations from -45 °C to +60 °C with constant luminous flux
- > Application: Packaging and storage of raw products, storage of packaged finished products, cold cells, production areas with high heat development

ERFURT LED



- > Surface-mounted ceiling luminaire
- > Comprehensive range of accessories
- > Up to 8000 lm
- > IP 65 (1/2 lamps) and IP 67 (1 lamp)
- > Application: Packaging and storage of raw products, storage of packaged finished products, changing rooms

KIRUNA LED



- > Cold-resistant surface-mounted ceiling luminaire
- > For use in cold areas from -45 °C to +30 °C with constant luminous flux
- > Application: Packaging and storage of raw products, storage of packaged finished products

METIS² / METIS LT



- > Surface-mounted ceiling luminaire with LED array and especially high lumen package
- > Up to 12500 lm (1 lamp)
- > LT version for use with external ballast up to -60 °C
- > Application: Packaging and storage of raw products, storage of packaged finished products

MÜNCHEN LED



- > Surface-mounted ceiling luminaire with LED and particularly flat housing
- > Extreme wide beam
- > Application: Packaging and storage of raw products, storage of packaged finished products, changing rooms

LUMINAIRE RANGE – OVERVIEW

NEUSTADT disinfection



- > Surface-mounted ceiling luminaire for T-UV-C fluorescent lamps
- > For use in industrial applications
- > Application: disinfection, e.g. in ventilation systems

POLARIS / POLARIS HT



- > Floodlight for ceiling wall or pole mounting
- > Replacement for HQL lamps up to 400 W
- > Elliptical light distribution
- > Different lighting technologies
- > HT version for use with external ballast in areas up to + 70 °C
- > Application: Packaging and storage of raw products, storage of packaged finished products, high rack warehouses, installation on cranes, ambient temperature up to -35 °C

SCHÖNEFELD LED / SCHÖNEFELD LED LT



- > Single-battery escape route luminaire with pictogram film in line with EN ISO 7010
- > Compact design
- > Emergency light operation through electronic integrated emergency lighting unit, including charging, indicator, mains monitoring and protection against total discharge
- > Emergency light duration 1 h or 3 h, with self-test function
- > For use in areas from -5°C to +35°C
- > LT version for use with external ballast up to -40 °C
- > Application: Cold stores and cold storage rooms, packaging and storage of raw products, storage of packaged finished products, changing rooms

URANUS



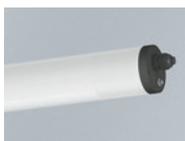
- > Floodlight with LED array
- > Ceiling, wall and pole attachment
- > Luminaire housing made of weatherproof, fibreglass-reinforced polymer
- > Reflector housing made of die-cast aluminium, can be swivelled continuously and locked in any position
- > Application: Packaging and storage of raw products, suitable for illuminating façades and advertising spaces

URANUS flat surface



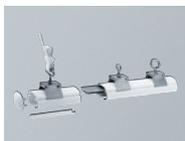
- > Floodlight with LED array
- > Ceiling, wall and pole attachment
- > Luminaire housing made of weatherproof, fibreglass-reinforced polymer
- > Reflector housing made of die-cast aluminium, can be swivelled continuously and locked in any position
- > Application: Packaging and storage of raw materials, suitable for illumination façades and advertising spaces, traffic routes indoors and outdoors (available from Q3/2015)

ZUG LED



- > Tubular luminaire Ø75 mm with LEDs
- > Secured against unauthorised opening using a stainless steel hexagon socket screw
- > Easy opening through eccentric locking technology with collapsible handle
- > Application: Handling packaged products, handling raw products

Mounting rail system polymer



- > Fibreglass-reinforced polyester, white, corrosion-resistant
- > Available in standard lengths of 4.0 m or 6.0 m
- > Round cross-section with smooth surface
- > Particularly suitable for high level hygienic-sensitive areas
- > Application: Storage of packaged finished products, changing rooms

REPRESENTATIONS / WORLDWIDE

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