LED Lighting for Offshore Platforms
Glamox is the leading supplier of lighting solutions to the world’s marine and offshore markets.

Modern products and solutions
As a local partner with a strong global network and a range of popular lighting brands, Glamox can fulfill all maritime lighting requirements, including interior lighting, floodlights and searchlights, explosion-proof luminaires and navigation lights. We are setting the standard for marine and offshore lighting with our innovative and energy efficient solutions for extreme applications.

Quality and expertise
Our products and solutions are developed and tested by our engineers at our own research and testing facilities, and manufactured and certified in accordance with all relevant quality and environmental standards. They are based on the latest technology and expertise – and generations of experience.
Welcome to our world of light!

Welcome to our world of light! is a picture book with an overview of recent projects featuring our products and solutions. Here you will find reference projects from all markets and segments, at sea and on land. Here are some examples.

**COSL Innovator**, semi-submersible drilling rig, China Oilfield Services Limited (page 254)

**Skandi Skolten**, AHTS Construction and Field Support vessel, DOF Subsea (page 250)

**Mongstad crude oil terminal and refinery**, Hordaland, Norway (page 258)

**Melkøya onshore process terminal** (Snøhvit natural gas field) (page 260)

**Heidrun B**, Floating storage unit, Statoil Petroleum (page 252)

**Goliath Floating Production, Storage and Offloading vessel (FPSO)** (page 246)

**Scarabeo 8**, semi-submersible drilling rig, Saipem (page 248)

**HMS Queen Elisabeth**, Royal Navy aircraft carrier (page 236)

**MSC Splendida**, Fantasia-class cruise liner, MSC Cruises (page 216)

**Far Solitaire**, platform supply vessel, Farstad Shipping (page 204)

**Melkøya onshore process terminal** (Snøhvit natural gas field) (page 260)

**MSC Splendida**, Fantasia-class cruise liner, MSC Cruises (page 216)

**Far Sleipner**, Farstad Shipping SUBSEA Fleet (page 210)

**Stena Drillmax Ice**, ice class drill ship, Stena Drilling (page 256)

**Blue Fighter**, platform supply vessel (page 200)

**Nyhamna onshore process terminal expansion project** (Ormen Lange gas field) Norway (page 262)

**M/S Freedom of the Seas**, cruise liner, Royal Caribbean Cruises (page 220)
Warm white light: 2,700 kelvin, 500 lux.

Cool white light: 6,500 kelvin, > 1000 lux.

Adjustable colour temperature at the Ivar Aasen control room:
Human Centric Lighting

The right light for shift work

AkerBP has built one of the first onshore control rooms for the operation of an offshore production platform.

- One of the world’s first on-shore control room for oil platforms.
- Equipped with 14 x Modul R Premium
- DALI DT 8 touch panel
- 2 or 3 shifts during the day
- Automatic shift sequence
- Manual focus light (6,500 K) and standard standard light (3,500 K)
- Fully operational in 2016

Shift work

- Shift work has a negative impact on health
- High risk of accidents during the night shift, especially during the last hours
- Variation in colour temperature and intensity increases productivity, improves sleep patterns and reduces stress and accidents
Generations of experience.
Technology of tomorrow.

Glamox was founded on a technological invention – the glamoxation process; a method for electrochemical surface treatment of aluminium. With this technology our founders were able to manufacture high quality luminaires with efficient aluminium reflectors at a competitive price.

This was the start of an industrial adventure that now includes a whole family of product brands – several of which are even older than the parent company.

Since 1947, our ability to stay in the forefront of the technological development has made it possible for us to provide our customers with state-of-the-art lighting products on a continuous basis. Our products and solutions are developed and tested by our engineers at our own research and testing facilities, and manufactured and certified in accordance with all relevant quality and environmental standards. They are based on the latest technology and expertise – and generations of experience.
Environmental simulations in climate test chambers allow us to measure the effects of temperature and humidity on our products in a controlled manner. Our climate test chambers have a test space of up to 1,500 litres. They are used to undertake heat tests of up to +180°C, cold tests of down to -75°C and humidity examinations in a range from 15% to 98%. Here we are able to reproduce the effect on our luminaires of a wide range of temperature and humidity levels, including extreme stress parameters such as rapid temperature change.

Climatic testing

Electromagnetic compatibility is the branch of electrical sciences which studies the unintentional generation, propagation and reception of electromagnetic energy with reference to the unwanted effects that such energy may induce. EMC aims to ensure that equipment items or systems will not interfere with or prevent each other's correct operation through spurious emission and absorption of electromagnetic interference. Inside our shielded chamber we can perform all tests necessary for luminaires. We can test products against radiated and conducted emission, electrostatic discharge ESD, burst and surge on power lines and immunity to high frequency electro-magnetic fields.

Electromagnetic compatibility testing (EMC)

Free fall shock tests

Mechanical shock has the potential for damaging a product. For this reason there are shock resistance requirements based on a number of international standards, depending on a luminaire's intended application and purpose. We test our luminaires in accordance with these requirements for type approval purposes. In the fall-shock facility, the objects are tested with a maximum weight of 70 kg. Each shock pulse is recorded in an oscillogram. Depending on the height of drop, a maximum of 300 G can be achieved. Our free fall shock test stand is designed to perform high-G/short duration shock impulses. This free fall shock test system will accomplish half-sine wave impact results.

Dedicated to quality

Glamox is the leading supplier of lighting solutions to the global marine – and offshore markets. We take pride in providing products on superior technical quality that are designed and work reliably under extreme conditions. Products and solutions are designed and tested to meet relevant quality and environmental standards.
With certain technologies, the heat experienced by the light source and the ballast (or driver) affects the overall performance of the luminaire in terms of light output, colour quality, lumen maintenance, lamp life, and ballast (or driver) life. For this reason, good thermal control is a very important aspect of luminaire design. Our engineers dedicate much energy to the various aspects of thermal control. Heat measurements are of major importance for finding critical component temperatures, in order to obtain the longest possible lifetime for the product, and to determine the maximum ambient temperature (Ta value) for the luminaire.

Heat measurements

Photometry

Photometry is the science of the measurement of light, in terms of its perceived brightness to the human eye. Photometric measurement is based on photodetectors that produce an electric signal when exposed to light. Our luminaires are tested using rotating mirror photometers, which keep the luminaire stationary at a sufficient distance from the photocell that the luminaire can be considered a point source. From the photometric data it is possible to produce light technical data according to utilized standards and applications. The data serve as basis for lighting calculation programs in which entire rooms, fitted with diverse luminaires, are calculated and evaluated, exact illumination design plans can be produced.

Optical spectrometry

Spectrometry is the study of objects based on the spectrum of colour they emit or reflect. The visible spectrum is the portion of the electromagnetic spectrum that can be detected by the human eye. At Glamox Luxo Lighting, we use sophisticated equipment such as spectroradiometers to determine the quality of light sources and luminaires. With the aid of this equipment we can produce precise measurements of total luminous flux and total spectral flux. Standard configurations are optimized for capturing total flux measurements of LEDs, lamps and luminaires.
In our wetrooms we assess the protection of our luminaires against ingress of water, varying over differing degrees of protection, depending upon the requirements for the different types of lighting product.

The IP code (Ingress Protection Rating) classifies and rates the degree of protection provided against the intrusion of solid objects (including body parts like hands and fingers), dust, accidental contact, and water in mechanical casings and with electrical enclosures.

**IP rating (water)**

In our laboratories and dust chambers we assess the protection of our luminaires against ingress of solid particles, varying over differing degrees of protection, depending upon the requirements for the different types of lighting product.

Dust tests are performed to test the functioning of our luminaires under extreme environmental conditions. International standards specify the test duration and the composition of dust used. The formation of dust within the test space is effected by compressed air injection. The dust is blown and swirled in the chamber by intensive air movement.

**IP rating (objects)**

The salt mist spray test is a standardized test method used to check corrosion resistance of coated samples. The test produces a corrosive attack to the coated samples in order to predict the coating’s suitability in use as a protective finish. Salt spray testing is very important for assessing the suitability of products intended for outdoor use or for use in cold or wet environments. Unacceptable products corrode within a short time under the influence of the saline air. In our salt spray chamber with a volume of 1000 liters we are able to simulate the effect of saline air on our luminaires, speeded up in time. The appearance of corrosion products (oxides) is evaluated after a period of time. Test duration depends on the corrosion resistance of the coating; the more corrosion resistant the coating is, the longer the period in testing without showing signs of corrosion.

**Salt mist spray test**
Impact tests are used in studying the toughness of materials. A material’s toughness is a factor of its ability to absorb energy during deformation. Brittle materials have low toughness as a result of the small amount of deformation that they can endure. The impact value of a material can also change with temperature. Generally, at lower temperatures the impact energy of a material is decreased.

We test our luminaires with the aid of a pendulum of known mass and length that is dropped from a known height to impact a specimen. The specimen is placed in a specialized chamber with temperatures down to -50°C. The temperature in the chamber should be five degrees lower than the lowest ambient temperature (Ta value) specified by the manufacturer for the luminaire being tested.

Impact resistance in sub-zero environments

Sports hall ball tests

Luminaires for use in sport facilities and multipurpose halls should be impact resistant. Several of our products have the ball test approval in accordance with the German DIN 57710-13 regulation. This standard is concerned with the impact resistance of luminaires for indoor sports facilities. It requires that a luminaire struck by a ball must withstand any damage that could cause luminaire parts to fall to the ground. To pass the standard test, a luminaire needs to withstand 36 shots from three directions. The maximum impact velocity is 60 km/hour and the ball is a calibrated hand ball. The product must be functioning after the test without any loose or broken parts falling down, and without change in IP rating.

Production tests and quality control

Routine testing consisting of a number of safety and functionality tests are carried out on 100% of our manufactured products in our production facilities.

At the factories, safety and functionality testing is a regular feature of the quality control that takes place in the assembly units. When the luminaires are assembled, each is tested and marked before packaging and labeling takes place.

Functionality testing includes controlling moveable parts, if any. Operators make sure the products provide the right light output, and check for irregularities in the electrical current and cable isolation. For this purpose, calibrated test instruments are in place along the assembly lines.
Glamox supplies TX60 LED luminaires to Chrysaor for installation across three North Sea oil and gas platforms

LED lighting specialist Glamox has so far supplied more than 1,400 TX60 explosion-protected (Ex e) linear LED luminaires to Chrysaor – the UK’s leading North Sea independent oil and gas company – which are currently being installed across three of its gas and condensate platforms in the Central North Sea.

Chrysaor has a diversified portfolio of interests in five of the 10 largest production hubs in the UK North Sea. It operates eight fields with 21 wells and partners some of the world’s largest companies in 17 non-operated fields with 147 wells. Chrysaor operates three gas and condensate platforms in the Central North Sea – Armada, Everest and Lomond. These platforms are currently part-way through replacing their T8 fluorescent light fittings with TX60 LED linear luminaires from Glamox.

Reduced waste and CO2 emissions
The TX60 will replace the existing T8 fluorescents on a like-for-like basis without Chrysaor having to completely revisit the lighting design. The decision to move away from fluorescent technology to LED means that Chrysaor will no longer have to deal with the ongoing disposal of mercury vapour tubes and the reduced energy demand from LED lighting aligns with Chrysaor’s commitment to reduce CO2 emissions.

30% energy savings
TX60 LED luminaires are specifically designed to enable rapid, easy replacement of existing T8 fluorescent light fittings without requiring any additional design or installation changes. The TX60 LED is suitable for onshore and offshore oil & gas and marine installations, where reduction of lighting maintenance and operating costs are critical. Designed with comparable light distribution, lumen output, colour temperature and colour rendering to conventional T8 HF fluorescent lamps, the TX60 LED can be installed indoors or outdoors in a Zone 1 or a Zone 2 hazardous area.

As Gordon Low, Area Sales Manager at Glamox states: “As well as having much reduced maintenance requirements over 100,000 hours, the TX60 also reduces energy costs, providing around 30% energy savings compared to conventional T8 HF fluorescent lamps. You can simply replace an existing T8 fluorescent fixture with a TX60 LED luminaire, without any additional design or installation changes. The latest through-wired battery-operated version extends our range even further, providing our oil and gas customers with an important easy-to-install version.”

Floodlights
In addition to the TX60, Chrysaor will also install FX60 LED floodlights from Glamox across the three platforms. These floodlights will be installed in specific areas to illuminate flare and exhaust structures, as well as over-side escape areas.
Glamox is a Norwegian industrial group that develops, manufactures and distributes professional lighting solutions for the global market. The Glamox Group is a leading supplier to the world’s marine and offshore markets, and a significant supplier to the professional building market in Europe.

The Glamox Group is a global organization, with approx. 1550 employees within sales and production in several European countries, as well as Asia, North and South America. The annual turnover is MNOK 2.770 (2018). The Group owns a range of quality lighting brands including Glamox, Aqua Signal, Luxo, Norselight, LINKSrechts, Küttel and Luxonic. Glamox is committed to meeting customer needs and expectations by providing quality products and solutions, service and support.
Equinor makes significant savings with LED on the Johan Sverdrup Field

Glamox is proud to supply lighting to Johan Sverdrup, the first offshore field development project fully supplied with LED lighting.

Safety is critical on an offshore installation. A high-quality light installation ensures safe working environment hence good lighting is of key importance. When Equinor decided to use Glamox AS LED lighting solutions on their new Johan Sverdrup facility, they created a safe working environment in addition to becoming more energy efficient. Calculations done together with Equinor shows significant savings when using LED lighting solutions from Glamox AS, the facility will reduce its operational maintenance cost with 90 % when comparing with a conventional light installation. Improved environmental performance was also an objective when selecting LED lighting solutions. The annual reduction of energy is estimated to 50 % which converts to 500 tons of CO2 emission.

The facility represents a milestone for offshore installations as the first fully equipped offshore field development with LED technology.

Glamox AS is pleased with the collaboration with Equinor and their main contractors Aker Solutions, Aibel, Kvaerner and Samsung Heavy Industries.
LED lighting on Johan Sverdrup:

- Reducing Energy consumption by 5 000 MWh
- CO2 emission / LNG reduced with > 900 tons
- More than 8 000 hrs of maintenance saved
- Return of investment, less than 2 yrs.

257 LED floodlights are mounted in the main support frame of the Johan Sverdrup platform.
LED Lighting solutions for EX Hazardous Area

With decades of experience as a global supplier to the marine and oil & gas industry, our main focus will always be quality, safety and service. For hazardous areas, it is very important that the product is designed for use in the designated area, and certifications and specifications are according to the requirements. Glamox EX lighting solutions have been developed through years of experience. Our experienced staff can give you advice on explosion proof lighting for the offshore industry.
TX50
Ex e hazardous area luminaire

- Long lifetime, min. 100 000 hrs at Ta 25°C
- Explosion proof, Zone 1 and 21
- Available in 2350lm and 4700lm
- High system efficacy
- 1,5h and 3h battery available.
- Encapsulated replaceable LED cassette.
- Sturdy design, StainlessSteel or Aluzink body
- Certification pending.

TX60
Ex e hazardous area luminaire

- Long lifetime, min. 100 000 hrs at Ta 45°C
- Explosion proof, Zone 1 and 21
- Available in 2200 lm and 4500lm
- 1,5h and 3,0h battery available, Ta -40°C
- Adjustable brackets available
- No inrush current, IC-driver technology
- Sealed for life, no maintenance required.
- Seawater resistant aluminium housing
- Slim design.

FX60
Ex de – High Bay Floodlight

- Long lifetime, min. 100 000 hrs at Ta 45°C
- Explosion proof, Zone 1 and Zone 21
- Modular based, available in a 1-4 module config. 4500lm – 18000lm
- Sealed for life, no maintenance required
- No flame path
- No inrush current, IC-driver technology
- Seawater resistant aluminum housing and stainless steel bracket

TX61
Ex n hazardous area luminaire

- Long lifetime, min. 100 000 hrs at Ta 45°C
- Explosion proof, Zone 2
- Available in 2200 lm and 4500lm
- Battery backup available
- Adjustable brackets available
- Sealed for life
- Seawater resistant aluminium housing
- Slim design.

MAX LED IC
Zone 1 LED luminaire

- Long lifetime, min. 100 000hrs at Ta 45°C
- Explosion proof, zone 1
- Available in 2200lm and 4500lm
- 1,5h and 3,0h battery available
- Variety of brackets available
- No inrush current, IC-driver technology
- Acid proof stainless steel or galvanized steel body

TX65
Ex de Low Bay Area Lighting

- Long lifetime, min. 100 000 hrs at Ta 45°C
- Explosion proof, Zone 1 and Zone 21
- Available in a 1-2 module config. 4500lm – 9000lm
- Sealed for life, no maintenance required
- No flame path
- No inrush current, IC-driver technology
- Seawater resistant aluminium housing and stainless steel bracket
Lighting solutions for industrial areas

Glamox is the leading supplier of lighting solutions to world’s marine and offshore markets as well as heavy and demanding industry. Harsh environment with high temperatures, dusty environments and the presence of moist and water may pose challenges to the lighting installation. We take pride in providing products of superior technical quality that work reliably even under the most extreme industrial conditions.
**TL60**

Technical light

- Innovative watertight LED luminaire with marine approval
- Maintenance free
- Wide ambient temperature range $T_a$ -35°C to +55°C
- Slim design
- Flexible mounting
- Long lifetime 100,000h rated at 45°C ambient temperature

**TL50**

Technical light

- Innovative watertight LED luminaire with marine approval
- Maintenance free
- Wide ambient temperature range $T_a$ -25°C to +45°C
- Slim design
- Flexible mounting
- Long lifetime 80,000h rated at 45°C ambient temperature

**MIR LED**

Technical light

- Long lifetime (50,000 hours at 45°C ambient temperature)
- Easy retrofit from tubes to LED
- Low energy consumption
- Marine approved

**FL70**

New LED Floodlight ready for delivery 2019

- 220-254V, 50/60Hz
- IP 66/67
- $T_a$ -45°C to +55°C
- Lifetime 100,000hrs. @ 45°C
- EMC1 Class B
- Spot, Narrow, Medium and Wide beam
- 1, 2 and 3 module versions up to 70,000lumen
- Weight below 20kg for 1 module

**FL60**

Floodlight

- Long lifetime, min. 100,000 hrs at $T_a$ 45°C
- Available in a 1-4 module config. 4500lm – 18,000lm
- Spot beam available
- Sealed for life, no maintenance required
- No inrush current, IC-driver technology
- Seawater resistant aluminium housing and stainless steel bracket
Lighting solutions for living quarters and accommodation areas

Proper lighting ensures safety and ability to maneuver around in a safe and secure manner. Lighting is a critical factor in ensuring a safe working environment. Light design in accordance with applicable regulations ensures correct lighting at designated areas as well as comfortable in cabins and public areas. Light quality by correct color temperature and correct LUX level is just as important in the engine room as in e.g. the dining area.
GRX3 LED I C
Ex zone 1, Recessed LED interior fixture

- Explosion proof, Ex em, zone 1 and zone 21
- Available in 1600lm and 3300lm
- Colour temperature 3000K
- 1,5h and 3,0h battery available
- Operating temp Ta -20°C - 45°C. Ta 0°C -40°C for battery version
- No inrush current, IC-driver technology

AL42-W LED
Decorative energy saving bed light

- Compact designed bed light
- Characteristic modern look
- Designed to meet maritime requirements
- Available with integrated on off switch (S), or touch switch that is dimmable (S-DIM), or touch switch that is dimmable and with an integrated USB socket for charging (S-DIM and USB).
- Energy saving with only 6 W at 353 lm light output
- Easy to install
- Flexible to cover 110 - 230 V, 50 - 60 Hz

AL60-SC 160
Surface mounted LED luminaire

- A small surface mounted luminaire
- Designed to meet maritime requirements
- Compact design and easy installation
- Wide range of decors and colours
- Long lifetime 50.000h rated at 40°C ambient temperature

AL60-SQ
Architectural

- 5 different architectural designs for indoor usage
- Compact design
- High light quality
- Wide range of decors and colors
- Long lifetime (50 000 hours) at 45°C ambient temperature.
- Designed according to marine norms
- Marine approval pending

DL60
Downlight

- Low energy consumption
- Excellent light quality
- Aesthetic expression
- Wide range of decor options
- Marine approved
- B0 and B15 approved
- Long lifetime (50 000 hours at 45°C ambient temperature)

E20 G2
Technical light

- Combined exit sign and lead light
- Flexible mounting options
- Integrated battery backup
- Optional for 230V or 24V UPS
- Optional with double sign diffuser