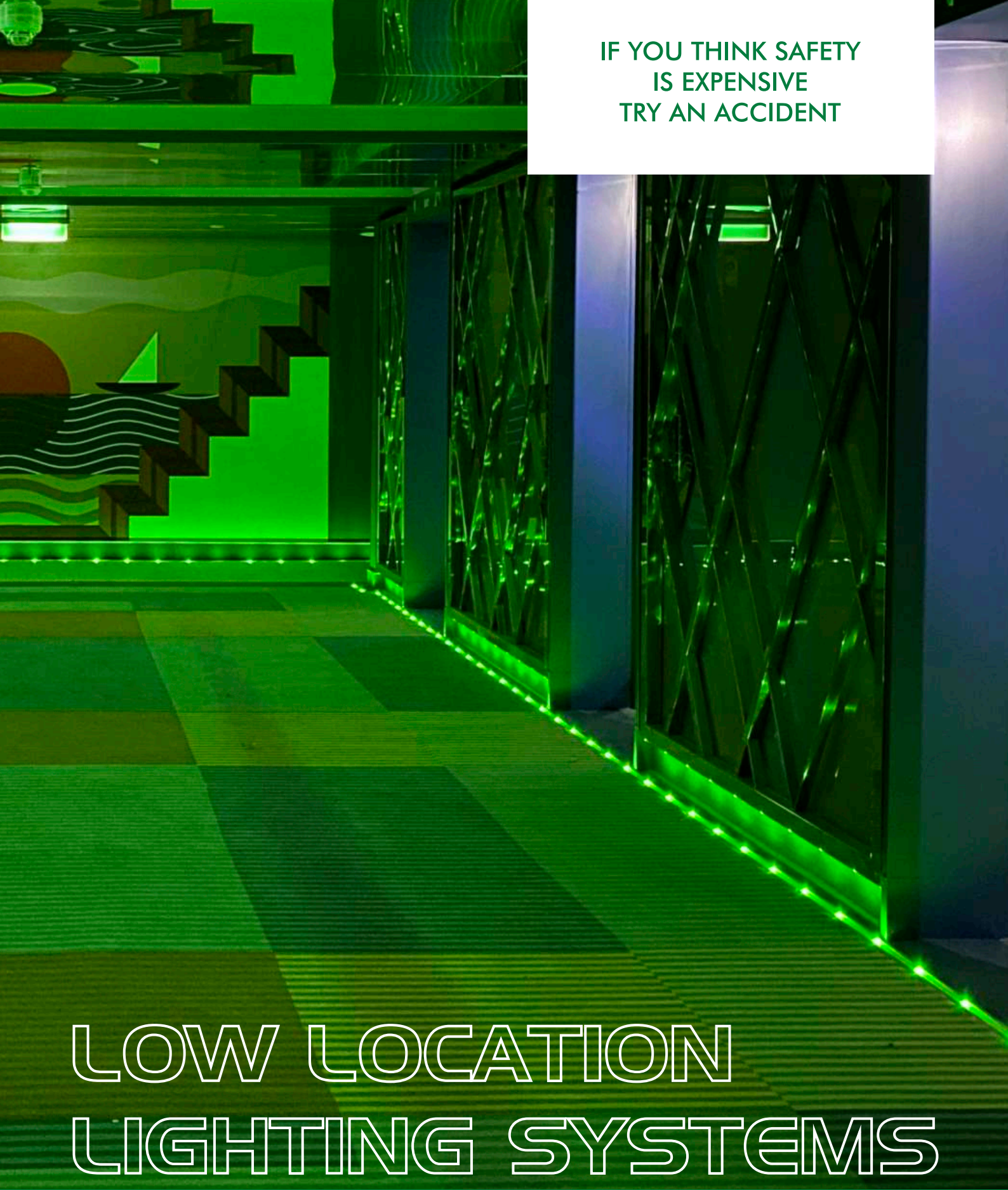
IF YOU THINK SAFETY
IS EXPENSIVE
TRY AN ACCIDENT



LOW LOCATION LIGHTING SYSTEMS

INTERNATIONAL SHIPSUPPLIERS & SERVICES ASSOCIATION
ISSA

SIGNWELL®
VISIBLE SOLUTIONS

SIGNWELL®
VISIBLE SOLUTIONS

“Take a step towards a safer environment with our Visible Solutions”

INTRODUCTION

Low Location Lighting Systems plays an crucial part onboard ships and offshore platforms in case of a sudden electrical failure when facing a black-out, or heavily darkened situation due to other factors such as smoke development. The Photoluminescent Low Location Lighting Systems as well as the Electrical Powered Low Location Lighting Systems are therefore necessary for guiding people towards safety. As stipulated according to IMO, SOLAS and ISO regulations, ships carrying more than 36 passengers shall be equipped with such systems to efficiently mark obstacles, stairs, routes to the exits, and emergency exits. Our photoluminescent and Electrical powered (LED) systems are used to create the optimal way to safety for passengers and personnel.

Signwell realizes new-/and refurbishment projects of implementing Low Location Lighting Systems, **3L-PL™** / **3L-EP™** and conducts the **3L-SI™**, Low Location Lighting System Inspections /certifications of your system.

RULES & REGULATIONS

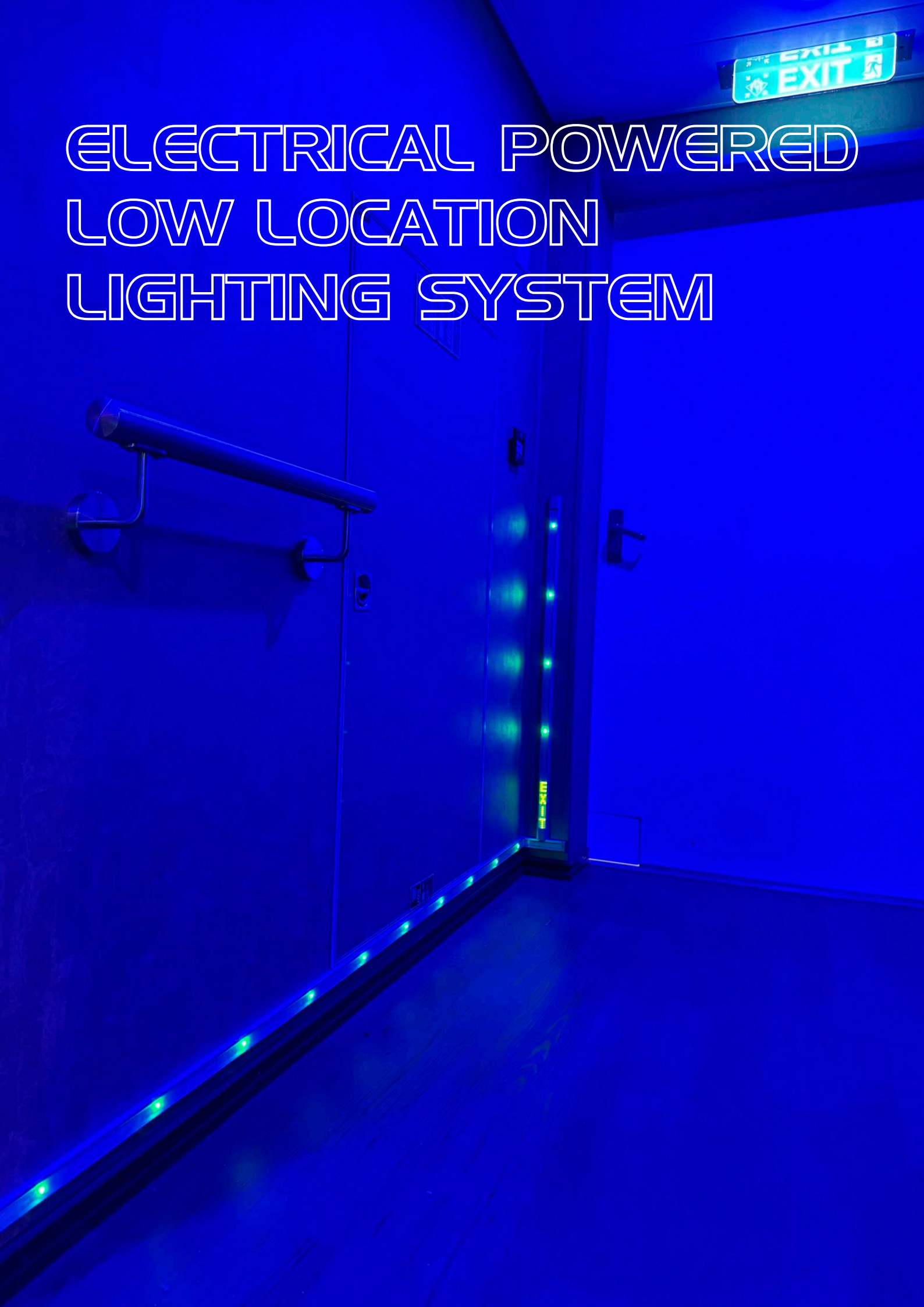
The below rules, regulations and standards describe the technical performance and properties of the products used, how to install these products/systems and how to certify and maintain these products and systems.

Standard	Description
IMO Resolution A.752 (18)	Guidelines for the evaluation, testing and application of LLL on passenger ships
SOLAS Chapter II-2 regulation 13	Means of escape - Marking of escape routes
European Directive 2002/25/EC	Safety rules and standards for passenger ships
ISO 15370:2021	Low Location Lighting (LLL) on passenger ships
ISO 16069	SWGS - Safety Way Guidance Systems
ISO 24409-2:2014	Ships and marine technology -- Design, location and use of shipboard safety signs, fire control plan signs, safety notices and safety markings
ISO 17398:2004	Safety colours and safety signs - Classification, performance & durability of safety signs

REQUIREMENTS

Signwell is a DNV approved specialist for Low Location Lighting systems on passenger and RoPax vessels. IMO & SOLAS regulations require that ships carrying more than 36 passengers shall be fitted with a Low Location Light system. Resolutions A.752(18) & ISO15370:2021 details system requirements and testing procedures:

- The installed material must be class/Wheelmark approved
- All escape routes, including stairs, must be marked with a Low Location Lighting System
- Where stairs or corridors are wider than 200cm, the Low Location Lighting System shall be installed on both sides of the corridor.
- Escape signs shall be located at each EXIT on the same side as the door handle (as in the picture).
- Fire- and water tight doors shall be marked to show how the door is opened.
- The Low Location Lighting System must be placed no higher than 30cm above the deck at all points of the escape route.
- Photoluminescent Low Location Lighting Systems must have their luminescence tested every 5 year by an authorized body.

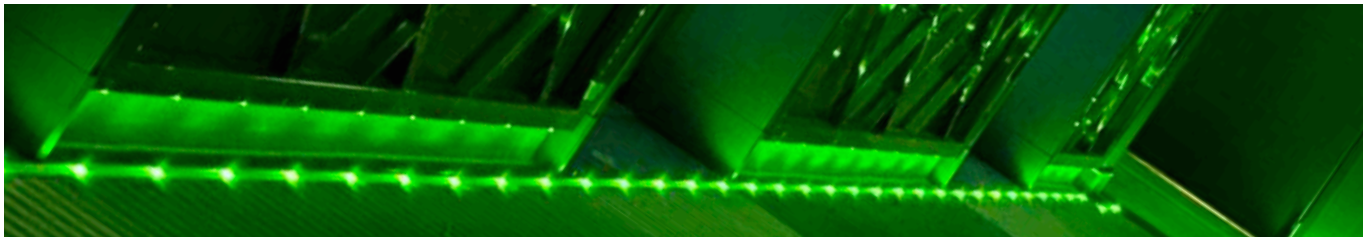


ELECTRICAL POWERED LOW LOCATION LIGHTING SYSTEM

LOW LOCATION LIGHTING ELECTRICAL POWERED SYSTEM

The LED Low Location Lighting system (Electrical Powered Low Location Lighting System) is designed for Escape Route Guidance. Its principle is the same as the Photoluminescent LLL systems, but this product does not need a light source to glow, its glow does not fade over time and the system does not require an audit every 5 year by an authorised body. Due to its great flexibility, the installation can be done, for example, on curved walls.

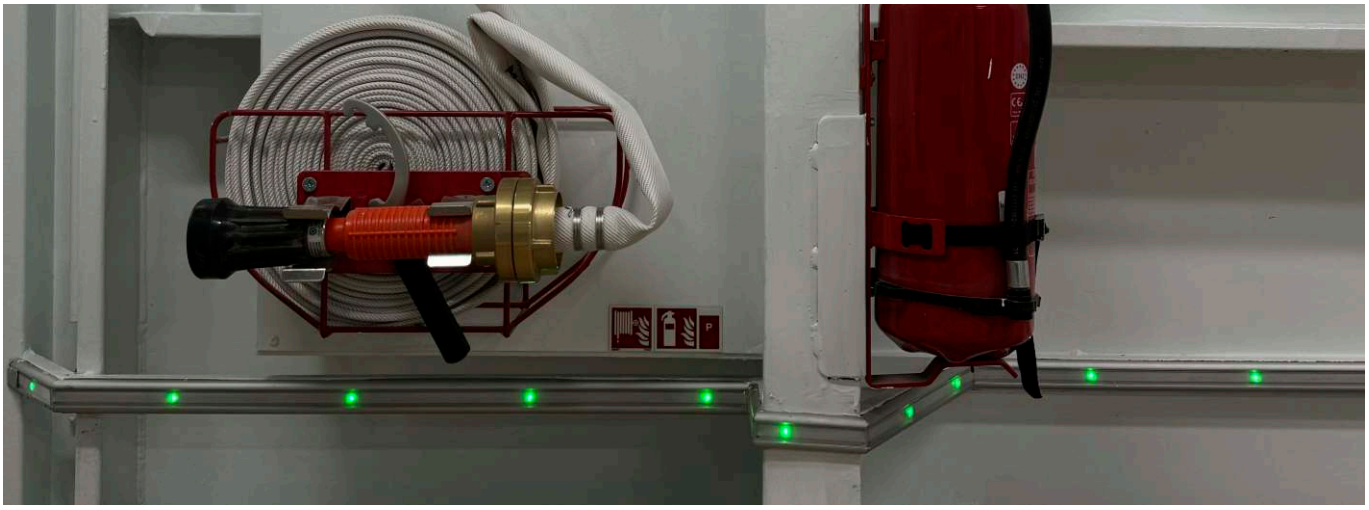
We produce, sell and install Low Location Lighting systems in accordance to IMO RESOLUTION A.752(18) and ISO 15370:2021. The turnkey service includes: mapping, planning and professional installation services.



CERTIFICATION AND APPROVALS

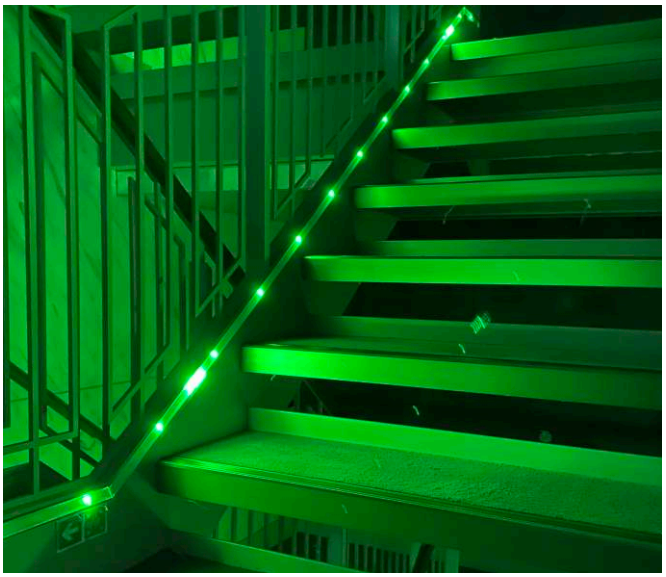
Low Location Lighting Systems comply with the environmental conditions and test procedures as defined in the requirements of the current editions of:

- IEC Pub. 598-2-22
- Regulation for the Performance of Type tests for Electric Appliances Components
- Type approval of instrumentation and automation equipment, DNV MED



TECHNICAL DATA LED-STRIP

- Standard LED Distance: **200mm**
- High brightness LEDs colour “true green” **720 mcd**
- IP Grade: **IP67**
- Operating temp.: **-15°C** to **+ 55°C**
- Life time: **> 150 000 hours**
- Due to high flexibility, LED-Strip can follow **even 90° corners** or tight curves without any electrical interruption



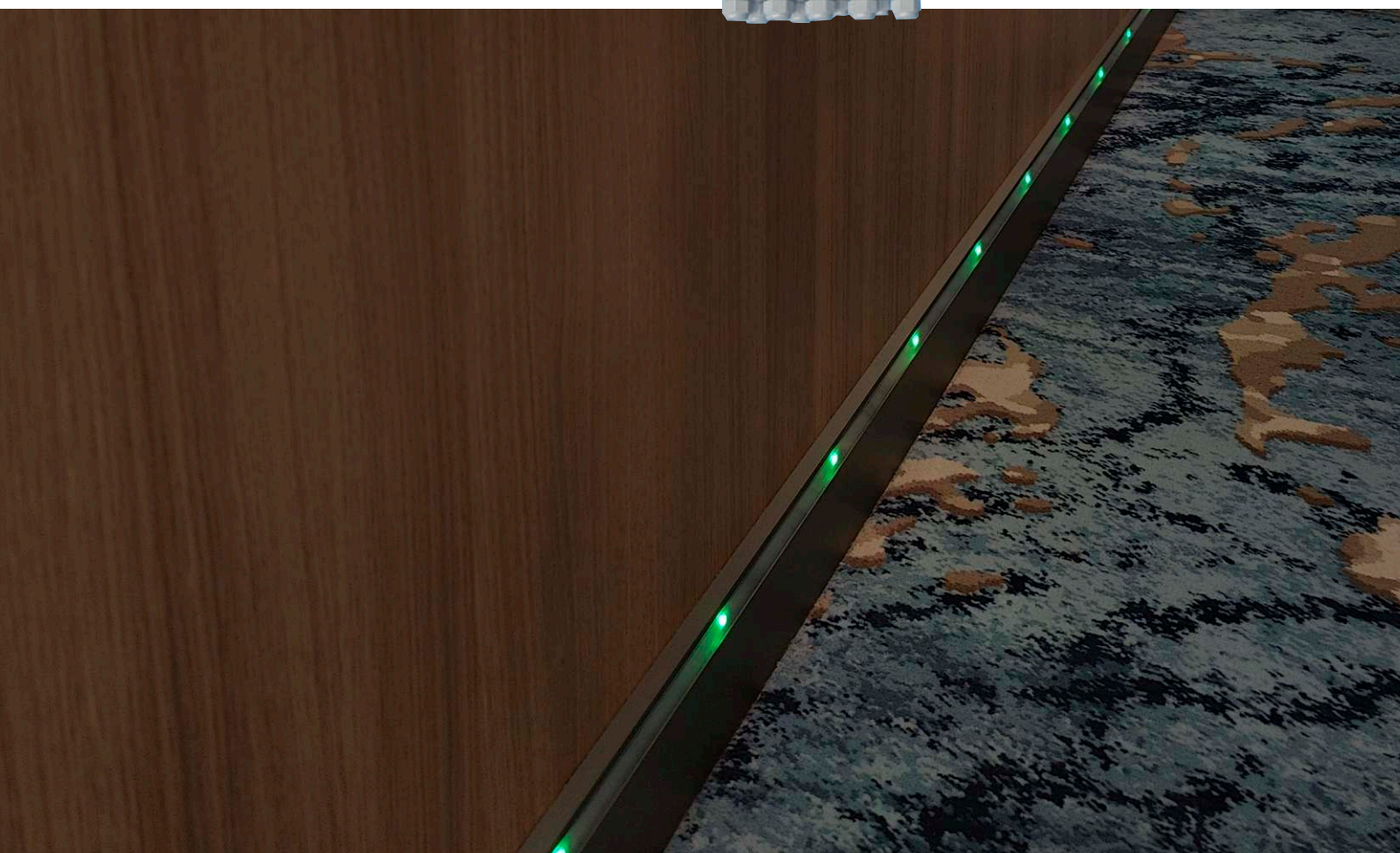
LOW LOCATION LIGHTING
ELECTRICAL POWERED SYSTEM

POWER BOX UNIT (PSU)

The Power Box Unit (PSU) feeds the system with power (each LED-strip is fed from both side and two different PSUs for safety reasons). System activation can be done from the bridge either by an input signal (from SMS- or emergency shut down-system) on board or manually from the bridge by switching the system simply ON/OFF.

TECHNICAL DATA

- Nominal Voltage: 115-230 V AC/DC
- Average Power Consumption: 77 VA (under fully load)
- Output Voltage: 22 V DC
- Output Power: 100 W
- Capable to feed up to 1.000 m LED-strip
- IP Grade: IP 55
- Batteries: 3 Sealed Lead Acid (7.26 kg)
- Housing: Metal, in colour RAL 7035 (grey)
- Battery charging also under systemactivation mode!
- Dimension: a) incl. Batt.: 445 x 340 x 127 mm
  b) excl. Batt.: 280 x 340 x 127 mm
- Weight: a) incl. Batt.: ~ 16.85 kg
  b) excl. Batt.: ~ 9.60 kg
- NO extra housing for batteries required (!)
- Cable Glands: 9 x grommets in different sizes
- Terminal configuration plan inside

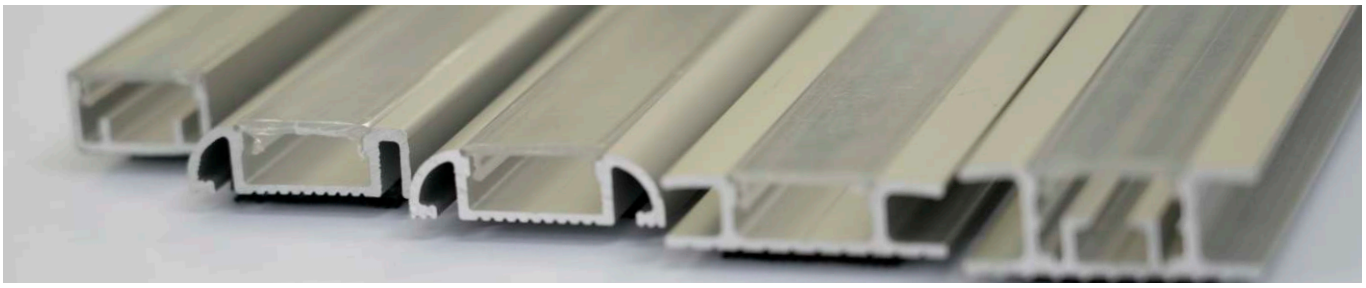


PROFILE TYPES

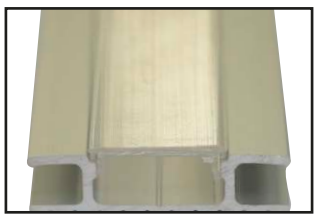
Our Electrical powered Low Location Lighting System can be installed in two different ways, floor mounted or wall mounted. Electrical Low Location Lighting systems goes under the category "Active systems" whereas Photoluminescent Low Location Lighting Systems goes under " Passive Systems".

SIGNWELL offers turnkey services for both systems, mostly for new building projects but also for refurbishment projects on all scales. Our range of profiles and methods varies from integrated profile systems to wall mounted and floor mounted profiles.

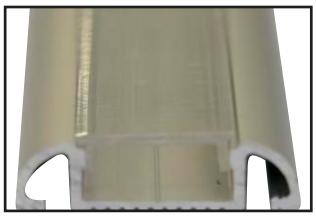
STANDARD ALUMINIUM PROFILES



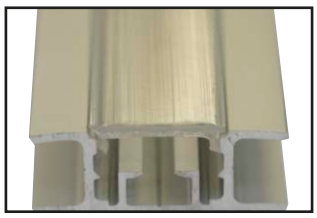
- **Standard colour:** Anodised silver
- Further colours on request e.g. Black anodized.
- Protection covers and end-caps



Integrated floor profile
CC38/10
B00 803 111 00

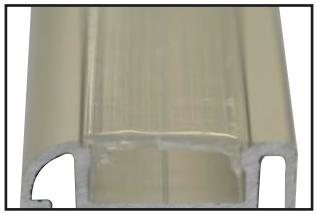


Double rounded edge profile
RR37/10
B00 803 091 00



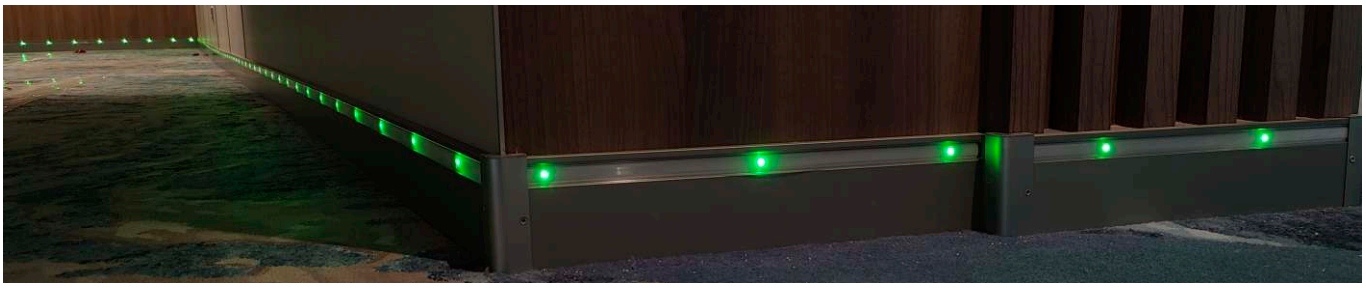
Integrated floor profile
CC38/15.5
B00 803 011 00

Integrated profile
U22/12
B00 803 021 00



Single rounded edge profile
RS34/10
B00 803 071 00

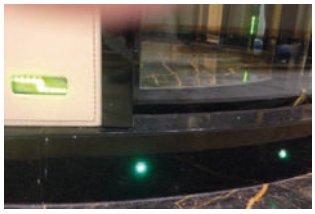
LOW LOCATION LIGHTING
ELECTRICAL POWERED SYSTEM



CUSTOM SPECIAL PROFILE TYPES

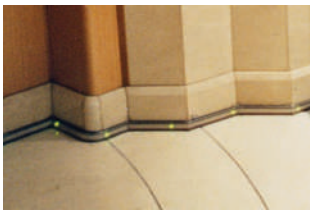
Skirting Board Profile

- Original RIVINOX-/ BEZAULT-/ SCHWEPPER Skirting board profiles
- Available colours: GOLD and SILVER
- Other skirting board profiles available on request



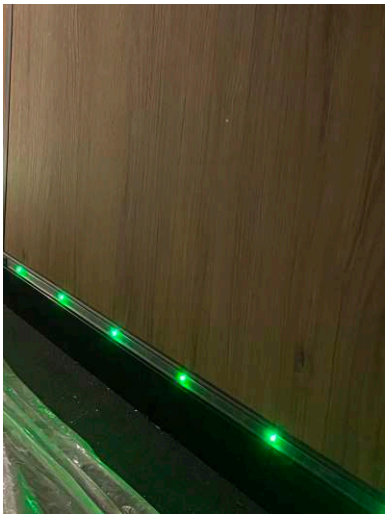
Wall recessed option (w/o profile)

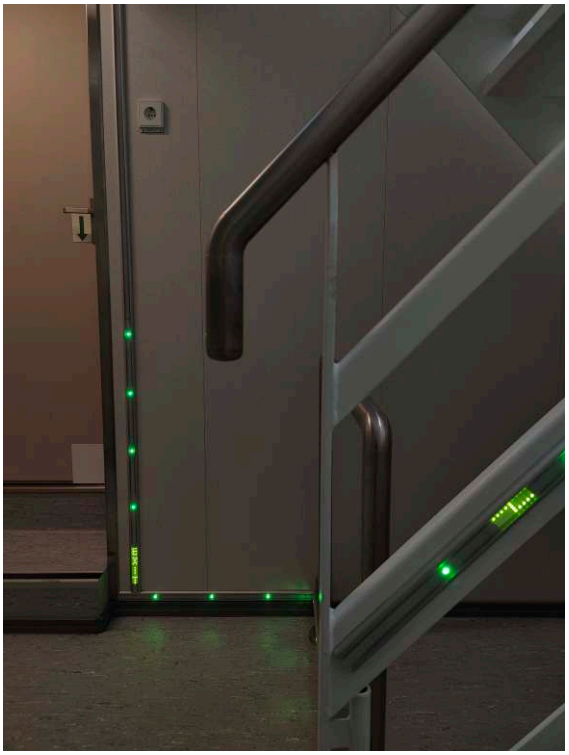
- Clipped- in from behind into the wall panels
- Installed into the pre-manufactured wooden skirting board profiles (pre- manufactured cutouts)



Polycarbonate Profile

- Available in all RAL colours (Standard colours is RAL7026)
- Non toxic, halogen free and fire retardant
- Protection covers and end-caps in same quality



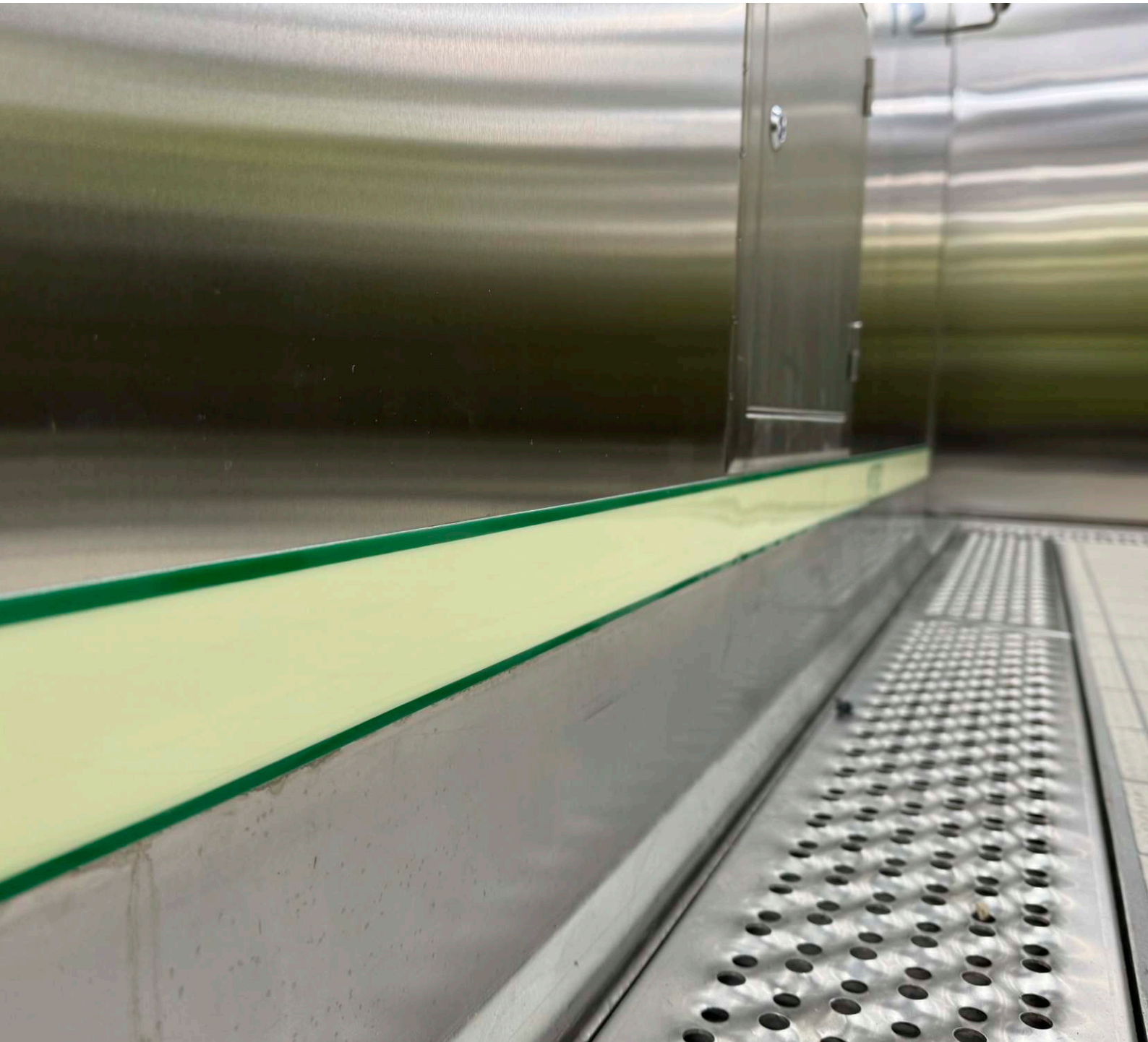


Innovations

The New Generation of PL Low Location Lighting Systems, LightLine XXL (non PVC/ halogen free) is a pioneer and a game changer on the market. With its high quality and environmental footprint it is by far the best choise of PL LLL today on the Maritime Industry market. Today most sign makers use PVC, despite the fact that it is the single most environmentally damaging of all plastics. PVC contains halogens and their toxicity of smoke is of highest concern within enclosed spaces, which you will find onboard any ship or offshore platform.

PET-X instead of PVC

During our innovation project we managed to replace PVC with a safe material, a modified recyclable polymer called PET-X, which is free of halogens. Besides this new material the innovation went on, and we managed to innovate our printing process in such a way that the expected life is up to 5 times longer than the market average. The last upside is the visual appearance, SafeSign signs and Low Location Lighting strips have a high quality glossy finish, which is easy to clean. The use of these new materials and techniques helped us to achieve innovative product which is also more economical and looks better.



LOW LOCATION LIGHTING PHOTOLUMINESCENT

Luminance properties

The rules, regulations and standards classify the luminescence of signage and low location light systems as per below table, SafeSign products meet or exceed the required luminance.

Applicable Standards and Resolutions vs. SafeSigns	Luminescent intensity (mcd/m²) (After removing the existing light)	
	10 minutes	60 minutes
IMO Res. A. 752(18)	15 mcd/m²	2 mcd/m²
ISO 15370	15 mcd/m²	2 mcd/m²
DIN 67 510-4	23 mcd/m²	3 mcd/m²
ISO 17398 Class A	25 mcd/m²	3 mcd/m²
ISO 17398 Class B	50 mcd/m²	7 mcd/m²
ISO 17398 Class C	140 mcd/m²	20 mcd/m²
ISO 17398 Class D	260 mcd/m²	35 mcd/m²
ISO 17398 Class E	400 mcd/m²	55 mcd/m²
ISO 17398 Class F	520 mcd/m²	70 mcd/m²
SafeSign XL	Class B+	Class B+
SafeSign XXL	Class C+	Class C+
SafeSign XXX	Class E+	Class E+

Exceeding the requirements, excellent photoluminescense.

The mentioned value's according to IMO Res. A 752(18) in above table are applicable when the width of the photo luminescent LLL is 75 mm. For all other heights, the values need to be re-calculated as specified in IS015370:2021 Annex D. Below table show the minimum requirement for different widths.

Height of LLL system in mm	Luminescent intensity (mcd/m²) (After removing the existing light)	
	10 minutes	60 minutes
75 mm	15,0 mcd/m²	2,0 mcd/m²
65 mm	23,4 mcd/m²	3,1 mcd/m²
50 mm	33,8 mcd/m²	4,5 mcd/m²
40 mm	52,7 mcd/m²	7,0 mcd/m²
30 mm	93,7 mcd/m²	12,5 mcd/m²
25 mm	135,0 mcd/m²	18,0 mcd/m²

THE NEW GENERATION OF LOW LOCATION LIGHTING SYSTEMS

We offer as the only manufacturer in the market SafeSign PET-X LLL photoluminescent strips.
This innovative product offers the following benefits:

- Glossy finish
- PVC Free
- Halogen Free
- Easy to wipe clean
- UV resistant
- Recyclable
- No end caps needed
- 10 year warranty
- >10 years life durability
- No shrinking
- 50% timesaving on installation
- Self-adhesive backing
- Salt Water resistant

BENEFITS COMPARED TO OLDER GENERATION ALUMINIUM PROFILE SYSTEMS:

- No lost or loose end caps
- No gaps due to shrinking
- No more dirt collections on profile
- No mechanical damages
- No more dirt on insert which cannot be removed
- Not as time consuming to replace
- No unnecessary weight due to profiles
- No shivering from loose profiles after some years

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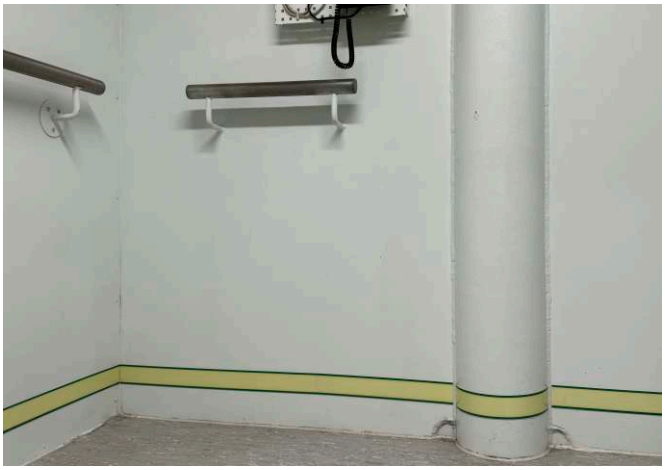
LOW LOCATION LIGHTING
PHOTOLUMINESCENT

THE NEW GENERATION OF PL LOW LOCATION LIGHT LIGHTLINE XXL PET-X STRIPS

The LightLine Photoluminescent Low Location Lighting system is the most efficient and cost effective PL LLL system to install. The system requires only the application of the LLL strips where needed. Cutting on required lenghts can be done easily with a knife or scissors. The system is finalized by positioning the mini symbols in the correct positions.

LightLine Pet-X photoluminescent strips are Non PVC/ Halogen-free plastic strips with backlighting material and a strong self-adhesive foam tape on the back. The material has a 'glossy' finish which is easy to clean and gives it a high quality appearance. The LightLine strips are available with or without 5mm safety green edges at the top and bottom of the strips.



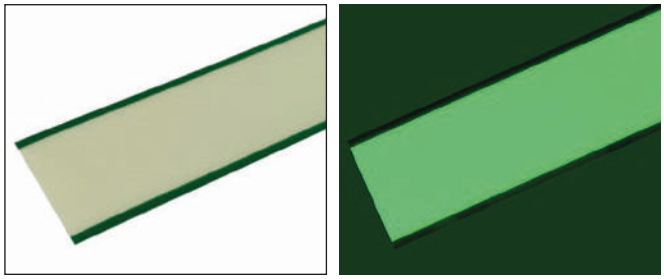
Approvals
- DNV MED
- Wheelmark
- Korean Register

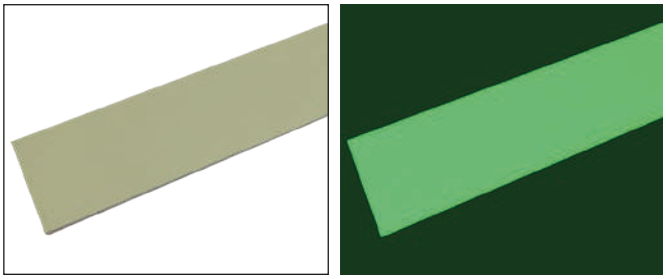
Standards
- Complies with IMO Resolution A. 752 (18) and ISO standard 15370

LightLine strips have a standard length of 1 m, 50 mm height and are produced with the high luminescence class XXL. All strips have a self-adhesive backing for easy fixing during new builds or refurbishment projects. LightLine strips are besides Non PVC/halogen-free, flame retardant and therefore exceeding all current requirements. Upon request we can manufacture LightLine strips in other widths and/or with other coloured marking stripes.

Article number	Description	Dimensions	Quality	Thickness
SX060CG	LightLine Strip Pet-X green edges	1 m x 60 mm (50 mm)	XXL	1,5 mm
SX070CG	LightLine Strip Pet-X green edges	1 m x 70 mm (60 mm)	XXL	1,5 mm
SX100CG	LightLine Strip Pet-X green edges	1 m x 100 mm (90 mm)	XXL	1,5 mm
SX040CN	LightLine Strip Pet-X neutral	1 m x 40 mm	XXL	1,5 mm
SX050CN	LightLine Strip Pet-X neutral	1 m x 50 mm	XXL	1,5 mm
SX070CN	LightLine Strip Pet-X neutral	1 m x 70 mm	XXL	1,5 mm

Note: The width of the photoluminescent material in the strips with green or grey edges is shown in the parentheses. The total widht of the edges is 10mm. The widht in the parentheses is also the one used during the measurements.





LOW LOCATION LIGHTING PHOTOLUMINESCENT

LIGHTLINE XXL Low Location Light System

Integration into the architecture (Installation on curved pillar)

THE NEW GENERATION OF LOW LOCATION LIGHTING SYSTEMS

The benefits of implementing The New Generation of Low Location Lighting are many. Our innovative product offers you the following:

- Glossy finish
- PVC Free
- Halogen Free
- Easy to wipe clean
- UV resistant
- Recyclable
- No end caps needed
- 10 year warranty
- >10 years life durability
- No shrinking
- 50% timesaving on installation
- Self-adhesive backing
- Salt Water resistant
- Easy to replace if needed
- Weight saving –> energy saving
- No shivering
- Excellent photoluminescent capability
- Flexible material, great for installation

Flexible installation

Flexible installation

Green edge standard to indicate safety

LIGHTLINE XXL
Low Location Light Systems
by SIGNWELL
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0575 / 2023

Grey edge option

LIGHTLINE XXL
Low Location Light Systems
by SIGNWELL
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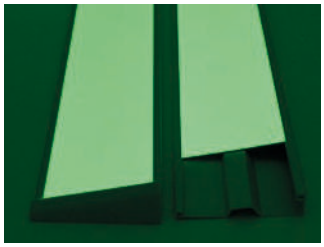
LOW LOCATION LIGHTING
ALUMINIUM PROFILES AND INSERTS

Our LightLine LLL Profile System is a system consisting of an extruded aluminium carrier and rigid photoluminescent strips. We have two different types of profiles at our range; an angled or a flat profile containing a 55,4 mm wide visible backlighting strip. The performance of the rigid panels is certified by DNV.

The flat profile is made of anodized aluminium and contains a central channel in which a strip of photoluminescent material is inserted. End caps are available to protect the ends of the profile. The angled profile is slightly angled away from the vertical to allow the photoluminescent strip to catch more light.

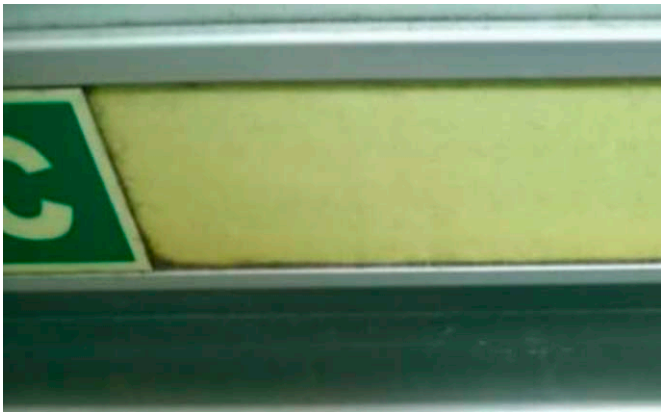
Approvals
- DNV
- Wheelmark

Standards
- Complies with IMO Resolution A. 752 (18) and ISO standard 15370



Article number	Description	Dimensions	Quality
IPA055CN	LightLine Insert PVC for angled profile	1 m x 55,4 mm	XXL
PAA60-100	Insertprofile ALU angled (insert 55,4 mm)	1 m x 60 mm	Alu. anodised
PAA60-300	Insertprofile ALU angled (insert 55,4 mm)	3 m x 60 mm	Alu. anodised
ENDCAP-AL	LLL endcap angled profile left	15 mm x 60 mm	Plastic
ENDCAP-AR	LLL endcap angled profile right	15 mm x 60 mm	Plastic
IPF056CN	LightLine Insert PVC for flat profile	1 m x 56 mm	XXL
PAF60-100	Insertprofile ALU flat (insert 56 mm)	1 m x 60 mm	Alu. anodised
PAF60-300	Insertprofile ALU flat (insert 56 mm)	3 m x 60 mm	Alu. anodised
ENDCAP-F	LLL endcap flat profile	4 mm x 53 mm	Alu. anodised

Profile + insert Low Location Light System



Dust and dirt collector

A result of loose endcaps

The OLDER GENERATION ALUMINIUM PROFILE SYSTEMS:

The previous generation of Low Location Lighting Systems, Profile + insert:

- PVC containing
- Not halogen Free
- Not as easy to clean
- Needs end caps (that will get lost after heavy use)
- Shrinks
- Time consuming to install
- Harder to replace, due to profile.
- Adds a lot of extra unnecessary weight to the ship –> energy consuming
- Can start to shiver after some years in use
- Damages more visible due to both damaged profiles and inserts
- Gaps when end caps falls off

Damaged profile and insert

A result of loose endcaps

LOW LOCATION LIGHTING
MINI SYMBOLS

Low Location Lighting Systems shall include all necessary symbols for the escape route and fire-fighting equipment in addition to the IMO signs at eye level, according to ISO 15370 and SOLAS regulations. Our LLL mini symbols can be self-adhesive transparent stickers, SafeSign Pet-X halogen and PVC free signs or acrylic signs. The LLL mini symbols shall be the minimum height of 50mm according to the ISO 15370 standard.

Emergency exit (left hand)
50 x 50 mm
ES0001

Emergency exit (right hand)
50 x 50 mm
ES0002

Shipboard assembly station
50 x 50 mm
ES0004

Escape direction, arrow (90°)
50 x 50 mm
ES0006

Escape direction, arrow (45°)
50 x 50 mm
ES0007

Escape route forward/Esc. door
100 x 50 mm
ES1001

Escape door opens left
100 x 50 mm
ES1002

Escape route to the left
100 x 50 mm
ES1004

Escape route to the right
100 x 50 mm
ES1005

Escape route downstairs left
100 x 50 mm
ES1006

Escape downstairs right
100 x 50 mm
ES1007

Escape upstairs left
100 x 50 mm
ES1008

Escape upstairs right
100 x 50 mm
ES1009

Assembly station forward (througt door)
100 x 50 mm
ES1030

Assembly station left
100 x 50 mm
ES1032

Assembly station right
100 x 50 mm
ES1033

LOW LOCATION LIGHTING
MINI SYMBOLS

Assembly station downstairs left
100 x 50 mm
ES1034

Assembly station downstairs right
100 x 50 mm
ES1035

Assembly station upstairs left
100 x 50 mm
ES1036

Assembly station upstairs right
100 x 50 mm
ES1037

Assembly station forward/up
100 x 50 mm
ES1038

Lifeboat left
100 x 50 mm
ES1052

Lifeboat right
100 x 50 mm
ES1053

Escape route forward left vertical
50 x 100 mm
ES1101

Escape route forward right vertical
50 x 100 mm
ES1102

Escape route left vertical
50 x 100 mm
ES1103

Escape route right vertical
50 x 100 mm
ES1104

Assembly station forward vertical
50 x 100 mm
ES1105

Assembly station left vertical
50 x 100 mm
ES1106

Assembly station right vertical
50 x 100 mm
ES1107

LLL Stairs up to left
50 x 50 mm
ES1120

LLL Stairs up to right
50 x 50 mm
ES1121

LOW LOCATION LIGHTING
MINI SYMBOLS

Escape route forward left vertical
50 x 200 mm
ES2501

Escape route forward right vertical
50 x 200 mm
ES2502

Assembly station forward vertical
50 x 200 mm
ES2503

Fire extinguisher
50 x 50 mm
FS0001

Fire alarm call point
50 x 50 mm
FS0002

Fire hose reel
50 x 50 mm
FS0003

Unconnected fire hose
50 x 50 mm
FS0004

Fire hydrant
50 x 50 mm
FC0048

Material options:
- Transparent laminated vinyl
- SAFESIGN (PET-X)
- Acrylic

IMPLEMANTATION OF THE LOW LOCATION LIGHTING SYSTEMS

Signwell is your partner for newbuilding- and refurbishment projects world wide. We take care of the entire process. Everything from planning to realisation of Electrical powered or Photoluminescent Low Location Lighting Systems.

Our team will do the engineering and layout and produce the LLL in our production facilities, in order for us to adequately realise your deliveries and projects. We produce the LLL system by appropriate quality requirements, to endure the environment and desired life span. Our professional installation team specialized in Electrical (LED) Powered and Photoluminescent (PL) Low Location Lighting Systems, will take care of the implementation, and make sure that the 3L System is correctly installed.

Are you in need of a new system or in need for replacement of your old one? Contact our team today and get started.

3L-PL™
Low Location Lighting System Photoluminescent

3L-EP™
Low Location Lighting System Electrical Powered

LOW LOCATION LIGHTING INSTALLATION, MEASUREMENT AND CERTIFICATION

We are accredited by DNV to execute Low Location Lighting measurement services, our certification can be found on our website. As a vessel owner, you need to test all Low Location Lighting systems at least once every five years. Our engineers will test the luminance of your LLL systems on-board with fully certified test equipment. The photoluminescence measurement process as well as equipment are all certified by DNV.

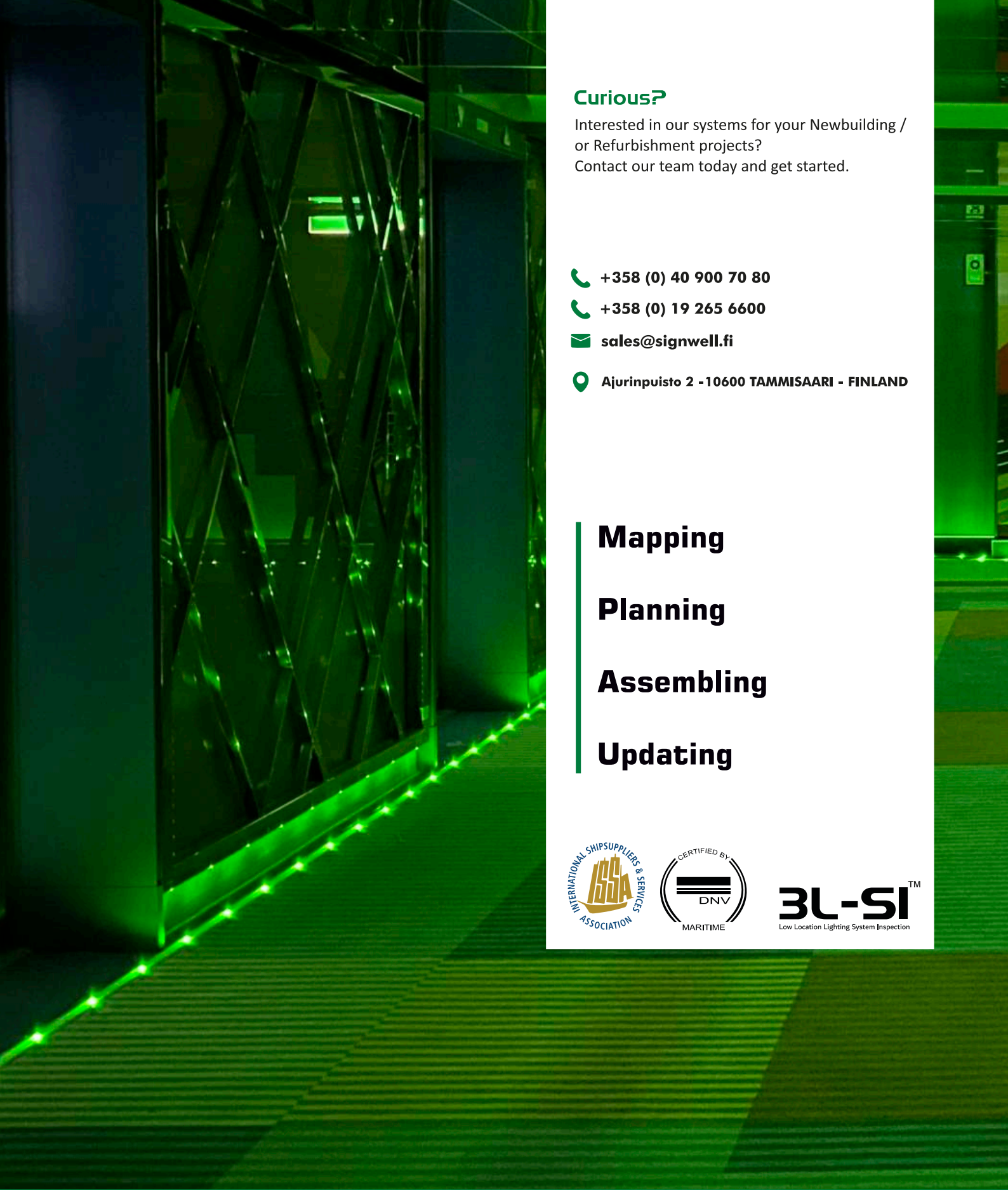
Examples of our low location lighting measuring services:

- Photo luminescent Low Location Lighting measurements and tests (DNV certified)
- Electric Low Location Lighting measurements and tests (DNV certified)
- Low Location Lighting refurbishment or replacement

Why are low location lighting measurements necessary?

According to several regulations, vessels that carry passengers are obligated to have a Low Location Lighting system installed. This could be a photo luminescent system as well as an electric system. A photo luminescent system is charged by the lighting on the vessel and will use the energy it collects to light up in the dark. The big advantage of this system is that there are no electric installations that need to be installed.

After Signwells **3L-SI**™, the Low Location Lighting System Inspection is done it will be finalized and the full report book will be handed over to the owner. SIGNWELLS **3L-SI**™ Report book includes the full measurement map containing all information needed and comes with instruction of how to maintain the system. If our engineers find anything worth to point out it will be written in the conclusion section.



Curious?

Interested in our systems for your Newbuilding / or Refurbishment projects?
Contact our team today and get started.

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+358 (0) 19 265 6600

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Mapping

Planning

Assembling

Updating

3L-SI™ Low Location Lighting System Inspection

Visit our website:
SIGNWELL.FI

SIGN & SAFETY SUPPLIER