LOW LOCATION LIGHTING

- Rules and regulations
- Light line PETX
- Aluminium profiles
- LLL inserts
- Other LLL products
- Engineering, measurements and LLL certification

RULES AND REGULATIONS

T-ISS is a specialist for Low Location Lighting Systems on Cruiseliners, ferries and all other ships carrying passengers, for both products and services.

Smoke, especially when spreading around, is one of the most dangerous consequences of a fire on-board and makes evacuation difficult and sometimes impossible. When this is the case, the reduced visibility can cause panic and jeopardize evacuation with an increased risk on intoxication or not to be able to find a safe place.

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/systems.

IMO Resolution A.752 (18)	Guidelines for the evaluation, testing and application of LLL on passenger ships
SOLAS Convention 2004	Means of escape - Marking of escape routes
European Directive 2002/25/EC	Safety rules and standards for passenger ships
ISO 15370	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
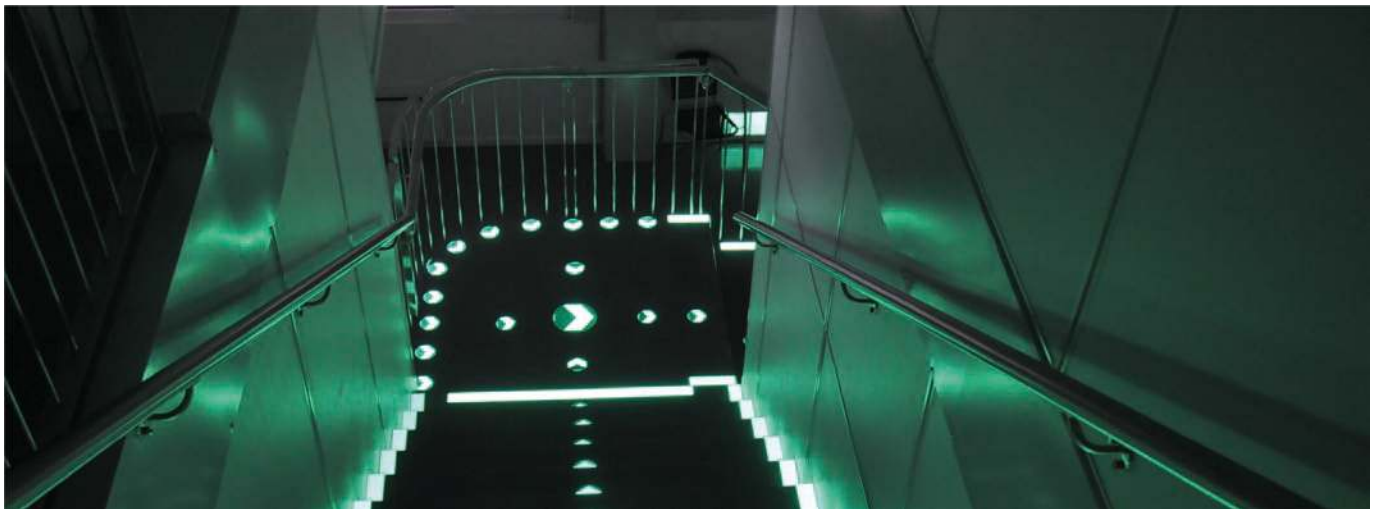
Rules and regulations

Rules and regulations details system requirements, of which below we highlight:
- The installed material must be Class/Wheelmark approved.
- All escape routes, including stairs, must be marked by LLL.
- Where stairs or corridors are more than 2m wide, LLL ships should be provided on both sides.
- 'Exit' signs should be provided at each exit, located on the same side as the door handle.
- Fire and watertight doors should be marked to show how the door opens.
- LLL lightning must be placed not more than 30cm above the deck at all points of the escape route.
- Systems must have their luminescence tested at least once every 5 years.

RULES AND REGULATIONS

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.

Luminance properties

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+

The mentioned value's according to IMO Res. A 752(18) in above table are applicable when the height of the photo luminescent LLL is 75 mm. For all other heights, the values need to be re-calculated as specified in IS015370:2010 Annex D. Below table show the minimum requirement for different heights.

Height of LLL system in mm	Luminescent intensity (mcd/m2) (After removing the existing light)	
	10 minutes	60 minutes
75 mm	15 mcd/m2	2 mcd/m2
55 mm	27,9 mcd/m2	3,7 mcd/m2
50 mm	33,8 mcd/m2	4,5 mcd/m2
40 mm	52,7 mcd/m2	7 mcd/m2
30 mm	93,75 mcd/m2.	12,5 mcd/m2
25 mm	135 mcd/m2.	18 mcd/m2

Innovation

T-ISS offers as the only manufacturer in the market SafeSign PET-X LLL photoluminescent strips, this innovative product offers the following benefits:

- Glossy finish
- Halogen Free
- UV resistant
- No end caps needed
- 10 years life expectancy
- 50% timesaving on installation
- Self adhesive backing

- PVC Free
- Easy to wipe clean
- Recyclable
- 10 year warrantee
- No shrinking

Benefits compared to 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

LIGHT LINE PETX

The LightLine LLL System is the easiest and most cost effective system to install, requiring only the application of the LLL strips where required, with its self adhesive backing. Cutting on required lengths can be done easily with a knife. The system is finalized by positioning the LLL signs at the appropriate places. LightLine Strips have a green lining which gives it a high class appearance and all LightLine strips come with an self adhesive backing. When installing the LightLine system, time saving up to 200% can be achieved. LightLine is DNVGL certified.

LightLine strips

LightLine strips have a standard lenght of 1 meter, 50 mm height and are produced with a luminescence XXL. All strips have a self adhesive backing for easy fixing during new build or refurbishment projects. LightLine strips are halogen-free and flame retardent and therefore exceeding all current requirements. Upon request we can manufacture LightLine strips in other heights and/or with other coloured marking stripes.

Order information		
Art. No.	Description	Size
LLLPETX	LLL strips with self-adhesive backing, XL	100 x 5 cm
LLL70PETGGE	LLL strips with self-adhesive backing, XXL green stripe	100 x 7 cm

ALUMINIUM PROFILES

LightLine LLL Profile System: is a system which comprises of an extruded aluminium carrier and rigid photo luminescent strips. Our standard is an angled, or flat profile with a 50mm wide visible strip. The performance of the rigid panels is certified by DNVGL.

Art.No.	Size:	Quality:	Description:
LLL Flat	300x5cm		LLL-50 aluminium profile flat (excl. inserts)
LLL Angle	300x5cm		LLL-50 aluminium profile with 12° angle (excl. inserts)
LLL PVC	100x5cm	XL	LLL strip XL PVC
LLL Alu	100x5cm	XXX	LLL strip XXX ALU
LLL PetX	100x5cm	XXL	LLL strip XXL
LLL PVC	100x7,5cm	XXL	LLL strip XXL
LLL50RA			Right end-cap for aluminium profile LLL50
LLL 50LA			Left end-cap for aluminium profile LLL50
LLL 50RF			Right end-cap for aluminium profile LLL50F
LLL 50LF			Left end-cap for aluminium profile LLL50F

We can also create other shaped LLL systems according to the demands of ship-owners, yards and architects, we will support you in finding the optimal solution in design and quality of the Low Location Light system for new-builds and refurbishments.

LLL INSERTS

LLL Angled Corner Profiles

Photoluminescent stairnoses for marking stairs in escape routes. Fixation: 1mm foamtape, 90 degrees angle.

LLLSTNM   Stairnosemarker pl antiskid 240 x 50 mm

PU guideline

The PU guideline is extremely flexible and can be used for the marking of stairs, stairnoses and contourmarking. It has an anti-slip surface and is resistant against most chemicals. It can be fixed with doublesided foam tape or glue.

Width: 40 mm, insertstrip 35 mm
Length: 10 m per roll
Afterglow: 10 min. 200 mcd/m²
                60 min. 28 mcd/m²
Decaytime: 2900 min.

LLL-11   Light Line - PU guidingstrip 40 mm x 10 m
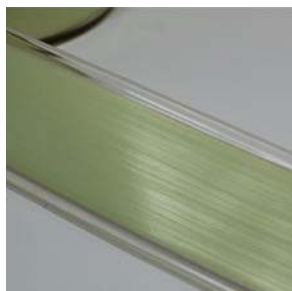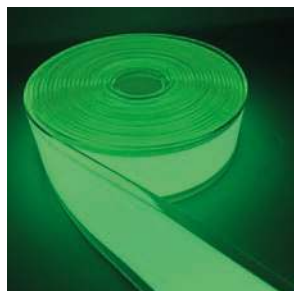
Anti-skid traildots

Photoluminescent aluminium traildots for marking routes with or without arrow. In diameter 90 mm or 200 mm. With self-adhesive backing.

Also available: a special mounting bracked designed for anti-skid traildots to fix on metal staircases.
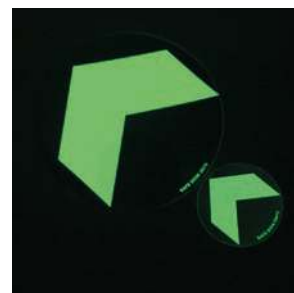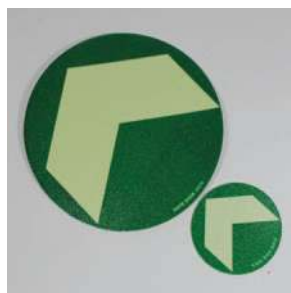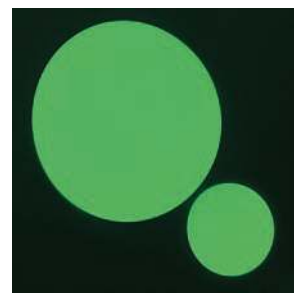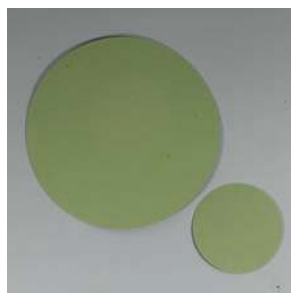
Article No.	Description
LLLDOTS90B	LLL traildot antiskid 90 mm
LLLDOTS200B	LLL traildot antiskid 200 mm
LLLDOTS90A	LLL traildot antiskid 90 mm arrow
LLLDOTS200A	LLL traildot antiskid 200 mm arrow

OTHER LLL PRODUCTS

Article Number	Description	Quality	IMPA	ISSA
ET-4N	LLL Tape neutral 40 mm x 10 m	Quality 200	33.2014	47.520.14
ET-8N	LLL Tape neutral 80 mm x 10 m	Quality 200	-	-
ET-4NB	LLL Tape neutral 40 mm x 10 m	Quality 100	33.2014	47.520.14
ET-8NB	LLL Tape neutral 80 mm x 10 m	Quality 100	-	-
ET-4NC	LLL Tape neutral 40 mm x 10 m	Quality 50	33.2014	47.520.14
ET-8NC	LLL Tape neutral 80 mm x 10 m	Quality 50	-	-
ET-4A	LLL Tape arrow 40 mm x 10 m	Quality 200	-	-
ET-8A	LLL Tape arrow 80 mm x 10 m	Quality 200	-	-
ET-4AB	LLL Tape arrow 40 mm x 10 m	Quality 100	-	-
ET-8AB	LLL Tape arrow 80 mm x 10 m	Quality 100	-	-
ET-4AC	LLL Tape arrow 40 mm x 10 m	Quality 50	-	-
ET-8NC	LLL Tape arrow 80 mm x 10 m	Quality 50	-	-
ET-4L	LLL Tape escape dir. 40 mm x 10 m	Quality 200	33.2024	47.520.24
ET-8L	LLL Tape escape dir. 80 mm x 10 m	Quality 200	-	-
ET-4LB	LLL Tape escape dir. 40 mm x 10 m	Quality 100	33.2024	47.520.24
ET-8LB	LLL Tape escape dir. 80 mm x 10 m	Quality 100	-	-
ET-4LC	LLL Tape escape dir. 40 mm x 10 m	Quality 50	33.2024	47.520.24
ET-8LC	LLL Tape escape dir. 80 mm x 10 m	Quality 50	-	-
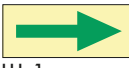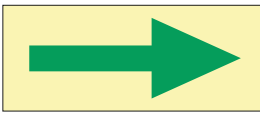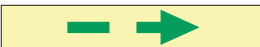
* Please note; this tape is delivered with 10 stickers "left" and 10 stickers "right" to be installed where needed

Low location light route marking

Stickers to mark your LLL system according to ISO 24409-2:2014.

Escape route left — LLL-10/1 10x5 cm ISSA 47.523.82 IMPA 33.2382
Escape route right — LLL-10/2 10x5 cm ISSA 47.523.83 IMPA 33.2383
Fire extinguisher — LLL-10/9 10x5 cm
Fire alarm — LLL-10/10 10x5 cm
Assembly point left — LLL-10/3 10x5 cm ISSA 47.523.80 IMPA 33.2380
Assembly point right — LLL-10/4 10x5 cm ISSA 47.523.81 IMPA 33.2381
Fire hose reel — LLL-10/11 10x5 cm
Arrow 45° — LLL-15 5x5 cm
Assembly point — LLL-14 5x5 cm
Arrow small — LLL-1 15x5 cm
Arrow long — LLL-21 30x5 cm
Running man left — LLL-13 5x5 cm
Running man right — LLL-10/12 5x5 cm
Arrow big — LLL-7 25x9 cm
Arrow long - breaks — LLL-22 30x5 cm
Stairs right up — LLL-10/5 10x5 cm
Stairs left up — LLL-10/6 10x5 cm
Stairs vertical left — LLL-10/7 5x15 cm ISSA 47.523.87 IMPA 33.2387
Stairs vertical right — LLL-10/8 5x15 cm ISSA 47.523.86 IMPA 33.2386