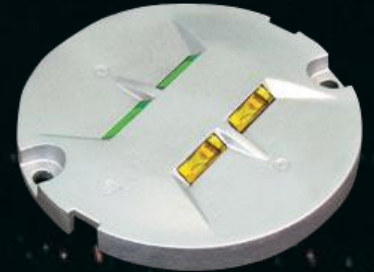


Airfield Lighting

Product Description

8" SafeLED and SafeLED IQ Inset Light
(SL-TC-I; SL-SB-I)

- Taxiway Centre Line
- Lead-on/Exit Taxiway
- Stop Bar
- Intermediate Holding Position
- Aircraft Stand Manoeuvring Guidance



Note: *This page is blank for convenient double-sided printing.*

1. INTRODUCTION

SafeLED and SafeLED IQ - the all in one revolution

The SafeLED range is a bi- or unidirectional low projection light-emitting diode (LED) inset light is available in three versions:

- **SafeLED** – a LED light with integrated fail open technology and backwards compatible with CCR operated halogen/incandescent inset lights.
- **SafeLED IQ** – a SafeLED with additional and integrated intelligence (IQ) in a built in converter for individual monitoring and control, based on Safegate ASP - SafeControl technology Individual Light Control and Monitor System (ILCMS).
- **SafeLED IQ Ready** – SafeLED IQ where the IQ functionality is temporarily disabled. Remote activation of IQ functionality is supported.

Note: *SafeLED IQ and SafeLED IQ Ready inset lights do not include fail open functionality, as they are installed in an ILCMS system which provides the same functionality.*

Feature	SafeLED IQ	SafeLED IQ Ready	SafeLED
Integrated fail open	-	-	Yes
2A operation (2A) ¹	Yes	Yes	-
Wake on circuit ²	Yes	Yes	-
Reinforced prism	Optional	Optional	Optional
Connector	Single	Single	Single or dual
Height of base (minimum)	100 mm	100 mm	100 mm

¹ Integrated support for fixed low current (2A) operation with intensity setting by command.

² Integrated wake on circuit functionality for remote SafeLED IQ fixture software updates.

Utilisation

- Taxiway Centre Line
- Lead-on/Exit Taxiway
- Stop Bar
- Intermediate Holding Position
- Aircraft Stand Manoeuvring Guidance

Compliance

- ICAO: Annex 14 Volume I Paragraphs 5.3.17, 5.3.20, 5.3.21, 5.3.27 for use in CAT I, II, III
- FAA: L-852C/K AC150/5345-46D
- IEC 61827
- NATO: STANAG 3316
- STAC

2. MAIN ADVANTAGES

2.1 SAFELED AND SAFELED IQ SPECIFIC ADVANTAGES

LED Source

The LED technology offers a long lasting light source, low power consumption depending on operation, a technology which is environmentally friendly and robust to vibration. By using SafeLED the maintenance cost, of light fittings and airport operation interruptions, is dramatically reduced.

LED technology secures a future proof Airfield Lighting (AFL) investment and removes the uncertainty of the proposed international phase out regulations for the traditional incandescent lamps.

Compact Design

The fitting has a low projection height of 6.35 mm (1/4") without any negative slope in front of the prisms. This gives the same performance in dry and rainy conditions. The fitting is designed to fit into low shallow 100 mm bases.

Robustness

SafeLED is designed for use in harsh environments. The electronic components are encapsulated in waterproof polyurethane, well protected from wear and tear. Castings are anodised and fixings are stainless steel. Component life cycle is dramatically extended and its operational lifespan is greatly increased. There is also an inbuilt over-voltage surge and lightning protection.

Mixed Circuit Compatibility

Compatible with incandescent halogen lights on CCR circuits (6.6A). The LED fitting follows the same light intensity curve as a halogen lamp. This allows mixed circuits with halogen and LED fittings. There is no need for updating previously installed AFL infrastructure when installing SafeLED.

CCR Compatibility

The SafeLED works as a halogen lamp with a resistive load profile. When turning on a Constant Current Regulator (CCR), the CCR does not trip as the current does not fluctuate with SafeLED technology.

Fail Open Technology

The LED fitting includes fail open technology providing functionality that allows a CCR to detect LED lamp failure. (SafeLED only)

Long Life Prisms

A LED fitting and the prisms do not heat up as much as a traditional halogen lamp fitting. For this reason chemical waste and dust from the airfield do not fasten to the prisms to the same extent as a fitting with a higher operating temperature.

To further prolong the lifetime of the fitting, a reinforced prism can be supplied as an option. The reinforced prism withstands higher operational mechanical stress compared to standard prisms.

2.2 SAFELED IQ SPECIFIC ADVANTAGES

2A Concept Based Features

The 2A concept provides high efficiency features. With remarkable power savings and strongly increased flexibility in the airfield lighting system, the 2A concept gives both economic and environmental benefits, regardless if it is a new or existing installation.

By setting the CCR at a low constant current, the ASP-SafeControl manages the intensity level of every single SafeLED IQ fitting. In traditional installations the power losses in the primary and secondary cabling increase when the CCR current steps up. With a CCR that is constantly running at a low current the power losses in the cabling system are minimized.

In a 2A system the SafeLED IQ fittings could have different light intensity levels in the same circuit, which is a major benefit when combining different lamp functions in the design of the series circuit. Due to this the costs for new cabling are decreased.

The 2A concept could be implemented in existing systems and there is no need to upgrade CCRs or isolation transformers.

Addressable Light Control

The SafeLED IQ communicates over the series circuit using a unique power line communication technique developed by Safegate Group. The SafeLED IQ on command either turns on or off or flashes the LED. The SafeLED IQ also indicates the status of the light back to the system.

Automatic Light Monitoring

Every electrical component in the fitting is monitored. If a fault is detected, the ASP-SC system creates an alarm to the appropriate organisation depending on if it is a critical or non-critical alarm. This increases the efficiency of the maintenance work and system users can focus on the operational aspects of running the airport.

Reduced Earthing Problems

The light control unit is well encapsulated inside the SafeLED IQ fitting. The integration of the light control unit minimizes earthing problems by reducing the amount of connectors with fewer problems and less corrective maintenance, which ensures a reliable application performance.

High Design Flexibility

The segmentation of lights into selectively controlled blocks is made in software, and not by means of cables and CCRs or selector switches. This reduces the installation and hardware costs substantially and at the same time increases the flexibility of the operational design of the airfield lighting system. A segment can easily be redefined or added in the software.

Continuous Control and Monitoring

One and the same series circuit cable is used for both power transfer to the SafeLED IQ lamp on the circuit and for data communication for the ASP-SC system. This implies that whenever there is power available to the lamps, the ASP-SC system has access to its communications channel and control and monitoring is available. No extra communication cables or connectors are needed and that minimizes maintenance and maximizes reliability.

Easy Installation

The electrical requirements when installing a SafeLED IQ in an ASP-SC system are the same as for a light fitting or an isolation transformer¹.

Installation of this type of system, SafeLED IQ in an ASP-SC System, does not include any additional constraints and there is no conflict with electrical safety code and general or local standards.

SafeLED IQ is delivered as a pre-programmed unit with field position information and monitor/control parameter settings. The parameter settings can easily be updated remotely from the sub-station in a fitting in the airfield using the **Wake On Circuit** function or in a workshop during maintenance.

SafeLED IQ Ready is delivered without the IQ functionality switched on. This is primarily in situations where the IQ functionality is not required and future control and monitoring is anticipated. An installed SafeLED IQ Ready fitting supports

Wake On Circuit (remote activation from sub-station) activation when an upgrade to full functionality is required.

Minimized Sudden Load Changes

The SafeLED IQ with ASP-SC system minimizes sudden load changes, experienced by the CCR, on the circuits. This feature does not decrease system response times. This feature also increases CCR, lamp and field unit life time.

Low System Response Times

The SafeLED IQ fitting and the ASP-SC system is built to meet operational response times. The response time for a command to be executed, such as a stop-bar command, is less than one second from the time a button is pushed /a function is selected until the light is switched on.

¹ Safegate has a set of general recommendation or preferences regarding for example cable routing, which may be applied in case a new series circuit is to be designed.

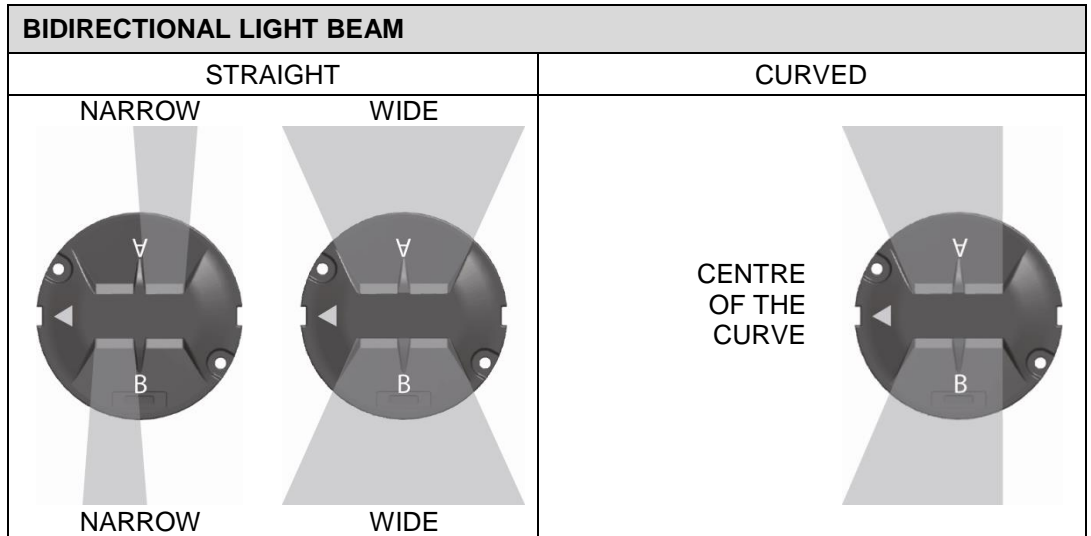
3. TECHNICAL CHARACTERISTICS

Characteristic	Symbol	Min	Max	Unit
Series Circuit				
Supply current from series circuit (50/60Hz)	I _{SUPPLY}	2.5	7.1 ¹ 8.2 ²	A _{RMS}
Output				
LED wattage unidirectional fitting @ 6.6 A _{RMS}	P _{LED}	2.5 ³	5.0	W
LED wattage bi-directional fitting @ 6.6 A _{RMS}	P _{LED}	5.0 ³	10.0	W
Power consumption				
Total power consumption unidirectional fitting @ 6.6 A _{RMS}	P _{fit}	9.0 ³	14.0	W
Total power consumption bi-directional fitting @ 6.6 A _{RMS}	P _{fit}	10.0 ³	19.0	W
Environment				
Operating humidity range	RH	0	100	%
Operating temperature range, IQ mode not in use	T _A	-55	+80	°C
Operating temperature range, IQ mode in use	T _{AIQ}	-30	+75	°C
Storage temperature range	T _{STG}	-55	+80	°C
Power Supply	An integrated, encapsulated 6.6A electronic converter. Two-pole FAA plug(s) for connection to one (or two) transformer(s). Power Factor (PF) type 0.95 – 0.99 (depending on operation) MTBF > 500 000 h @ 25 C ambient temperature.			
Optics	Equipped with 2, 4 or 8 LEDs ⁷ . No colour filters required, colours obtained directly by the LED in compliance with standards.			
IQ functionality	Programmable intelligence in the converter. Remote identification (wake on circuit) for individual light monitoring and control.			
Finish	External parts made of anodised aluminium alloy casting. All fixings and fastenings in stainless steel.			
Protection	IP 67			
CCR detection	Open secondary failure mode (SafeLED only).			
Dimensions	Projection: 6.35 mm (1/4"). Diameter: 203 mm (8").			
Net Weight	3.5 kg			
Packaging	Volume: 0.006 m ³ . Dimensions: 255 x 235 x 100 mm.			
<i>Key</i>	<i>Description</i>			
1	In accordance with FAA advisory circular 150/5345-47A (Isolation transformers for airport lighting systems).			
2	For max 1s, in accordance with FAA advisory circular 150/5345-10E (Specification for CCRs and regulator monitors).			
3	For narrow straight light beam.			
4	The IQ mode is the ASP-SC power line communication, which only operates if the SafeLED IQ has been configured for that, and an ASP-SC system is available.			
5	Ambient temperature inside the hand hole or where the inset light is installed.			
6	If the IQ functionality is operated above the specified temperature range, the IQ functionality will gradually be shut down to reduce power losses. The operational consequences will be that the SafeLED IQ can sporadically report false LED-failure status. It is still possible to command the SafeLED IQ ON/OFF.			
7	Lifetime LED depending on operation.			
Note: For more information, contact Safegate Group or see www.safegate.com .				

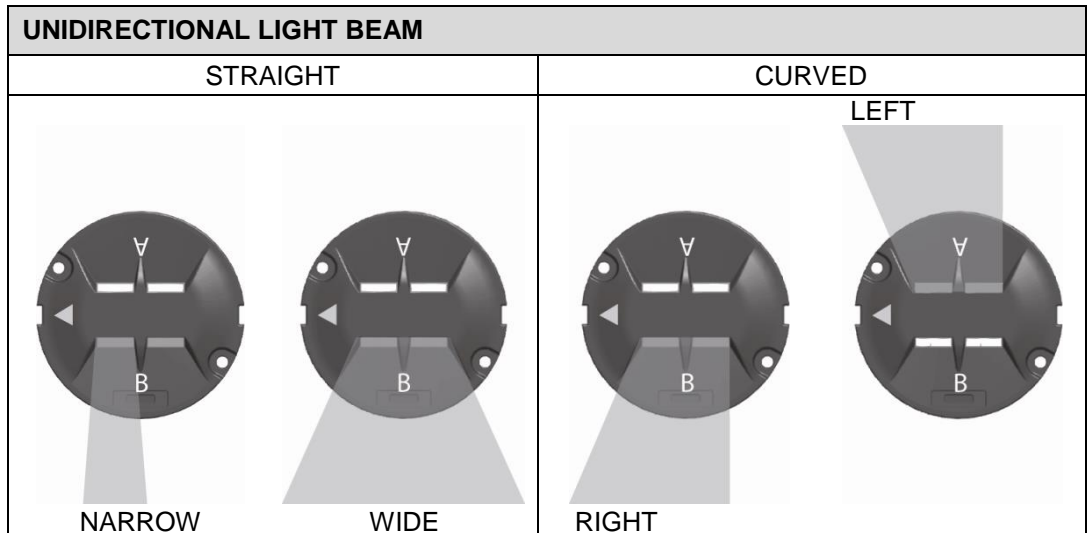
4. LIGHT BEAM TYPES

The inset light fittings are equipped with different prisms which achieve the different light beams: narrow, wide and curve. The drawings below show the different types of light beam, which correspond to the different types of fitting.

Note: In order to assist with the installation of the fitting in its base in Curved Sections (with curved prisms), the top of the fitting is marked with an arrow which must always point to the Centre of the Curve.



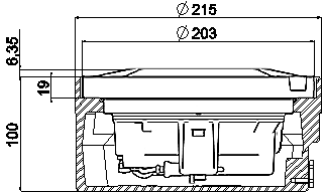
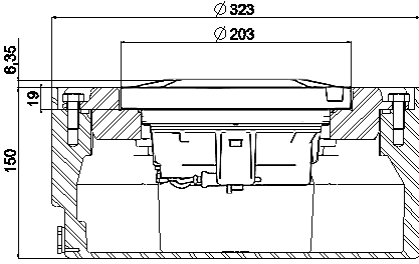
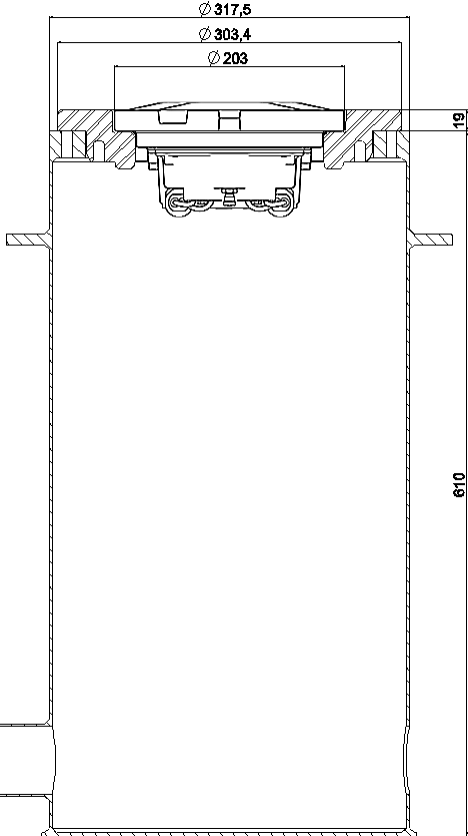
Note: For narrow, one window per side is used.



Note: For narrow, one window per side is used.

5. INSTALLATION OPTIONS

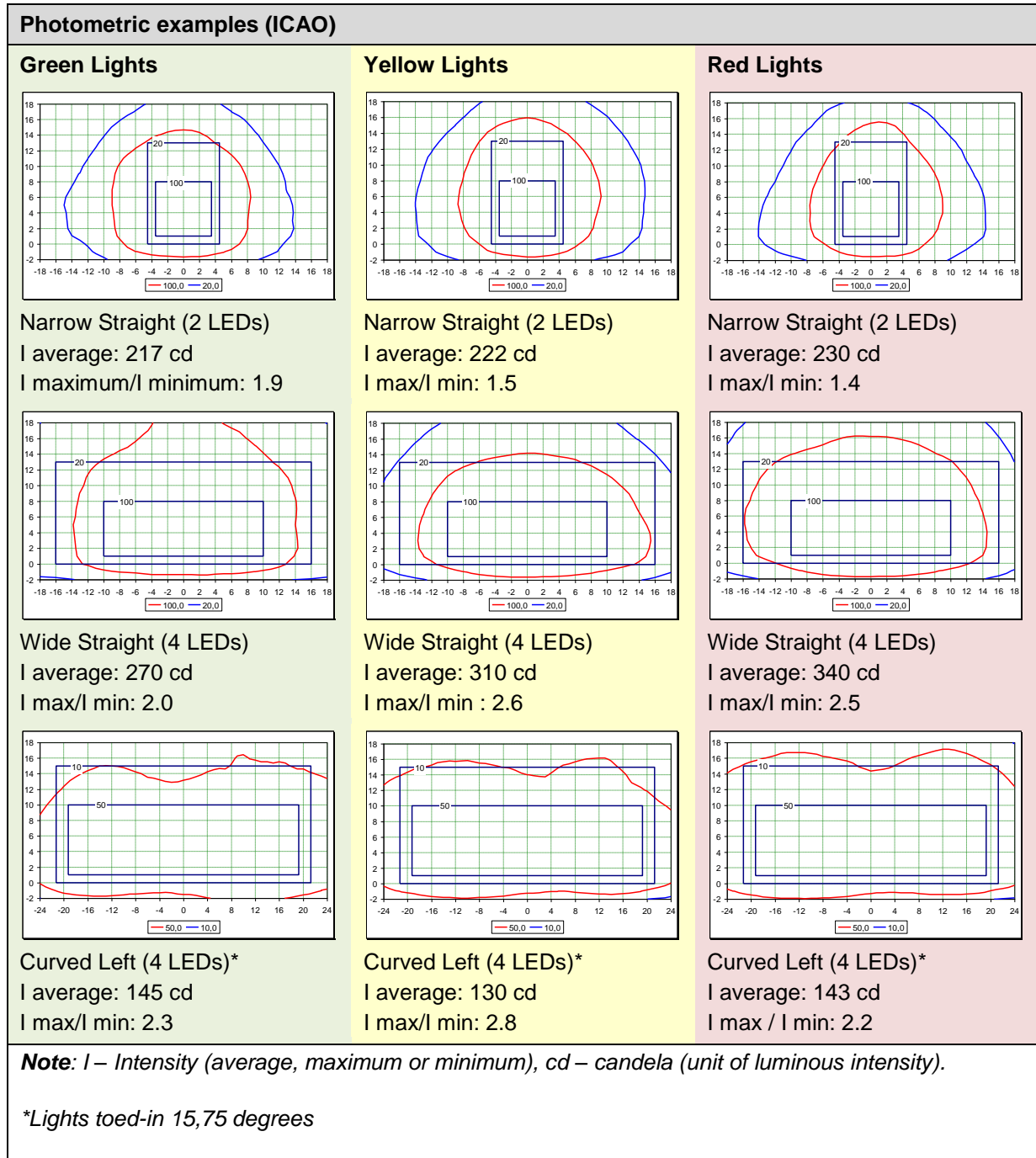
The light fixture can be installed on different supports as follows (All configurations are compliant with ICAO Annex 14 Volume I Paragraph 5.3.22 Configuration A, High Intensity):

Description	Image examples
<ul style="list-style-type: none"> On an 8" shallow base minimum height 100 mm with side or bottom entry for the cable. Note: Contact Safegate Group for advice regarding selection of a suitable 8" base. 	
<ul style="list-style-type: none"> On a 12" base with side or bottom entry and an adapter ring 12" - 8". 	
<ul style="list-style-type: none"> On an FAA L-868B deep base using an adapter ring. 	
<p>Note: The inset light supports bases with two anti-rotation pins.</p>	

6. PHOTOMETRICS

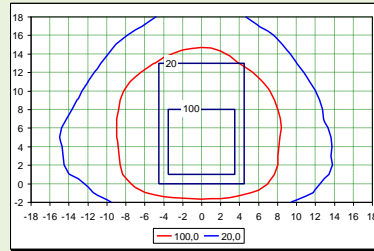
The inset light is a bi-/unidirectional very low projection inset LED light.

This section includes photometric examples of different light configurations according to standards (ICAO and FAA).

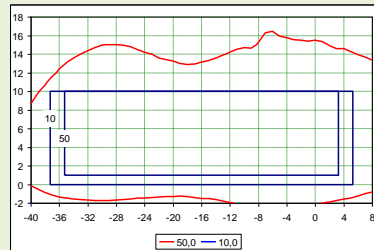


Photometric examples (FAA)

Green Lights

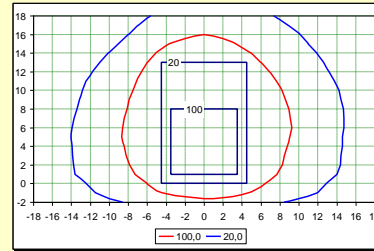


L852C (2 LEDs)
 I average: H line 300 cd,
 V line 300 cd

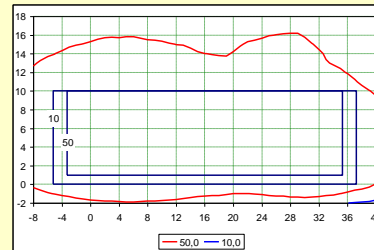


L852K (4 LEDs)*
 I average: 180 cd

Yellow Lights



L852C (2 LEDs)
 I average: H line 360 cd,
 V line 360 cd



L852K (4 LEDs)*
 I average: 145 cd

Note: I – Intensity (average, maximum or minimum), cd – candela (unit of luminous intensity), H – Horizontal, V - Vertical.

*Lights toed-in 15,75 degrees

7. DESIGN

Components	SL-TC-I; SL-SB-I
Top plate ¹	
Prism gasket ²	
Blank plug ³	
Prisms ⁴	
Protection plate ⁵	
LED board holder ⁶ including screws and washers	
Housing gasket ⁷	
Housing assembly ⁸ including cable(s), rubber compression seals, valve and screws.	
Converter ⁹	
Base gasket ¹⁰ (O-Ring)	
<p>Note: Component availability or design may be subject to change due to unforeseen circumstances. This document is subject to change or new information from Safegate Group, as and when available or if required.</p>	

8. ORDER CODES

The table below is a guide to order codes for an inset light fitting with **X** representing the available component parts.

It is important to consider the correct isolation transformer for fittings depending on the configuration.

Ordering Code	Components	X	X	X	X	X	X	X	X	X
SafeLED	-									
SafeLED IQ										
Disabled (Ready)	IQ0									
Enabled	IQ1									
Location										
Stop bar	SB									
Taxiway Centreline	TC									
Fitting										
Inset	I									
Type										
Unidirectional	U									
Bi-directional	B									
Light beam(s)										
Narrow	N									
Wide	W									
Curved (bi-directional)	C									
Curve Right * (B-side)	R									
Curve Left * (A-side)	L									
Extra wide**	D									
Note: * Only for Unidirectional. ** Used for yellow aircraft stand manoeuvring guidance light										
Prism										
Standard or	S									
Reinforced	R									
Colour(s)										
Green and/or	G									* B-side
Yellow and/or	Y									
Red	R									* A-side
Note: Only one colour is required for Unidirectional. * For more information, see information on page 6.										
Connection to isolating transformer(s)										
1 Connector or	1C									
2 Connectors	2C									
Additional										
Shallow base and Adapter ring. Isolation transformer, depending on the configuration. For more information, contact Safegate Group or see www.safegate.com .										

9. SPECIFICATION

SL-TC-I; SL-SB-I include numerous technical benefits:

- Taxiway centre line and stop bar inset LED light.
- Monitors LED lamp status. (Integrated Fail Open technology/SafeLED only)
- Acts like a halogen lamp and does not pulsate due to resistive load.
- 6 mm elevation point, only.
- Reinforced prism with 5 times longer life time (option).
- No negative slope (dirt advert design).
- Over voltage surge and lightning protection.
- *All-in-one* integrated and moulded electronics with a connector.
- An easily replaced prism.
- Backwards compatible with halogen lamps on CCR series circuit.
- A bi-directional design that allows for separate lighting of the directions.
- Photometrics and colours in compliance with recommendations in ICAO Annex 14 Volume 1.
- Can be powered by an isolating transformer on a standard 6.6 A AGL primary loop, due to the internal converter in the fitting.
- All external parts are made of anodised aluminium alloy casting.
- All fixings and fastenings are stainless steel.
- The fitting has a maximum outer diameter of 203 mm (8").
- The weight of the fitting is less than 3.5 kg.
- The fitting is installed directly on an 8" shallow base minimum 100 mm, or in a Thorn AFL adapter ring on a FAA L-868B deep base.
- The fitting is designed to allow easy maintenance.

SafeLED IQ specific features:

- 2A concept with remarkable power savings.
- Individual monitoring and can detect adjacent and critical lamp failure as per ICAO requirements.
- Individual intensity control.
- Defines segments in software and not by cable and CCR (not limited to one segment per circuit).
- Allows flexible routing.

Compliance:

- ICAO: Annex 14 Volume I Paragraphs 5.3.17, 5.3.20, 5.3.21, 5.3.27 for use in CAT I, II, III
- FAA: L-852C/K AC150/5345-46D
- IEC 61827
- NATO: STANAG 3316
- STAC

Note: *All descriptions and photometric characteristics in this publication present only general particulars and shall not form part of any contract. The right is reserved to change them without prior notification.*

Note: *This page is blank for convenient double-sided printing.*

Check in to the future

How many aircraft can your airport handle today?
Can this number be increased without adverse effects on the airport's safety level?
It is a known fact that traffic volume will rise in the foreseeable future. More movements will demand monitoring of the entire airport. Requirements will be sharpened and the development of an integrated system

controlling not only ground movements but also air traffic close to the airport is of the highest interest.
The International Civil Aviation Organization (ICAO) already describes A-SMGCS, Advanced Surface Movement Guidance and Control System, as the answer to the future modern airport need to control the entire airport space in one superior system.

To a larger extent than today's systems, A-SMGCS will rely on automated processes to give both pilots and traffic controllers exact information about positions and directions. Safegate Group delivers complete A-SMGCS solutions already, as well as all vital parts relating to it. Safegate Group can check your airport into the future – today!



Safegate Group HQ
Djurhagegatan 19
SE-213 76 Malmö, Sweden
Phone: +46 (0)40 699 17 00
Fax: +46 (0)40 699 17 30
E-mail: market@safegate.com

Australia
australia@safegate.com
+61 (0)3 9720-3233

Austria
office@avibit.com
+43 316 429961

Brazil
brazil@safegate.com
+55 11 2137 4405

China
china@safegate.com
+8610-85275297

Dubai
dubai@safegate.com
+971 4 452 75 75

Finland
finland@safegate.com
+358 (0)20754 7700

France
france@safegate.com
+33 (0)1 42 99 60 40

Germany
germany@safegate.com
+49 (0)4121 464 303

India
india@safegate.com
+91 11 4106 1545

Malaysia
malaysia@safegate.com
+60 32 011 3522

Qatar
qatar@safegate.com
+974 436 9628

Russia
russia@safegate.com
+7 495 917 4614

Singapore
singapore@safegate.com
+65 6289 6893

Spain
spain@safegate.com
+34 917 157 598

UK
uk@safegate.com
+44 (0)208 573 0384

USA
usa@safegate.com
+1 763 535 92 99

THORN
Airfield Lighting

IDMAN

avibit
AIR TRAFFIC SOLUTIONS

SAFEGATE
GROUP 

Safegate Group offers solutions for increased safety, efficiency and environmental benefits to airports worldwide. The company was founded in 1973 and has its headquarters in Malmö, Sweden. Safegate Group has more than 70 partners around the globe in order to be close to its customers. Earlier members of Safegate Group include Thorn AFL and Idman, who both have over 40 years of experience in airfield lighting solutions for airports and heliports. The latest member of Safegate Group is Avibit, a leading provider of next generation software applications and integration of efficient air traffic control systems. Safegate Group's complete range of products and services, a "one-stop shop", provides solutions to customers and airborne travellers around the globe.

www.safegate.com