

Airfield Lighting

Manual

12" Unidirectional High-Intensity Inset Light (IDM 4351)

- Threshold
- Runway End



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MANUAL
12" UNIDIRECTIONAL HIGH-INTENSITY INSET LIGHT
(IDM 4351)
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Documentation

This document includes Airfield Lighting information with a focus on safety, installation and maintenance procedures.

For more information, see www.safegate.com.

Note: *It is very important to read this document before any work is started.*

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History

Version	Date	Description
1.0	January 2011	First Release
1.1	March 2014	Second Release

Note: *This page is to be updated with every authorised change to the document.*

Abbreviations and Terms

This document may include abbreviations and terms.

Abbreviation	Term
CAA	Civil Aviation Authority
CCR	Constant Current Regulator
CU	Concentrator Unit
FAA	Federal Aviation Administration
ICAO	International Civil Aviation Organization
IEC	International Electrotechnical Committee
LED	Light Emitting Diode
LMS	Light Monitor and Switch unit
NATO	North Atlantic Treaty Organization
STAC	Service Technique de l'Aviation Civile (France)
STANAG	Standardization Agreement (NATO)

1. INTRODUCTION

In this section you can find a general description and safety instructions related to the installation and usage of the fitting.

IDM 4351 is a 12" unidirectional high-intensity inset light.

The fitting has many advantages and special features:

- Low protrusion construction only half of the allowed height.
- Ease of installation and maintenance brought even further with optional tools.

1.1 SAFETY INSTRUCTIONS

Make sure you read this section and are familiar with safety precautions before any work is started.

1.1.1 Product Safety

Airfield lighting fixtures in a constant current circuits are connected in a circuit via isolating transformers with currents between 2.0 – 6.6A in the primary circuits.. The primary voltages, depending on the circuitry, are usually several kilovolts and therefore lethal. Although the open circuit voltages of the isolating transformers are much lower, the peak voltage while opening the secondary circuit under current is also hazardous. So it is vitally important to follow all the safety regulations with adequate circumspection.

In the design of this equipment all the practical safety aspects have been taken into account. It is also important to strictly follow existing international or national regulations, the instructions established by civil aviation authority or airport operator and the following instructions.

1.1.2 Electrical Maintenance

Valid safety regulations must always be followed. Never carry out any maintenance or maintenance measures before the current is confirmed as safely disconnected. Use extreme caution when disconnecting or connecting high voltage primary connectors.



WARNING! PRIOR TO THE COMMENCEMENT OF WORK ALL ELECTRICAL SERVICES MUST BE ISOLATED FROM THE SUPPLY AND CONNECTED TO EARTH. FULL DETAILS OF THE WORK INVOLVED MUST BE GIVEN TO THE AUTHORISED PERSON RESPONSIBLE FOR THE ELECTRICAL ENGINEERING SERVICES AT THE AIRPORT WITH REGARD TO THE DURATION OF THE WORK AND SO ON. IT IS RECOMMENDED THAT PRIOR TO STARTING ANY CUTTING WORK, THE NATURE AND LOCATION OF SERVICES SUCH AS CABLE DUCTS AND THE LIKE SHOULD BE IDENTIFIED. ANY INSTALLATION OR MAINTENANCE WORK SHOULD ONLY BE CARRIED OUT BY TRAINED AND EXPERIENCED PERSONNEL. ALSO, WHEN WORKING ON CIRCUITS USING AIRFIELD SMART POWER SYSTEM (ASP) THE SCM MUST BE TUNED OFF.

1.1.3 Mechanical Maintenance

When maintaining mechanical components, it is important to follow the instructions for electrical maintenance.

WARNING! IT IS STRONGLY RECOMMENDED TO DEPRESSURIZE THE LIGHT BEFORE OPENING FOR MAINTENANCE. IT IS IMPORTANT TO UNDERSTAND



THAT OPENING A PRESSURIZED LIGHT CAUSES THE LIGHT HALVES TO SEPARATE AT HIGH SPEED, AND MAY CAUSE PERSONAL INJURY AND DAMAGE THE LIGHT.

THE LIGHTS ARE DESIGNED TO WITHSTAND INTERNAL PRESSURE OF 1.5 BAR. IT IS NOT ALLOWED TO EXCEED 1.5 BAR OF PRESSURE IN ANY CIRCUMSTANCES. FOR THIS REASON, IT IS NOT ALLOWED TO OPEN THE INNER COVER USING COMPRESSED AIR, AS THIS MAY CAUSE PERSONAL INJURY AND DAMAGE THE LIGHT.

1.2 DESCRIPTION OF THE FITTING

IDM 4351 is a 12" unidirectional high-intensity inset light.

The lights are designed according to airfield placement and functionality.

Overview of lights			
Light	Colours	Power	Description
IDM 4351	Green (G)	2 x 105W	Threshold, No toe-in
			Threshold, Toe-in 3,5° right
			Threshold, Toe-in 3,5° left
	Red (R)	105W	Unidirectional runway end light

For more information, see www.safegate.com.

1.3 DELIVERY OF THE FITTING

Each unit is supplied completely assembled, tested and sealed, ready for installation. The electrical connection is made via one cable assembly; the cable is equipped with an FAA L-823 Style 6 plug.

Each unit is individually packed in a durable cardboard box, labelled with its reference name and code.

2. INSTALLATION

In this section you can find a description the different steps for successful installation of the fitting. Before you start, make sure you have read and understand §1.1 Safety Instructions.

When removing the fitting from its packaging box, check that nothing is broken.

The screw tapping of the frangible support can be either 2 in. NPS (American standard - 11.5 threads per inch) or 2 in. BPS (British standard - 11 threads per inch). Check support and base tapings fit.

Inset lights are installed in base receptacles that are stationary installed on the field.

There are many different installation practices that can be adopted for bases; detailed instructions on how to carry out the installation can be found in manuals for the specific base.

For correct light location, it is recommended to read and comply with the following:

- ICAO: Annex 14 Volume I 5th edition 2009
- FAA AC 150 / 5345 – 46D
- All drawings and design plans, for the particular project, to guarantee correct location for each fixture.

The following tools and accessories are required for installation and removal of the unit:

Standard tools and accessories:

- Lifting hooks
- Torque wrench, socket 17mm

The base option for 12" fittings has following dimensions: outer diameter is 326 mm and height is 150 mm.

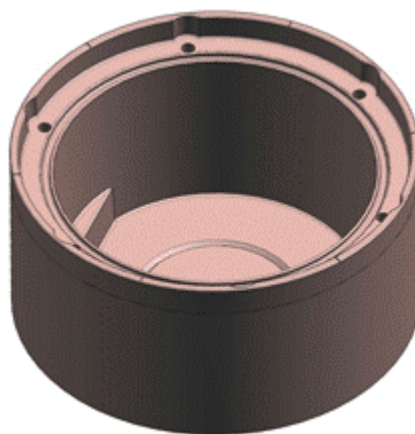


FIGURE 1 - BASE FOR 12" INSET LIGHTS

The installation steps refer to:

1. Mounting the fitting in the base

2.1 MOUNTING THE FITTING IN THE BASE

- (a) Check and clean the contact surface of the base receptacle, especially the groove for O-ring gasket.
- (b) Place the O-ring gasket to the groove in the base receptacle and connect the secondary connectors.
- (c) Using lifting hooks, place the luminaire to the base receptacle. Make sure that the O-ring gasket and cable settle well into the base.
- (d) Align light channels parallel to aiming grooves in base receptacle.
- (e) Fasten the bolts M10x25 by hand. By using a torque wrench, fasten the bolts gradually crosswise in a sequence to a torque of **40 Nm**.

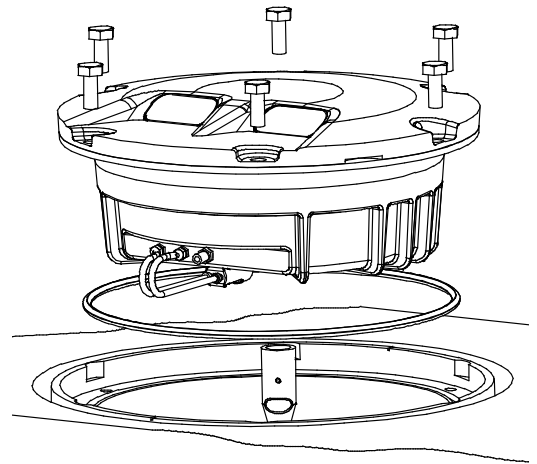


FIGURE 2 – LIGHT INSTALLATION

3. MAINTENANCE

In this section you can find a description of the different steps for the maintenance of the fitting.

Before you start, make sure you have read and understand §1.1 Safety Instructions. Find out the location of the light unit that needs maintenance. If the purpose is to replace an existing light unit with new one, make sure that corresponding unit is available.



WARNING! WHEN A FITTING HAS BEEN REMOVED FROM ITS BASE, THE BASE MUST BE EITHER FITTED WITH A COVER OR A RESERVE FITTING PUT IN ITS PLACE.

IT IS RECOMMENDED THAT ONLY AUTHORIZED PERSONNEL DISASSEMBLE FITTINGS WITH PRIOR AGREEMENT FROM SAFEGATE.

3.1 BASIC MAINTENANCE PROGRAMME

There are recommended maintenance tasks to ensure that the equipment is in correct operating condition.

Maintenance tasks	
Weekly	<ul style="list-style-type: none">• Visual inspection of the fitting.• Removal of dust from external surfaces of the fitting.
Monthly	<ul style="list-style-type: none">• Check of the optical window, check for mechanical damage.• Check for proper fixing of the fitting in its base.
Yearly	<ul style="list-style-type: none">• Detailed inspection of the fitting.• Check of the body resistance, check for mechanical damage (for example cracks around prism windows).• Clean of the optical windows.

A daily function check is referred to in the document:
ICAO, Airport Services Manual Part 9, Airport Maintenance Practice and FAA AC 150/5340-26A, Maintenance of airport visual aids facilities.

The light is designed for outdoor operation, however storing the light outside without using it is a risk for damage to light components. For a longer storage time (more than a week), it is recommended to store the light indoors in a dry and dust free environment and at room temperature. Proper storage ensures trouble free replacement procedures. It is strongly recommended not to store any electrical equipment outside.

Note: Only the most common maintenance procedures are instructed in following paragraphs. Construction of the luminaire allows that it can be fully disassembled and all the parts can be replaced if needed.

3.1.1 Depressurizing the Fitting

The light is provided with a valve component according to standard automotive tubeless valve design for common pressure gauges. The valve has to be loosened to release pressure during maintenance and tightened after assembly for testing, before use in the field.

It is important to depressurize the light using the valve in the inner cover immediately before maintenance as following scenarios can occur:

- If the light has been on for a long period of time prior to maintenance, it may contain pressure due to high internal temperature.
- If the light cover is hot, there is probably pressure inside and the light.
- If the latch mechanism feels abnormally tight, there is a risk for pressure inside the light.

3.1.2 Testing the Seal Integrity

The luminaire can be easily tested for seal integrity as completely assembled with secondary cable through the metal valve installed to the inner cover.

The valve is standard automotive tubeless valve and commonly available pressure gauges with pressure release function for automotive tyres can be used for testing.

Before testing make sure that the inner cover is properly closed. This mean that the flange of the inner cover meets the top cover and the holes for base receptacle fastening bolts are completely aligned with respect to each other (so that M10x25 bolt can run through).

As an additional safety measure before pressurising the luminaire for test, it is advised to install three (3) pieces of M10x25 bolts, 120 degrees apart from each other, through the luminaire fastening holes and install suitable nuts for the bolts. The nuts should be tightened with a hand tightening torque. The purpose is to minimise the safety hazard against pressured air equipment faults or unintentional misuse of pressured air equipment.



WARNING! NEVER EXCEED TESTING PRESSURE OF 1.5 BAR. THE LIGHT IS NOT DESIGNED TO WITHSTAND PRESSURES HIGHER THAN 1.5 BAR.

Fit the pressure gauge to the valve and put the luminaire into water container so that the whole luminaire is covered by water. Gradually increase the pressure to the maximum testing pressure of 1,5 bar (150 kPa). Keep the luminaire in water for couple of minutes and inspect for air leaks. If leaks exist, it is necessary either to reassemble the luminaire, tighten the cable gland or change the gasket or O-ring gasket, depending on the leak position.

3.1.3 Cleaning the Fitting

It is important to handle with care and clean to maximize the light and component lifetime and minimize maintenance.

- Do not touch the glass bulb or the reflecting surface of the lamp with bare hands as this can shorten the expected lifetime of the lamp.
- Use a soft, clean and dry rag when cleaning, handling or maintaining the optical parts of the light.
- When any maintenance procedures are carried out, remove all possible dust and moisture from the inside of the base, inner cover and top cover.
- All sealing mating surfaces must be thoroughly cleaned before reassembling.

3.2 WORKSHOP MAINTENANCE

Before you start, make sure you have read and understand §1.1 Safety Instructions.

The workshop maintenance refers to following:

1. Disassembling/ assembling the fitting
2. Replacing the fitting
3. Replacing the lamp
4. Replacing the prism and the prism gasket
5. Replacing the O-ring gasket

3.2.1 Disassembling/ Assembling the Fitting

It is important to always make sure that the light is depressurized before disassembly for maintenance work.

Note: Make sure you have read and understand §1.1 Safety Instructions.

Only the most common maintenance procedures are instructed in the following paragraphs. Construction of the luminaire allows that it can be fully disassembled and all the parts can be replaced if needed.

Disassemble

- (a) Fasten the stationary tool (bigger) to a bench plastic side upwards.
- (b) Place the luminaire upside down on the tool, which prevents the top cover from rotating.
- (c) Lock the seal integrity testing valve open with a bleeding nozzle.
- (d) Attach the c-shaped tool to inner cover plastic side against it.
- (e) Turn the inner cover counter-clockwise with respect to the top cover until the holes for fastening bolts in the top cover cannot be seen through the holes in the inner cover.

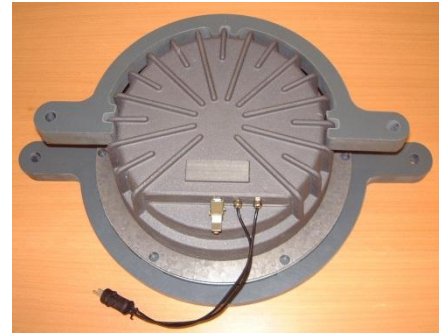


FIGURE 3 – OPENING THE INNER COVER

- (f) Place the removal pliers to slots in top cover and press to separate the inner cover from top cover. If covers are not separated completely at once, move the pliers to flat surface beside the slot and press again.
- (g) Lift the inner cover straight up.



FIGURE 4 – REMOVING THE INNER COVER

Assemble

- (a) Always replace the O-ring gasket of the inner cover when a light is opened for maintenance.
- (b) Before replacing the inner cover, apply lubricant to the O-ring and/or top cover sealing mating surface. This eases replacement considerably and extends the lifetime of the O-ring.
- (c) Place the inner cover on top of the top cover so that the studs pass through the openings in the fastening plates.
- (d) Fit the bleeding nozzle to the seal integrity testing valve to keep the needle open and press the inner cover downwards until the flange meets the top cover.
- (e) Turn the inner cover clockwise with respect to the top cover until the holes for fastening bolts in top and inner covers are fully aligned.
- (f) Remove the bleeding nozzle.



FIGURE 5 – ASSEMBLING THE INNER COVER

3.2.2 Replacing the Fitting

Remove

- (a) Clean the outer surface of the top cover.
- (b) Unfasten the six bolts securing the base.
- (c) Use the lifting hooks to lift the light from the base receptacle.
- (d) Disconnect the secondary cable.



FIGURE 6 – LIFTING HOOKS TO REMOVE AND INSTALL LUMINAIRE FROM THE BASE RECEPTACLE

Replace

- (a) Check and clean the contact surface of the base receptacle, especially the groove for O-ring gasket.
- (b) Place the O-ring gasket to the groove in the base receptacle and connect the secondary connectors.
- (c) Using lifting hooks, place the luminaire to the base receptacle. Make sure that the O-ring gasket and cable settle well into the base.
- (d) Align light channels parallel to aiming grooves in base receptacle.
- (e) Fasten the bolts M10x25 by hand. By using a torque wrench fasten the bolts gradually crosswise in a sequence to a torque of **40 Nm**.

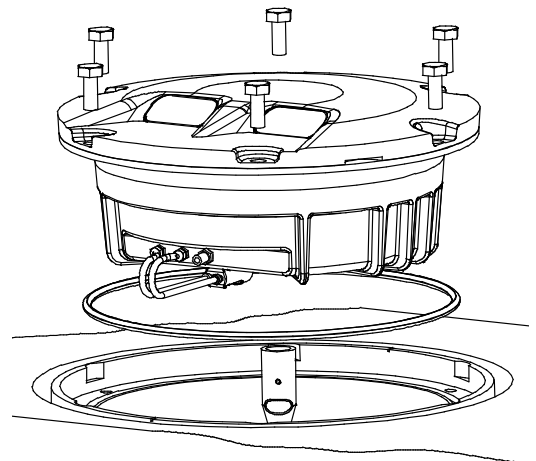



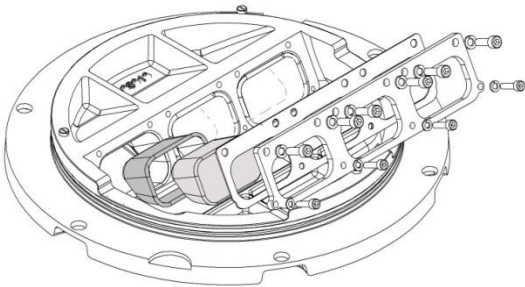
FIGURE 7 – LIGHT INSTALLATION

3.2.3

Replacing the Lamp


Remove	
<p>(a) Disassemble the light.</p> <p>(b) Disconnect the lamp wires from the terminal strip by pulling them straight out. Note: <i>Do not bend the connectors nor loosen the terminal strip screw!</i></p> <p>(c) If there are PTFE protection hoses on the lamps, remove those from the wires of the old lamp.</p> <p>(d) To remove the lamp, first push the lower locking pin from behind to release the lamp fastener and turn it counter-clockwise to remove the lamp.</p>	 <p>FIGURE 8 – REMOVING A LAMP</p>
Replace	
<p>(a) Take the new lamp and remove the white or clear protection hoses around the connectors by splitting them.</p> <p>(b) Install the longer PTFE protection hoses earlier removed from the old lamp to the wires of the new lamp.</p> <p>(c) Pass the wires through the hole in the lamp holder and place the lamp.</p> <p>(d) Turn the lamp fastener clockwise and press the pin from behind.</p> <p>(e) Guide the fastener opening to the pin and release it to lock the fastener.</p> <p>(f) Rotate the lamp so that the arrow on the lamp reflector is pointing upwards and check that the lamp has settled properly to the holder.</p> <p>(g) Connect the lamp wires to the round male connectors in the terminal strip and slide the PTFE protection hoses on top of the connectors.</p>	

3.2.4 Replacing the Prism and the Prism Gasket

Remove	
<ul style="list-style-type: none"> (a) Disassemble the light. (b) Unfasten the screws securing the prism fastening plate. (c) Remove the fastening plate and prism protection plate. (d) Remove the prism and gasket from the top cover by pressing them inwards to the luminaire. 	 <p>FIGURE 9 – PRISMS AND GASKET REPLACEMENT</p>
Replace	
<ul style="list-style-type: none"> (a) Clean the gasket mating surfaces in the top cover and the new gasket. (b) Apply a thin layer of high temperature resistant grease on the surface of the prism. (c) Insert the prism about halfway through to the gasket and apply some grease on top of the gasket. (d) Install the gasket with prism to the top cover so that the O-ring shaped edge of the gasket settles well to the chamfer around the prism opening in the top cover. (e) Press the prism to the top cover with thumbs as much as possible. (f) Install the prism protection plate and fastening plate and tighten the screws alternately until the protection plate meets with the surface of the top cover. (g) Using a thin sharp knife cut the surplus gasket around the prism opening from the outside of the luminaire. (h) Clean the visible surfaces of the prism from any possible grease or fingerprints using soft damp cloth (mild soap water or glass cleaner can be used provided that no residues will remain). (i) Reassemble the cover. 	

3.2.5 Replacing the O-ring Gasket


It is recommended to change the O-ring gasket simultaneously with the lamp replacement. Perform a seal integrity test for the assembled luminaire.

Remove	
<ul style="list-style-type: none">(a) Disassemble the light.(b) Remove the old O-ring gasket, but be careful not to damage the surfaces in top cover.(c) Clean properly the sealing surfaces in the inner and top cover.	
FIGURE 10 – O-RING REPLACEMENT	
Replace	
<ul style="list-style-type: none">(a) Install the new O-ring gasket to the groove.(b) Apply high temperature resistant grease to the O-ring vertical mating surface in the inner cover to ease the operation.(c) Close the inner cover.	

4.

SUPPORT

Our experienced engineers are available for support and service at all times, 24 hour/7 days a week. They are part of a dynamic organization making sure the entire Safegate Group is committed to minimal disturbance for airport operations.

Safegate Group Support	
<p>Safegate Group knows that our equipment is used in one of the busiest industries in the world, where down-time costs money and creates delays for airlines and their passengers. As one of the world's leading suppliers of airport systems, Safegate Group is committed to ensuring that our customers are able to get the most out of your equipment, regardless of the location or the time of day. For this reason, Safegate Group has established the Safegate Group Support service.</p> <p>Safegate Group Support is a unique service provided by Safegate Group to our customers, free of charge during the warranty period or as a service contract. Any time of day, any day of the year, a Safegate Group engineer is on standby to answer questions and assist with any problems that may arise. Qualified technical assistance is just a phone call or an e-mail away, 24-7 worldwide.</p> <p>✉ support@safegate.com</p> <p>☎ +46 40 699 1740</p>	

4.1.1

Safegate Group Website

The Safegate Group Website, www.safegate.com, offers information regarding our airport solutions, products, company, news, links, downloads, references, contacts and more.

Note: There is also a **Client/Partner login** area for the latest information and updates, if available.

4.2 RE-CYCLING

4.2.1 Local Authority Re-cycling

The disposal of Safegate Group products is to be made at an applicable collection point for the recycling of electrical and electronic equipment. The correct disposal of equipment prevents any potential negative consequences for the environment and human health, which could otherwise be caused by inappropriate waste handling. The recycling of materials helps to conserve natural resources. For more detailed information about recycling of products, contact your local authority city office.

4.2.2 Safegate Group Re-cycling

Safegate Group is fully committed to environmentally-conscious manufacturing with strict monitoring of our own processes as well as supplier components and sub-contractor operations. Safegate Group offers a re-cycling program for our products to all customers worldwide, whether or not the products were sold within the EU.

Safegate Group products and/or specific electrical and electronic component parts which are fully removed/separated from any customer equipment and returned will be accepted for our recycling program.

All items returned must be clearly labelled as follows:

- **For ROHS/WEEE Re-cycling**
- Sender contact information (Name, Business Address, Phone number).
- Main Unit Serial Number.

Safegate Group will continue to monitor and update according for any future requirements for EU directives as and when EU member states implement new regulations and or amendments. It is our aim to maintain our compliance plan and assist our customers.

Note: For more information, see www.safegate.com, or contact Safegate Group Support via email at support@safegate.com or phone +46 40 699 1740.

4.3 SPARE PARTS

Spare parts are available for Airfield Lighting. For more information see the Spare Parts List document.

Note: Contact Safegate Group for assistance with ordering spare parts.

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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

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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.

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