

# Airfield Lighting Manual

IDMAN

12" Inset Lights – IDM 2051

- Approach Center Line and Crossbar
- Approach Side Row Unidirectional Inset Light



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

## 12" INSET LIGHTS

### IDM 2051

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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](http://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

**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

IDM 2051 is a unidirectional approach centre line, crossbar and side row inset light. Only one light for each installation position is required.



FIGURE 1 - 12" INSET LIGHT

### 1.1 SAFETY INSTRUCTIONS

#### 1.1.1 General safety

Make sure you read this section and are familiar with safety precautions before any work is started. Keep away from live circuits. It is vital to switch off the current securely before any installation or maintenance procedures are carried out. It is also strongly recommended to disconnect the primary circuit from CCR before these activities.

#### 1.1.2 Product safety

Airfield lighting is connected to a constant current circuit with nominal current of 6.6 amperes via an isolating transformer. 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.

#### 1.1.3 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 SO ON SHOULD BE IDENTIFIED. ANY INSTALLATION OR MAINTENANCE WORK SHOULD ONLY BE CARRIED OUT BY TRAINED AND EXPERIENCED PERSONNEL.***

#### 1.1.4 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 DELIVERY AND OVERVIEW OF LIGHTS

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.

The lights are designed according to airfield placement and functionality.

Overview of lights				
Light	Colours	Power	Toe-in	Description
IDM 2051	Clear (C)	3 x 105W	0	Unidirectional approach centre line and crossbar
	Red (R)		L	Unidirectional approach side row
	Red (R)		R	Unidirectional approach side row

For more information, see [www.safegate.com](http://www.safegate.com).

## 2. INSTALLATION

Inset lights are installed in base receptacles that are stationary installed on the field. There are many different installation practices which can be adopted for bases and detailed instructions how to carry out the installation can be found on base manuals. For correct light location, it is recommended to read and comply with the following:

- ICAO: Annex 14 Volume I 5th edition 2009
- All drawings and design plans, for the particular project, to guarantee correct location for each fixture.

### 2.1 BEFORE YOU START

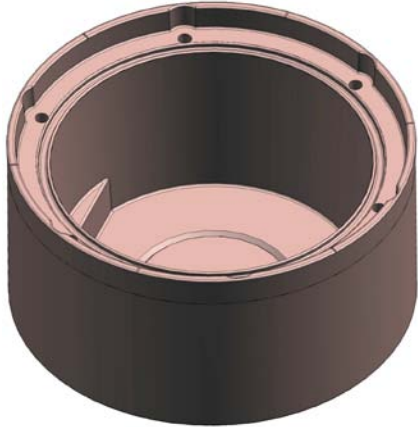
Make sure you have read and understand Safety Instructions on page 3.

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.

#### 2.1.1 Tools and materials required

- Lifting hooks
- Torque wrench, socket 17mm

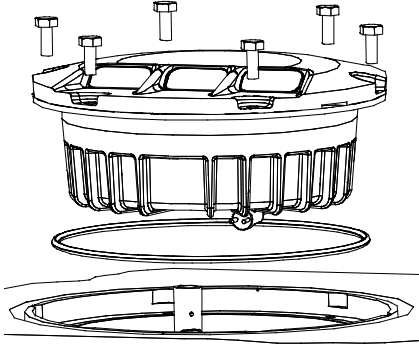
#### 2.1.2 Base option

Base option for 12" fittings	Image example
The base dimensions are: outer diameter is 345 mm and height is 160 mm.	 <p data-bbox="948 1458 1366 1480">FIGURE 2 - BASE FOR 12" INSET LIGHTS</p>

## 2.2 INSTALL A LIGHT IN A BASE

Clear approach centre line and crossbar lights can be installed to whatever position. However, when installing a side row light, make sure that right type of light is installed to correct location (L, R or 0). If side row bases have been installed to toe-in angle, type "0" side row lights can be installed to whatever position. However, if side row bases are installed parallel to runway centre line, type "L" lights are installed to the left of runway centre line and correspondingly type "R" lights to the right. **Left and right is determined as seen from approach direction.** It is imperative to follow a.m. rules as misplaced lights lead to incorrect information provided to pilots.

**Note:** *Read carefully the material safety data sheet and application and mixing information of sealing resin before starting to work. Pay special attention to allowed environmental conditions (temperature, relative humidity etc.), pot life and curing times of mixed resin. Obeying given information, mix a suitable amount of sealing resin. Depending on the resin type used, the filling of wire ways is done either in layers or directly to the surface level at once.*

Install a light	Image example
<ul style="list-style-type: none"><li>(a) Check and clean the contact surface of the base receptacle, especially the groove for o-ring gasket.</li><li>(b) Place the o-ring gasket to its groove in the base and connect the secondary connectors.</li><li>(c) Using lifting hooks, place the light to the base making sure that o-ring gasket and cable settle well into the base.</li><li>(d) Align light channels parallel to aiming grooves in the base receptacle.</li><li>(e) Screw the fastening bolts M10x25 first by hand.</li><li>(f) Tighten the bolts gradually crosswise to the final torque of <b>40 Nm</b> using torque wrench.</li></ul>	 <p data-bbox="991 1245 1337 1272">FIGURE 3 – LIGHT INSTALLATION</p>



### 3. MAINTENANCE

#### 3.1 BEFORE YOU START



***WARNING!*** MAKE SURE YOU HAVE READ AND UNDERSTOOD SAFETY INSTRUCTIONS ON PAGE 3.

##### 3.1.1 Light pressure

Depressurize the light using the valve in the inner cover immediately before maintenance due to:


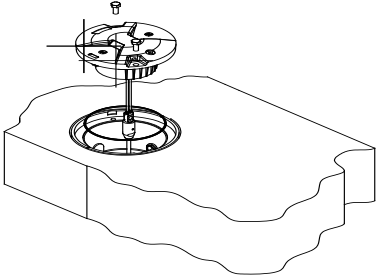
- The light may contain pressure due to high internal temperature as it has been on for a long period of time immediately before maintenance.
- If the light cover is hot, there is probably pressure inside and the light.
- If the latch mechanism feels abnormally tight this means there is a risk for pressure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

##### 3.1.2 Handle with care and clean

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 REPLACE A LIGHT IN A BASE

Replace a light	Image examples
<p><b>Note:</b> Make sure you have read and understood Safety Instructions on page 3.</p>	
<p><b>Remove a light from a base</b></p> <ul style="list-style-type: none"> <li>(a) Clean the outer surface of the light.</li> <li>(b) Unfasten the six bolts securing it to the base.</li> <li>(c) Use the lifting hooks to lift the light from the base.</li> <li>(d) Disconnect the secondary cable.</li> </ul>	 <p style="text-align: center;">FIGURE 4 – LIFTING HOOK</p>
<p><b>Install a light in a base</b></p> <ul style="list-style-type: none"> <li>(e) Check and clean the contact surface of the base receptacle, especially the groove for o-ring gasket.</li> <li>(f) Place the o-ring gasket to its groove in the base and connect the secondary connectors.</li> <li>(g) Using lifting hooks, place the light in the base making sure that o-ring gasket and cable settle well into the base.</li> <li>(h) Align light channels parallel to aiming grooves in the base receptacle.</li> <li>(i) Screw the fastening bolts M10x25 first by hand.</li> <li>(j) Tighten the bolts gradually crosswise to the final torque of <b>40 Nm</b> using torque wrench.</li> </ul>	 <p style="text-align: center;">FIGURE 5 – LIGHT INSTALLATION</p>

**3.3 WORKSHOP MAINTENANCE**

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

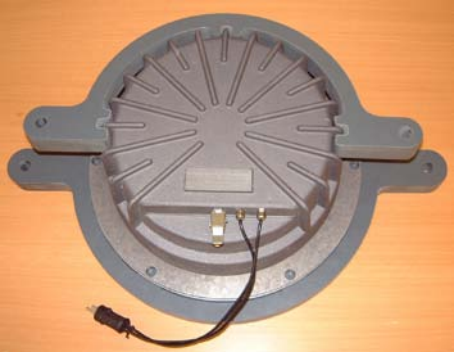

**Note:** Make sure you have read and understood Safety Instructions on page 3.

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


**3.3.1 Pressure release**

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

**3.3.2 Disassemble a light cover**

Disassemble a light cover	Image examples
<p><b>Note:</b> Make sure you have read and understood Safety Instructions on page 3.</p>	
<p>(a) Fasten the stationary tool (bigger) to a bench plastic side upwards.                      (b) Place the light upside down on the tool, which prevents the top cover from rotating.                      (c) Attach the c-shaped tool to inner cover plastic side against it.                      (d) 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.                      (e) Lock the seal integrity testing valve open with a bleeding nozzle.</p>	 <p>FIGURE 6 – OPENING THE INNER COVER</p>
<p>(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.</p>	 <p>FIGURE 7 – REMOVING THE INNER COVER</p>

### 3.3.3 Assemble a light cover

Assemble a light cover	Image example
<p>(a) Always replace the O-ring gasket of the inner cover when a light is opened for maintenance.</p> <p>(b) Before replacing the inner cover, apply lubricant to the O-ring and/or top cover sealing mating surface, for example high temperature resistant (minimum 200°C) grease. This eases replacement considerably and extends the lifetime of the O-ring.</p> <p><b>Note:</b> <i>Do not use copper based grease as it strongly stimulates corrosion.</i></p> <p>(c) Place the inner cover on top of the top cover so that the studs pass through the openings in the fastening plates.</p> <p>(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.</p> <p>(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.</p> <p>(f) Remove the bleeding nozzle.</p>	 <p>FIGURE 8 – ASSEMBLING THE INNER COVER</p>

### 3.3.4 Seal integrity test


The light 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 is the case when the flange of the inner cover meets with the top cover and when 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 light for test, it is advised to install three (3) pieces of M10x25 bolts, 120 degrees apart from each other, through the light fastening holes and install suitable nuts for the bolts. The nuts should be tightened in a hand tightening torque. This is done to minimise the safety hazard against pressurised air equipment faults or unintentional misuse of pressured air equipment.



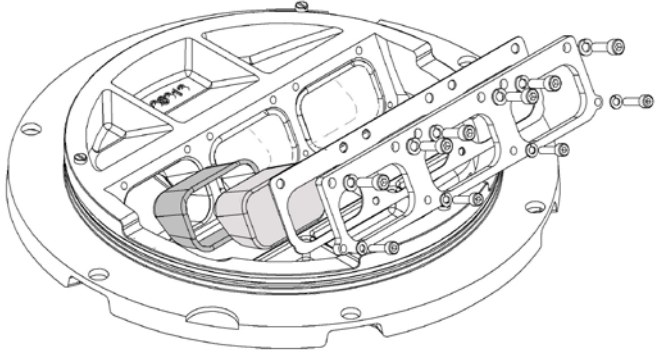
**WARNING! NEVER EXCEED TESTING PRESSURE OF 1.5 BAR. THE LIGHT IS NOT DESIGNED TO WITHSTAND PRESSURES HIGHER THAN 1.5 BAR.**

Fit the pressure gauge to the valve and put the light into water container so that the whole light is covered by water. Gradually increase the pressure to the maximum testing pressure of 1.5 bar (150 kPa). Keep the light in water for couple of minutes and inspect for air leaks. If leaks exist it is necessary either reassemble the light, tighten the cable gland or change the gasket or o-ring gasket depending on the leak position.

### 3.3.5 Replace a lamp in a light

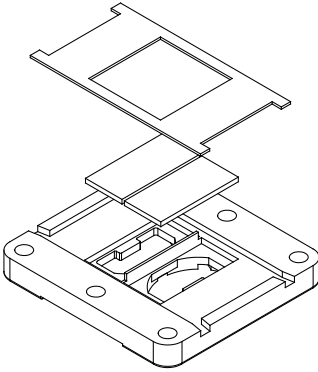
Replace a lamp in a light	Image examples
<p>(a) Disassemble the light, see 3.3.2 Disassemble a light cover on page 9.</p> <p>(b) Disconnect the lamp wires from the terminal strip by pulling them straight out. <b>Note:</b> <i>Do not bend the connectors nor loosen the terminal strip screws.</i></p> <p>(c) Remove the PTFE protection hoses 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>(e) Take the new lamp and remove the white or clear protection hoses around the connectors by splitting them.</p> <p>(f) Install the longer PTFE protection hoses earlier removed from the old lamp to the wires of the new lamp.</p> <p>(g) Pass the wires through the hole in the lamp holder and place the lamp.</p> <p>(h) Turn the lamp fastener clockwise and press the pin from behind.</p> <p>(i) Guide the fastener opening to the pin and release it to lock the fastener.</p> <p>(j) 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>(k) 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>	 <p>FIGURE 9 – REMOVING A LAMP</p>

### 3.3.6 Remove/insert prisms and a prism gasket

Remove prisms and a prism gasket	Image example
<p>(a) Disassemble the light, see 3.3.2  Disassemble a light cover on page 9.</p> <p>(b) Unfasten the screws securing the prism fastening plate.</p> <p>(c) Remove the fastening plate and prism protection plate.</p> <p><b>Note:</b> <i>All the prisms are fastened with the same fastening plate, so unfastening the plate releases all three prisms. However, a single prism can be replaced without removing the other two prisms as long as the two prisms seem to stay in their original positions.</i></p> <p>(d) Remove the prism and gasket from the top cover by pressing them inwards to the light.</p>	 <p>FIGURE 10 – PRISMS AND GASKET REPLACEMENT</p>
Insert prisms and a gasket	
<p>(a) Clean the gasket mating surfaces in the top cover and the new gasket.</p> <p>(b) Apply some silicone grease to the gasket surfaces.</p> <p>(c) Insert the prism about halfway through to the gasket and apply some grease on top of the gasket.</p> <p>(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.</p> <p>(e) Press the prism to the top cover with thumbs as much as possible.</p> <p>(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.</p> <p>(g) Using a thin sharp knife cut the surplus gasket around the prism opening from the outside of the light.</p> <p>(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).</p> <p>(i) Reassemble the inner cover. See 3.3.3 Assemble a light cover on page 10.</p>	

### 3.3.7 Replace an o-ring gasket

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

Replace an o-ring gasket	Image example
<ul style="list-style-type: none"><li>(a) Disassemble the light, see 3.3.2 Disassemble a light cover on page 9.</li><li>(b) Remove the old o-ring gasket, but be careful not to damage the surfaces in top cover.</li><li>(c) Clean properly the sealing surfaces in the inner and top cover.</li><li>(d) Install the new o-ring gasket to the groove. Apply high temperature resistant grease to the o-ring vertical mating surface in the inner cover to ease the operation.</li><li>(e) Close the inner cover as described in 3.3.3 Assemble a light cover on page 10.</li></ul>	 <p>The diagram shows an exploded view of a light cover assembly. At the bottom is the main housing with a rectangular groove. Above it is an inner cover with a corresponding protrusion. At the top is a separate top cover. An old o-ring gasket is shown being removed from the groove in the main housing. A new o-ring gasket is shown being placed into the groove. The caption below the diagram reads 'FIGURE 11 – O-RING REPLACEMENT'.</p>

### 3.4 TECHNICAL INFORMATION

#### 3.4.1 Storage

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 (warm or cool). Proper storage ensures trouble free replacement procedures. It is strongly recommended not to store any electrical equipment outside.

#### 3.4.2 Daily function check for installed equipment

If the equipment is installed, but not in operation or intended to be used for a longer period of time (more than one week), it is recommended to perform a daily function check to ensure system availability in case of urgent need.

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.

#### 3.4.3 Specification

- ICAO Annex 14 Volume I 5<sup>th</sup> edition 2009.
- Aerodrome Design Manual Part 4 Visual Aids, 4<sup>th</sup> edition 2004.

#### 3.4.4 Application

- Approach centre line and crossbar clear unidirectional inset light for Cat. I, II and III operations.
- Approach side row red unidirectional inset light for Cat. II and III operations.

#### 3.4.5 Technical characteristics

Characteristic	Description
<b>Light dimensions</b>	Protrusion 12 mm Diameter 326 mm Depth 150 mm
<b>Weight</b>	6.7 kg 11.6 kg with base receptacle
<b>Ingression Protection</b>	IP67
<b>Materials</b>	Top cover, inner cover and base receptacle: aluminium alloy Sheet metal fastening parts: stainless steel Silicone rubber gaskets Stainless steel hardware
<b>Surface treatment</b>	Anodising on aluminium alloy parts
<b>Cables and connectors</b>	Plugs: FAA L-823 Style 6 Receptacles: FAA L-823 Style 12 Secondary cable: FAA 150/5345-70
<b>Light sources</b>	3x105W, 6,6A, Ø50 mm dichroic halogen lamp with 130 mm wires and Ø4 mm round female connectors. Average lifetime 1000 hours at rated current.
<b>Packing</b>	Dimensions: 340x340x145 mm Weight: 6.8 kg
<b>Accessories</b>	Alignment device IDM 4306 Lifting hooks Set of maintenance tools

For more information, contact Safegate Group or see [www.safegate.com](http://www.safegate.com).



### 3.5 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>✉ <a href="mailto:support@safegate.com">support@safegate.com</a> ☎ +46 40 699 1740</p>	 

#### 3.5.1 Safegate Group Website

The Safegate Group Website, [www.safegate.com](http://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.

## 3.6 RE-CYCLING

### 3.6.1 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.

### 3.6.2 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](http://www.safegate.com), or contact Safegate Group Support via email at [support@safegate.com](mailto:support@safegate.com) or phone +46 40 699 1740.

## 3.7 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.

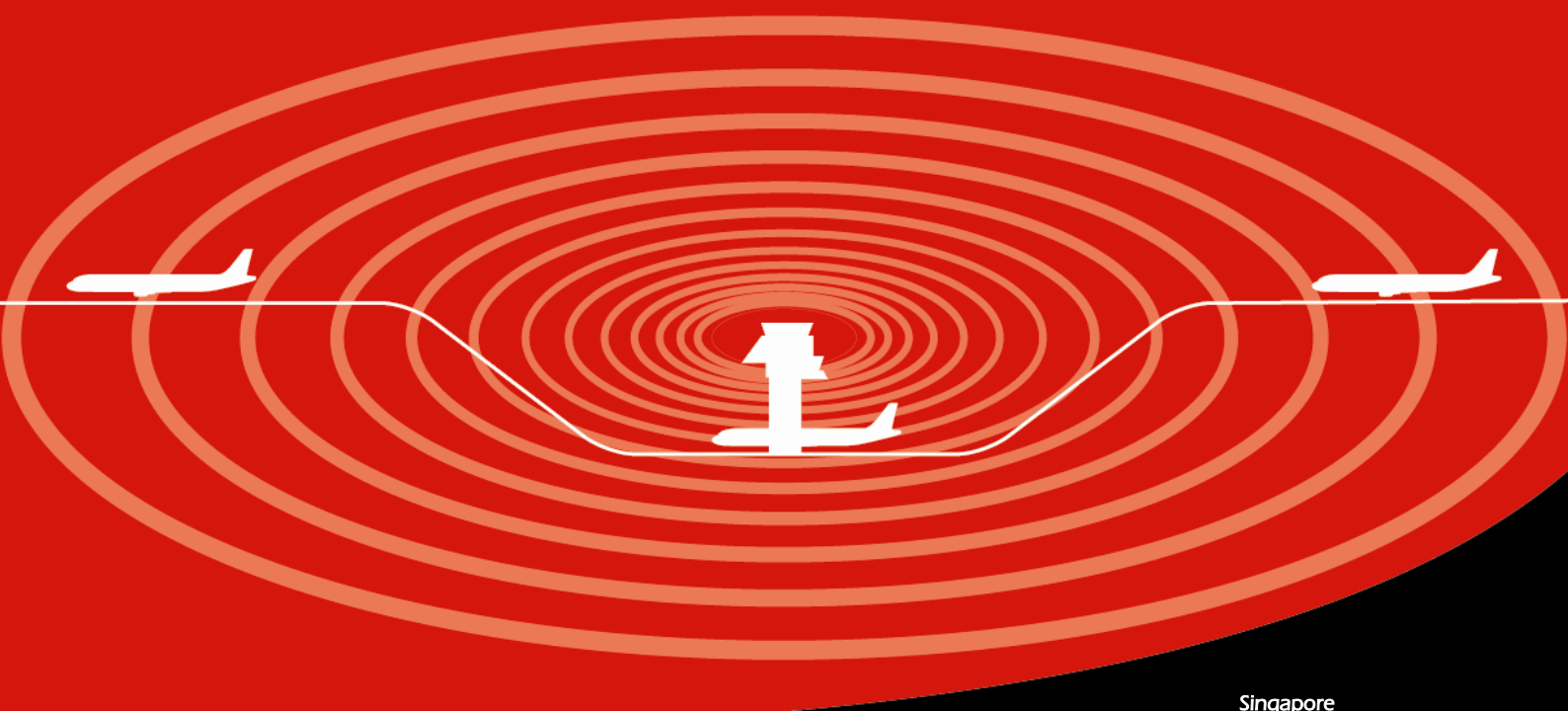


# Check in to the future

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!



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Safegate Group offers solutions for increased safety, efficiency and environmental benefits to airports around the world. The company was founded in 1973 and has its headquarters in Malmö, Sweden. Safegate Group has over 70 partners around the globe in order to be close to its customers. The latest members of Safegate Group, Thorn AFL and Idman, have both over 40 years of experience in airfield lighting solutions for airports and heliports worldwide. 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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