

LLEDO
SAS
International

by

**Integrated
Lighting**



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SAS International® has a global reputation for outstanding integrated metal ceilings installed in the most prestigious buildings worldwide. We are design and integration experts, achieving the complex balance between performance and aesthetics. This expertise includes the integration of lighting within the ceiling plane, delivering excellence in manufacturing and engineering quality.

Our lighting offer is the result of 50 years of design collaboration with the world's most discerning and innovative clients. Pioneers in our field, we understand the smallest error in detailing can undermine success. Designed in-house and manufactured by SAS International, our integrated lighting products ensure design intent where only the best will suffice.

Lighting

SAS International has decades of integrated lighting expertise dating back to 1976 when we successfully operated a specialist lighting division. Since then, we have manufactured thousands of ceilings with integrated lighting from simple down lighters to fully bespoke lighting installations.

Our new lighting portfolio, specifically designed and manufactured by SAS is engineered for hassle-free integration with our award-winning metal ceilings. Our beautifully integrated ceilings offer the specifier complete peace of mind, backed by full system warranties.



Since 1968, SAS International has become recognised as a leading global manufacturer. Best known for our award-winning metal ceiling systems, our products are installed in exemplar projects worldwide.

Our approach is guided by:

Service

Across the business, customer demands are our primary focus. We recognise that our long-term, sustained success is dependent upon the excellent service we provide. We set the industry benchmark, refining our approach as necessary to deliver unsurpassed levels of customer support.

Innovation

Innovation is the lifeblood for any business and SAS is no different. Internally, cross departmental collaboration feeds into our innovation pipeline, devising interior solutions based on new technology, materials and market drivers. Externally, we collaborate with the world's top architectural practices and developers on the most architecturally challenging projects. This sharing of ideas and expertise accelerates innovation, delivering world class solutions to evolving requirements, achieving the highest possible standards.

Quality

We have a hard won reputation for manufacturing to the highest quality standards. Our ISO 9001 accreditation validates our commitment not only to the quality of our products, but also our manufacturing processes. We continue to invest in our factories and design resource to maintain our quality leadership status.

Dependability

SAS has the financial stability and manufacturing capacity to deliver the largest scale developments internationally. Throughout, our commercial and technical design teams offer unparalleled levels of support to ensure project success. We are specified worldwide, not just for our quality, but an assurance that we will deliver. Our comprehensive service offering is second to none and depended on in the most challenging of project circumstances.

SAS International sets both the industry benchmark and customer expectations across all facets of manufacturing. Based on our core values, we passionately believe we can successfully achieve your most ambitious goals.

Lighting Design

Acoustic ceiling design in unison with lighting requirements is key to project success. Seamlessly integrating lights into an acoustic ceiling can be fraught with design issues when collaboration between manufacturers is lacking. Excess loads and poor detailing will undermine aesthetics, performance and ultimately client satisfaction.

Designed and engineered by SAS International, we manufacture our lighting products to integrate specifically with our compatible ceilings. We have dealt with design integration issues that may have affected installation at source. This improves aesthetics overall and effectively controls issues such as misalignment and overloading.

We also offer SAS Plus as a value add design service for the most ambitious schemes requiring fully bespoke manufacturing. Our in-house design team is available to collaborate on landmark projects pushing the boundaries of integrated ceiling capabilities. Projects such as the recent Bloomberg Headquarters in London are testament to our design and manufacturing capabilities when challenged.

Our Approach to System Design

Our systems have been designed to be flexible, offering the system designer scope to be creative. Supporting this approach, our highly knowledgeable sales teams are technically trained to assist best practice integrated ceiling system design. We endeavour to start a dialogue with the specification team regarding project scope and assist throughout the project delivery. Depending on specification, we can tailor the system to suit the exact budget requirements while maintaining original design intent.

Fully Bespoke Design

Premium projects often demand bespoke applications. The calibre of project dictates the highest levels of quality, design and aesthetics combined. SAS has a long standing history of delivering the very best of bespoke installations.

The approach to bespoke design is as flexible and broad as you can conceivably imagine. The only limitations are the material properties of sheet or extruded metal and what the material allows.

More typical bespoke applications are radial, trapezoidal, vaulted and waveform ceilings. Your designs are not limited to this palette however. SAS has engaged projects with the most far reaching of concepts and delivered them to complete client satisfaction.

For bespoke projects, please consult our technical design team as early as possible in the project design phase. They are on hand to offer expert advice on designing systems that can be manufactured effectively to budget.

SAS Special Projects

SAS has developed an enviable reputation of working alongside the most architecturally influential practices on the highest profile projects worldwide. The delivery of these projects are highly

complex, often high risk and at times of national political interest.

We have a specialist division tailor-made to manage and deliver these projects. SAS Special Projects is an internationally-operative team, ideally suited to the project management and delivery of the most ambitious schemes. Their expertise covers all facets of project delivery, from system conceptualisation, fully bespoke system design, manufacturing and on site installation.

Special Projects works closely with local agents on large scale overseas projects to ensure high quality installation standards. On all projects, we confer with clients, their design teams and contractors on preferred on site installation processes. Total control of the design, manufacture and installation programme offers clients complete project certainty. Our intimate knowledge of our systems and their installation means SAS is ideally placed to successfully deliver these landmark schemes.

SAS AfterCare

We provide a specialist repair, maintenance and alteration service for existing clients and facilities managers. SAS AfterCare offers property owners and occupiers a fast and reliable service to maintain and amend existing installations.

The adaptive nature of SAS ceilings allows for changes of use within the building. Changes may occur due to new tenants, restructuring of existing space or integration of new technology or services.

Our detailed knowledge of existing SAS projects allows us to engage with customers in an insightful and cost-effective manner. Helping to accelerate this process is our comprehensive project database containing original

drawings and specifications from historical SAS installations.

Members of the SAS AfterCare team are available to conduct on site surveys to quickly identify system detail and specification. Any new ceiling or alteration requirement is assessed prior to the placement of any orders. This avoids any doubt or risk associated with complex applications or bespoke products.

SAS AfterCare has expertise in system identification, estimating and design. Our team undertakes all required activities to assist in the maintenance and adaptation of bespoke and complex metal ceiling installations. These installations typically have close interfaces with other integrated services, such as lighting, ventilation, or even radiant chilled panels.

Full service offering:

- Dilapidations – Renewal or making good at the end of the lease period
- System replacements – Delivering replacements for damaged tiles and ceiling components
- Emergency repairs
- System upgrades – Replacing or upgrading light fittings and/or acoustic materials
- Extensions or modifications to existing installations
- Integration of new building services
- Technical advice

SAS AfterCare is only available in the UK. For more information please call **+44 (0) 118 929 0900**.

Light Level Recommendations & Guides

Lighting design is a skilled and mature profession. Whilst it is possible to assign a basic lux level requirement to a broadly defined type of space, reliance on this single parameter is unlikely to deliver an engaging and optimised lit environment.

Lighting Guidance Documents

Much is written with the specific goal of communicating the considerations and details that will bring many desirable features to a lighting scheme, publications such as:

- BS EN 12464-1:2011 Light and lighting. Lighting of work places. Part 1: Indoor work places
- SLL Code for Lighting
- BCO Guide to Lighting

These publications are widely recognised and respected. Many more exist for very specific applications and lighting requirements. There are also many skilled and experienced lighting professionals available to add their own level of creativity and flair to this key element of our everyday lives.

The following table lists broadly accepted targets for general lighting levels in a range of space types:

Space type	Typical light level
Office area including computer use, meeting rooms, classrooms	300 - 500 lux
Office ancillary area, e.g. copying, filing, archive	200 - 300 lux
Reception area	300 lux
Canteens, waiting areas, cloakrooms, toilets	150 - 200 lux
Circulation spaces, corridors, stairs, store rooms	100 - 150 lux
Commercial kitchens	500 lux
Night time observation lighting	5 lux

These values can be used with the 'typical lux level' guidance detailed on each of the following product pages. The intention is to allow a quick reference for selecting the most suitable product for a given application.

There are numerous international guidance documents offering specifiers information on lighting design within commercial spaces. Here we have listed a few of the most commonly referred to:

BS EN 12464-1:2011 Light and lighting - Lighting of work places. Part 1: Indoor work places.

Extensive detailed guidance for a range of indoor work places.

SLL Code for Lighting

Provides a detailed review of lighting practice guidelines, the way people respond to light, the metrics that can be employed to communicate lighting requirements and the wider considerations of providing lighting equipment.

SLL Lighting Guide

- 2:** Hospitals and healthcare buildings
- 5:** Lighting for Education
- 7:** Offices
- 9:** Lighting for Communal Residential Buildings

BCO Guide to Lighting

Focussed on office spaces; looking at natural lighting, energy efficiency, good lighting practice and specific design guidance.

BREEAM

A range of sections contain requirements for minimum standards pertaining to artificial lighting.

LEED

A range of sections contain requirements for minimum standards pertaining to artificial lighting.

WELL Building Standard

Light is a key concept area, within the standard. WELL details a number of features that must be delivered as a precondition of WELL certification.

Energy Technology Product List (ETL)

Government managed list of minimum product performance values, part of the Enhanced Capital Allowance (ECA) tax scheme.

Conservation of fuel and power: Approved Document L

Building Regulations guidance detailing minimum energy performance values for artificial lighting.

Specification Criteria

The science of lighting and its application within buildings can often be complex and confusing for the non-specialist. SAS International is an expert in this field and can support your project, providing guidance and experience to help you specify the most appropriate products for your design that meet industry and legislative standards. The information below should help explain some of the more relevant acoustic terminologies and technical aspects.

Light Level, or illuminance - expressed in Lux (L=)

Carefully specified lux levels are fundamental to ensuring an appropriate lit environment is delivered. This parameter describes how much light is reaching a particular surface, but if that surface is black it will still appear dark regardless of the lux level being delivered.

Examples of commonly encountered lux levels are as follows:

- Moonlight – 0.1 lux
- Emergency escape lighting – 1 lux
- Comfortable domestic lighting – 50 lux
- Corridors – 150 lux
- Offices – 400 lux
- Fine detail perception – 1000 lux
- Overcast day – 2000 lux
- Bright sunshine – 100,000 lux

Light Output, or Luminous Flux - expressed in Lumens (Lm)

The amount of light exiting a light source is a key parameter for specifying a lighting system.

Glare - most commonly expressed as a UGR value (Unified Glare Rating)

Glare is the term used to describe a reduction in visual ability due to light entering the eye in an undesirable way (sometimes referred to as 'dazzle'). Headlights from oncoming traffic and sunlight reflected from windows are common examples of glare reducing visual perception and even causing discomfort. The UGR calculation aims to assign a value to a specific lit environment that can be subjectively correlated to the occupant's experience of glare for a particular location in that space. UGR values cannot be individually assigned to a luminaire.

Luminance - expressed in candelas per square metre (cd/m²)

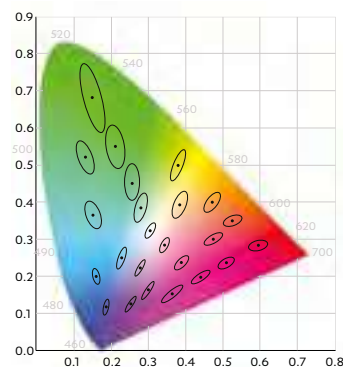
Describing the amount of light exiting a particular surface in a particular direction, luminance can be considered a specific part of the glare picture. Generally, large lit surfaces are low luminance and low glare. Small bright light sources are often high luminance and high glare even though they may not actually deliver much light.

Correlated Colour Temperature (CCT), or colour appearance - expressed in Kelvin (K)

White light comes in many colours, from the warm yellow light of a candle to the cool blue-white light of an arctic day. These colours can be compared to the temperature of a wire glowing white hot, with typical 'warm white' values equating to a temperature of about 2,700 K (around 2,400 °C) and 'cool white' at around 6,000 K.

Examples of commonly encountered CCTs are as follows:

- 1,800 K - candle flame
- 2,700 K - typical domestic light source
- 4,000 K - typical office lighting
- 6,500 K - daylight at midday



Chromaticity Diagram

Colour consistency – expressed in SDCM (Standard Deviation Colour Matching) or MacAdam ellipses

Seemingly identical light sources can deliver light with slightly different colour appearances. Small variations are imperceptible by the human eye, whilst large variations can be problematic for the aesthetic of a lit environment. A MacAdam Ellipse represents an area on the CIE 1931 Chromaticity Diagram within which a typical observer will not notice any variation in colour to the centre point - that is to say, the MacAdam ellipse represents a range of colours for which there is a 'just noticeable difference'. This idea is extended to the SDCM method of quantifying colour variation where 1 SDCM equates to a single MacAdam Ellipse, or a single step of 'just noticeable difference'.

Examples of common SDCM values are as follows:

- 1 SDCM - just noticeable difference
- 2 SDCM - the tightest tolerance LEDs are sorted to (or 'binned') by manufacturers
- 3 SDCM - generally accepted to be 'no practical variation' for general lighting installations
- 5 SDCM - worst-case consistency between fluorescent lamps from different manufacturers



Colour Fidelity, or Colour Rendering Index (CRI) - expressed as Ra

Pigments reveal their colour by reflecting light. A red pigment will not appear red if it is only illuminated with blue light, and this is an extreme example of poor colour rendering (low Ra). All white light sources contain a range of colours of light, even where the colour appearance (CCT) is identical. The balance of colours within a light source will affect the perception of pigments that are illuminated by it, with the measure of 'fidelity' as a comparison to reference light sources of similar CCT.

Examples of common light source CRI values are as follows:

- Ra 20 - high pressure sodium
- Ra 50 - halophosphate fluorescent lamps
- Ra 80 - triphosphor fluorescent lamps, LEDs for general lighting
- Ra 95 - high CRI LEDs
- Ra 100 - incandescent lamps, daylight (reference sources)

Life expectancy and lumen maintenance - expressed in the format Lxx Bxx Fxx

Generally, LEDs do not 'fail', consequently lifetime is not easily determined by the point at which they no longer emit light. Instead, lifetime is expressed as the time it takes for light output to decrease to the point where it is unacceptably dim. This 'unacceptable lumen maintenance level' may be set at 70% of the initial value, or maybe 90% depending on the application or specification. Due to the range of ways lifetime can be predicted, a standardised technique has been developed and is detailed in a document titled 'TM-21'.

A tight lifetime specification taking into account the TM-21 methodology may take a format similar to this:

- 60,000 hours to L90 B50 F10
- 60,000 hours is the 'lifetime' of the product.
- L90 indicates that this is expressed to a 90% lumen maintenance (10% dimmer than the first day it was operated)
- B50 indicates that this 90% value is an average for the product (i.e. in a test, half of the sample will be brighter than 90% and half will be dimmer than 90% after 60,000 hours)
- F10 indicates that the lifetime prediction allows for a 10% total failure (no light emitted) after 60,000 hours. (In practice, this is most likely to be due to control gear failure)

Circadian Lighting Design, Bioactive light or Human Centric Lighting (HCL)*

It is beyond doubt that light affects the human body clock, and appropriate synchronisation of the associated circadian rhythms is a fundamental aspect of 'wellness'. Measurements for quantifying visually useful light need modifying slightly to understand how much physiologically active content is present. Broadly, EML and/or CS can be presented as numeric values as part of a 'wellness' driven lighting design specification.

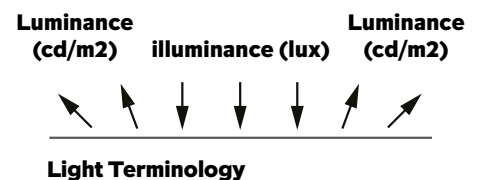
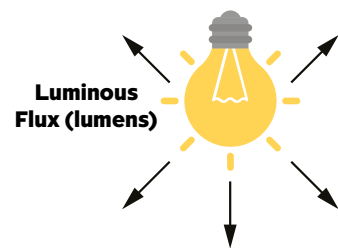
*Commonly expressed as Equivalent Melanopic Lux (EML) or Circadian Stimulus (CS)

Digital Addressable Lighting Interface, DALI

DALI is a standardised modern bi-directional lighting control interface with a high level of flexibility and market acceptance. Most proprietary lighting control systems and providers have compatibility with DALI-enabled luminaires, equally DALI-enabled luminaires may be connected to conventional light switches where no control system is present.

Emergency Lighting, Emergency Conversions, or Maintained Emergency Luminaires

A key requirement of artificial lighting is the ability to illuminate a safe means of escape should the normal power to the building fail. This is commonly provided by integrating batteries and additional electronics to a standard luminaire, specified to maintain a minimum light level for a period of at least three hours. Emergency lighting provision is critical to the safety of a building and has much legislation associated with it. Emergency lighting design should only be undertaken by a suitably qualified professional.



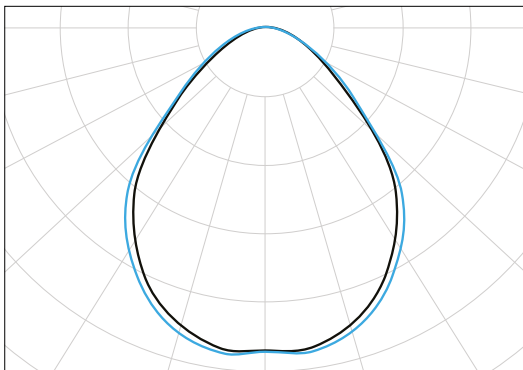
The Science Explained

It is often helpful to understand some of the basic science behind how SAS International products provide the performance quoted. A lighting professional should be familiar with these concepts, however it is understood that such expertise is not available on every project. In that event, SAS' lighting specialists are pleased to assist.

Light Distribution

Fundamental to a successful lighting installation is the distribution of light within that space. Understanding the spatial distribution of light from a luminaire is key to planning, predicting and designing with light. It is possible to communicate this 'intensity distribution' in a high resolution, digital manner with files suitable for use with lighting calculation software.

The intensity distribution of a light source can also be presented graphically with a polar diagram:



Polar diagrams are generated by plotting the intensity against the angle of view to the light source (where 0° is directly underneath). Polar diagrams are useful as a quick indicator of the way a luminaire will light a space - narrow curves may represent tight beamed spotlights, wide rounded curves may represent minimally shielded fluorescent tubes.

Light Quality

The concept of 'light quality' can be hard to communicate, this is the reason so many ways of measuring and describing light exist. Fundamentally, 'white' light can only exist as a mixture of individual colours of light (as a rainbow will attest to). The spectrum of colours emitted by a given light source (termed the Spectral Power Distribution) is key to the way it will react in a given environment.

The Spectral Power Distribution for a light source determines not just its overall CCT and any subtle colour tint, but also the way pigments are revealed and how accurate they may be to a reference source (colour rendering). By manipulating the spectral power distribution, it is possible to deliver light that selectively highlights particular colours, for example to make meat appear fresh or clothing more vibrant.

Lighting for Wellness

Artificial lighting is principally provided to support the function of the human vision system, but this is not the only mechanism through which our bodies respond to light. In addition to the familiar rods and cones present in the back of the eye, non-image forming photoreceptors exist - known as iPRGCs. These iPRGCs are sensitive to a wide range of light colours, but are most sensitive to blue. This sensitivity bias forms the basis of many Circadian Lighting Design strategies which seek to activate these iPRGCs in a manner that mimics the natural day-night cycle. Biologically relevant periods of light and dark are key to a 'synchronised body clock', which is in turn a major element in the concept of wellness.

Commonly Asked Questions

Light Emitting Diodes (LEDs)

LEDs only generate light of a single colour. White LEDs are almost exclusively made of blue LEDs with a layer of colour-conversion phosphors. These phosphors allow some blue light through and convert the rest to light with a spectral power distribution necessary for an overall white appearance.

Understanding this arrangement provides an insight to some of the commonly observed characteristics of LEDs:

- Cool white LEDs are more efficient than warm white because they don't require such a thick phosphor coating.
- LED spectral power distributions have a characteristic 'blue spike' due to the LED's native wavelength.
- LEDs normally have relatively poor colour rendering of red pigments as it is tricky to efficiently convert blue light to red.

How do I integrate SAS luminaires into a lighting controls system?

As standard, all SAS luminaires are compatible with a DALI control system. The control system itself can take many forms, from a simple conventional light switch to a BMS integrated network. SAS does not advise on control system products or strategies beyond the assurance that our luminaires adhere to the DALI standard protocol.

Are your fittings compliant to part L2 of The Building Regulations? Are they eligible for an ECA?

Yes, but the minimum standards for these schemes are regularly reviewed and each planned lighting installation should be assessed individually prior to commitment.

What is the UGR value for this fitting?

Light fittings themselves don't have UGR values. Glare is the subjective experience of an observer, the UGR calculation attempts to assign a value to this experience for a range of geometric relationships between the observer and a uniform array of luminaires. Strictly speaking, UGR values are only valid for the specific observer position they have been calculated for.

I need 500 lux, not 487!

Average light levels will by definition include areas of higher light levels and lower light levels, often corners and odd shaped alcoves can distort 'average' light levels misleadingly. Additionally, in practice there is no perceivable difference between the two levels noted above. A common rule-of-thumb is to use a tolerance of up to 20% either side of the target value.

Colour perception is important, I need a high Ra value.

Whilst there are undoubtedly applications requiring very high and repeatable colour fidelity (such as colour matching at a graphics printing facility), in practice there is only a subtle difference in a side-by-side comparison of Ra80 sources to something higher. Of dramatic and immediate notability is the difference in colour reproduction between sources of varying CCT. If vivid red reproduction is important, a warmer CCT will deliver far more apparent results than a high Ra.

What is the thermal output of your light fitting?

LEDs do not generate light by heating up until they glow, but 50 W of electrical load is still dissipating 50 W that will eventually end up as heat somewhere. The majority of the heat will be spread evenly across the LED PCBs themselves, whilst 10 or 12% will be lost at the driver. In normal conditions, surface temperatures will not exceed 50° C.





Integrated **Lighting**


Snowhill

Location
Birmingham, UK
Architect
**Sidell Gibson
Partnership / Weedon
Partnership**


Contractor
Balfour Beatty
Purpose
Commercial

SAS330i

SYSTEM GROUP	SUSPENSION METHOD
	
Suspended Ceiling	Exposed Grid – SAS C-Profile or Omega C-Profile suspension

TILE

Lay-In

ACOUSTICS	
A-C	15-50dB
Absorption class	Insulation

ACCESS	SYSTEM WEIGHT	LIFE EXPECTANCY
	Linear grid approx. 21 Kg/m²*	25yr
Lift and Tilt	Based on 1500 mm Module with continuous lights every 3 m	In excess of electrical 60k to 100k hours

***Note** This includes the entire system and full associated components (suspension, tile, acoustic pad and associated fixings.)



An evolution of the industry benchmark, SAS330i is suitable for any building module, offering all of the versatility of SAS330. The fully integrated lighting profile creates a clean and elegant alternative to separate lighting options. Available in linear and tartan grid forms, the system combines a crisp, monolithic aesthetic with high performance in equal measure.

SAS330i luminaires are designed to integrate seamlessly with the ceiling system. Lumen packages and optics have been specifically selected to address the lighting requirements of modern office spaces.

Access

The secure void is completely accessible by removing the lay-in tiles, with no need for specialist tools.

Module Sizes

SAS330i ceiling tiles can be manufactured in 50 mm increments up to 3 m lengths. Light modules available in 1.5 and 3 m as standard with terminator modules manufactured to order between 0.5 - 3 m in 50 mm increments.

Finishes

SAS330i is available in all standard SAS finishes, please refer to page 105*. Bespoke finishes are available on request.

Perforations

SAS330i tiles can be manufactured with any standard SAS perforation pattern. For our full range of perforations, please refer to page 83*. Bespoke perforations are also an option.

Acoustic Materials

16 mm deep, 80 kg/m³ density mineral wool pad with black tissue face, foil back and sides. Other acoustic materials are available depending on performance requirements, please refer to page 20*.

Service Integration

SAS330i ceiling tiles and profiles can be formed with apertures during manufacturing and post painted to integrate additional services. Chilled panels are also an option. Please contact our technical team for further information on integrating additional M&E services and sensors.

Please note Additional loads applied to SAS330i ceiling tiles must not exceed 7 kg. Anything in excess of 7 kg requires independent suspension.

Lifetime and Maintenance

The LED light source used in SAS330i will still deliver over 90% of their peak light output after 60,000 hours of operation. Electronic control gear will operate for 100,000 hours with a maximum 10% failure level.

Light modules can be accessed for maintenance from below the ceiling by removing the diffuser, and easily demounted by releasing the retaining spring clips positioned in each corner of the LED tray.

Emergency Lighting

Emergency lighting can be provided through 3-hour maintained emergency versions of the SAS330i light module. All emergency lighting provision calculations should be approved by a suitably qualified person.

Typically, 12 - 20% of luminaires in SAS330i are required to be maintained emergency versions.

Control System Compatibility

Each 1.5 m light module is supplied with DALI addressable and dimmable driver. Modules with integrated emergency provision have an additional DALI addressable and reporting emergency converter.

Technical Support

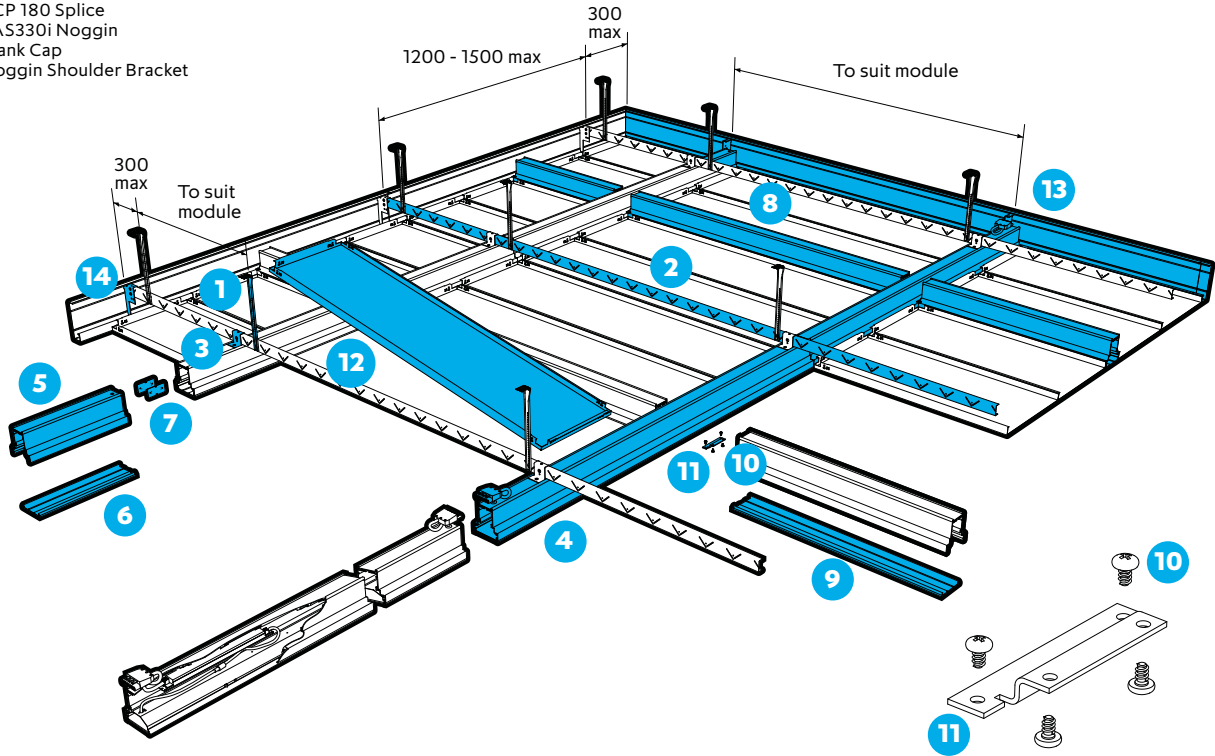
Please contact our technical team for all questions relating to access, security, bespoke features, service integration or load support.

* In the Metal Ceilings Brochure

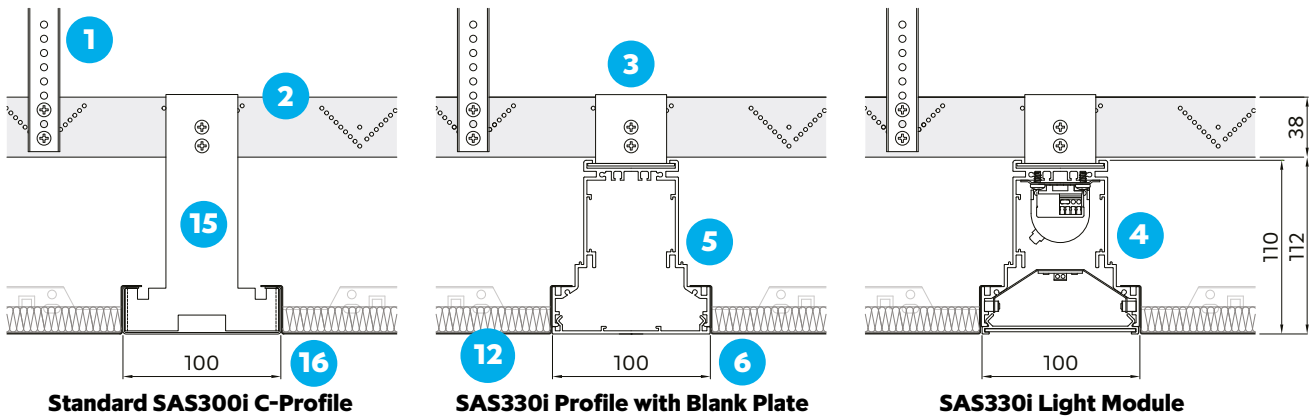


Perspective Drawing

- 1 Emac Hanger
- 2 Emac Grid
- 3 Emac Hook Over Bracket
- 4 SAS330i Module
- 5 Main Profile - 3 m length
- 6 Blank Cap
- 7 TCP 180 Splice
- 8 SAS330i Noggin
- 9 Blank Cap
- 10 Noggin Shoulder Bracket
- 11 Posi Pan Self Tapper
- 12 SAS330i Tile
- 13 Perimeter Trim/ Bulkhead Profile
- 14 Perimeter Trim/ Bulkhead Bracket
- 15 Extended SAS330i C Profile to Emac Hanger
- 16 Standard SAS330i C Profile



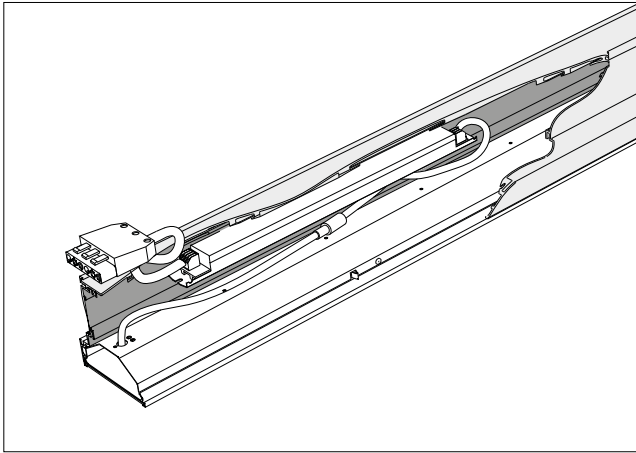
Section and Detail Drawings



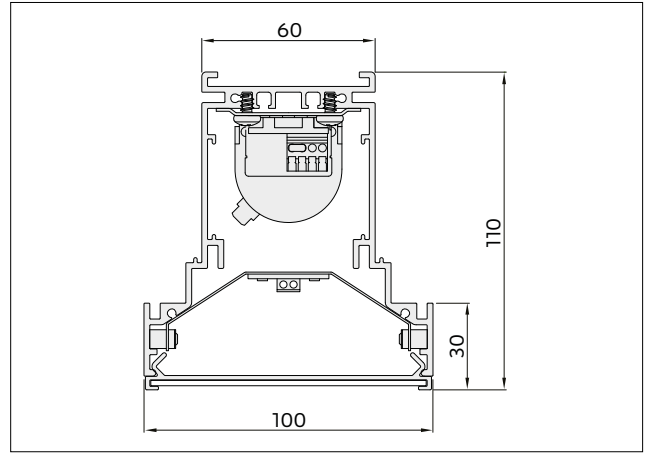


Light modules

Product performance and control system integration are delivered to best practice guidelines recommended in industry standard documents.



Cut Away Diagram

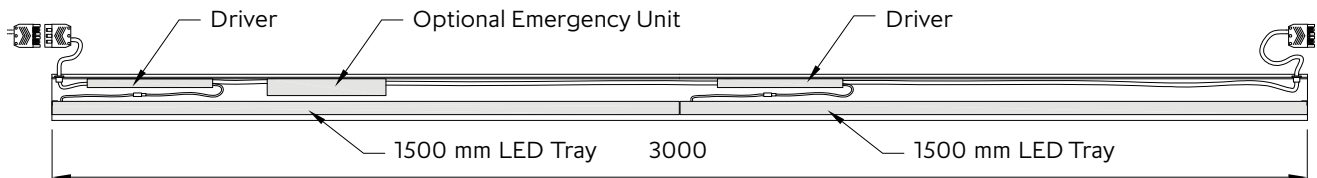


Section Detail

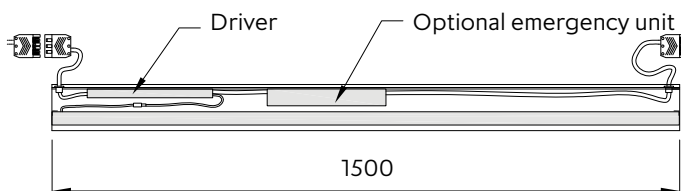
Applications

The SAS330i luminaire system delivers a single, homogeneous and continuous line of light with no practical limit to the length.

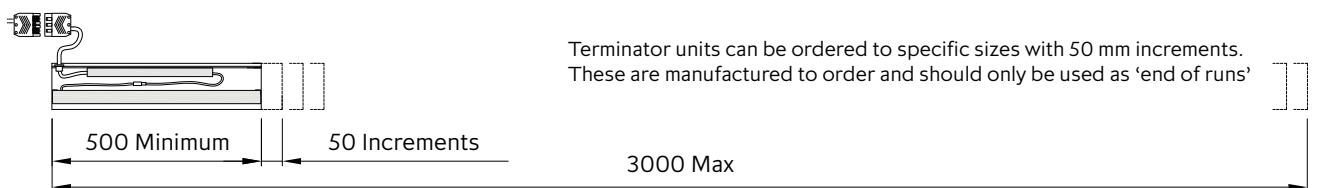
The self-luminous diffuser delivers a well balanced lit space typically delivering 500 lux, with a glare performance making it suitable for conventional office-type applications.



Assembled Standard Double Module



Assembled Standard Single Module



Assembled Terminator Module (Variable Length)

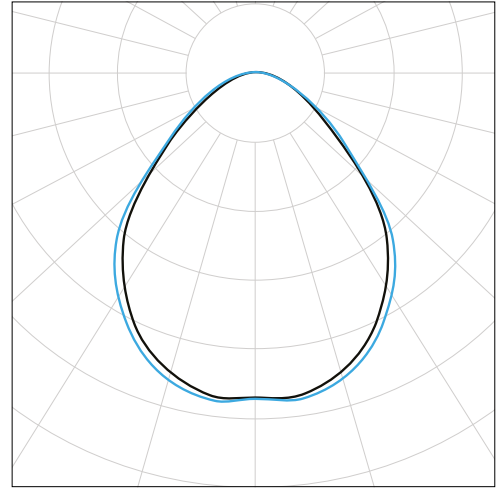
All dimensions are in mm.





Key Performance Parameters

Light output per linear metre	1533 lumens
Circuit power per linear metre	13.3 W
Typical UGR value*	19 or less
Luminance at 65 °	< 3000 cd/m²
CCT	4000 K
Colour Rendering Index	80 Ra
Colour Consistency	3 SDCM
Emergency lumen package (where ordered)	480 lumens
Lighting Control Protocol	DALI
Nominal maximum run length (C16 MCB)*	69 m



* Guidance values only, full calculations to be undertaken by a qualified engineer.

Lighting Design Guidance

The below values are provided as an indication of lighting performance in a typical application situation, they are not intended to replace the services of an experienced lighting design professional. All figures stated are representative of anticipated performance based on the parameters provided below. These are not guaranteed performance values.

Luminaire	Typical Desk-height Light Level (lux)	Typical Task Area Uniformity	Lighting Load (W/m ²)	Typical Glare Value (UGR)	Mean Cylindrical Illuminance (lux)	Typical Modelling Index
SAS330i	530	0.93	4.44	< 19	270	0.48

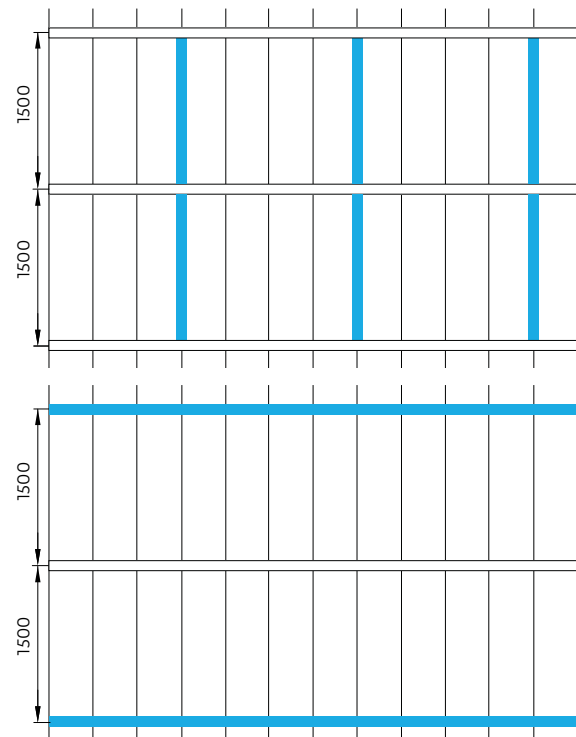
These values are based on the following room properties:

Dimensions (L x W x H): 30 m x 15 m x 2.7 m. Surface reflectance values (C:W:F): 80:60:30. Maintenance Factor: 0.85

Specification Text

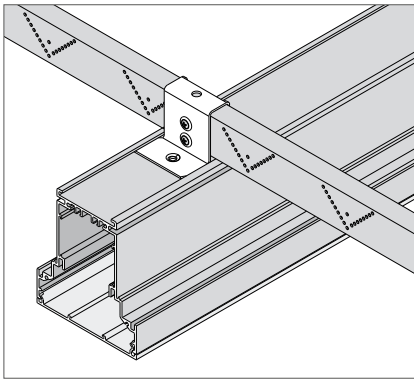
- Linear recessed luminaire capable of long continuously lit runs.
- 100 mm wide low glare micro-prismatic optic with integral source obscuration for a uniform lit appearance, suitable for installations requiring UGR values below 19 and luminance limits up to 3000 cd/m² at 65°.
- Light Output: 1533 lm/m
- Connected Load: 13.3 W/m
- CCT: 4000 K
- Colour Rendering Index: Ra 80 minimum
- Service Life: 60,000 hours to L90. Luminaire body of white powder coated extruded aluminium. Complete with integral DALI addressable control gear and modular wiring system. Integral 3 hours DALI addressable emergency versions available to order.

Typical installation of SAS330i in a linear arrangement with lights at 3 m centres.



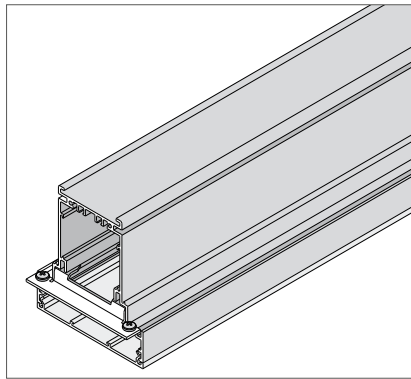


Emac hook over bracket



Designed to hook directly onto standard SAS EMAC Grid with a soft fold flange and fixing holes. The hook over bracket can be twisted into place locally and slides into its final position.

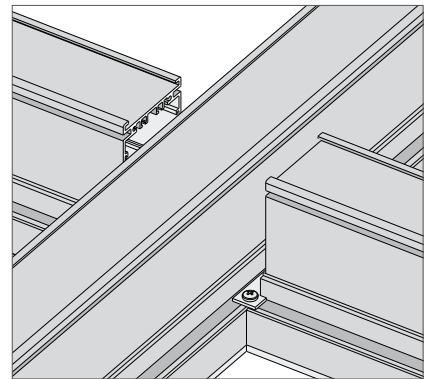
Noggin Shoulder bracket



This bracket can be fixed into SAS330i profile to allow it to be used as a noggin. The bracket can also be used for securing perimeter trims.

(Requires 4x Item No. 208649)

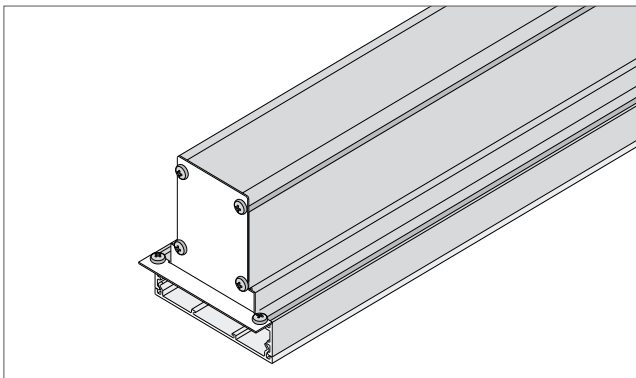
Noggin Interface



Assembled view of the noggin interface. The brackets allow noggins to be fixed down to the main runner.

(Requires 4x Item No. 208649).

Bulkhead / Noggin Interface End Cap

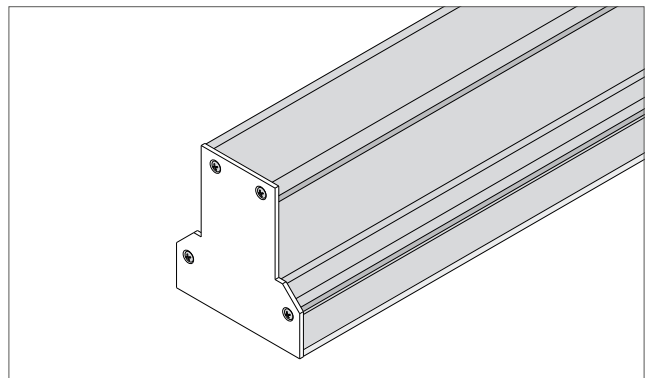


Standard screw on end cap for use at bulkheads and noggin interfaces (for profiles containing a light module). All light modules must be sealed with an end cap to prevent dust ingress.

This cap can be used to fix perimeter trims or other profiles.

(Requires 6x Item No. 208649).

Aluminium PPC Screw on End Cap






Standard screw on end cap suitable for use on installations without any trim (for profiles containing a light module). All light modules must be sealed with an end cap to prevent dust ingress.

3 mm aluminium with countersunk holes.

(Requires 4x No6 x 12 countersunk self-tapping BZP screws. Sold separately).

SAS**500** Lighting

SYSTEM GROUP	SUSPENSION METHOD
 Baffle	Suspended from primary grid, threaded rod or cable hangers

TILE	
 Enclosed baffle	 Square edge

ACOUSTICS
A-C
Absorption class

ACCESS	SYSTEM WEIGHT	LIFE EXPECTANCY
Baffles are open systems	9.3 kg/lm + 2.5 kg/lm for lights	Components 25Yr
	Based on standard 1000 x 400 x 50 mm baffle	In excess of electrical 60k to 100k hours



SAS500 luminaires are designed to integrate seamlessly with the SAS500 acoustic baffle system. Lumen packages and optics have been specifically selected to address the lighting requirements of large, open plan spaces.

Ideal for exposed soffit areas, baffles offer creative and acoustic flexibility, ideal for new build and retrofit schemes.

Baffle Sizes

Standard baffle lengths are 1200 mm, 1500 mm and 1800 mm. Baffle depths are between 150 mm and 500 mm. Standard width is 50 mm. Bespoke baffle sizes and shapes are available on request.

Note Individual baffles are supplied assembled ready for installation on-site.

Linear baffles intended for long continuous runs are supplied loose for on-site assembly.

Finishes

Available in all standard SAS finishes, please refer to page 105 of the metal ceilings brochure. Bespoke finishes are available on request.

Perforations

SAS500 can be manufactured with any standard SAS perforation. For our full range of perforations, please refer to page 83 of the metal ceilings brochure. Bespoke perforations are also an option.

Acoustic Materials

50 mm deep, 45 kg/m³ density mineral wool pad with black tissue face. Other acoustic materials are available.

Applications

SAS500 Luminaires are fully compatible with standard SAS500 baffles. Lit sections can be mounted individually or in a continuous run, with drivers external to the baffle(s).

SAS500 Light baffles are designed to deliver well balanced lit environments suitable for large spaces and central circulation areas.

Lifetime and Maintenance

The LED light source used with SAS500 will still deliver over 90% of their peak light output after 60,000 hours of operation. Electronic control gear will operate for 100,000 hours with a maximum 10% failure level.

Light modules can be accessed for maintenance from below by removing the diffuser, and easily demounted by releasing the retaining spring clips positioned in each corner.

Drivers may be replaced by unplugging the remote pack.

Emergency Lighting

Emergency lighting is provided through 3-hour maintained emergency versions of the baffle light module. All emergency lighting provision calculations should be approved by a suitably qualified person.

Control System Compatibility

Each individual unit is supplied with DALI addressable and dimmable control gear. Modules with integrated emergency provision have an additional DALI addressable and reporting emergency converter.

Optic

Opal polycarbonate diffuser or glare control lens options available.

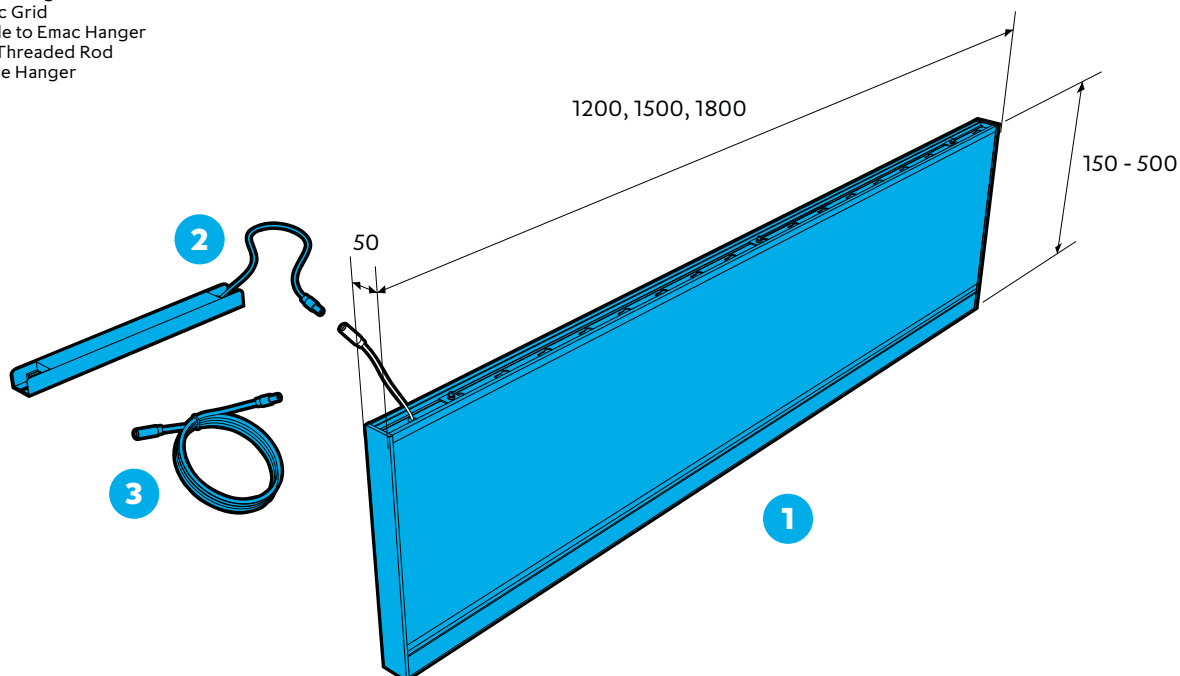
Technical Support

Please contact our technical team for all questions relating to bespoke features, sizes or service integration.



Perspective Drawing

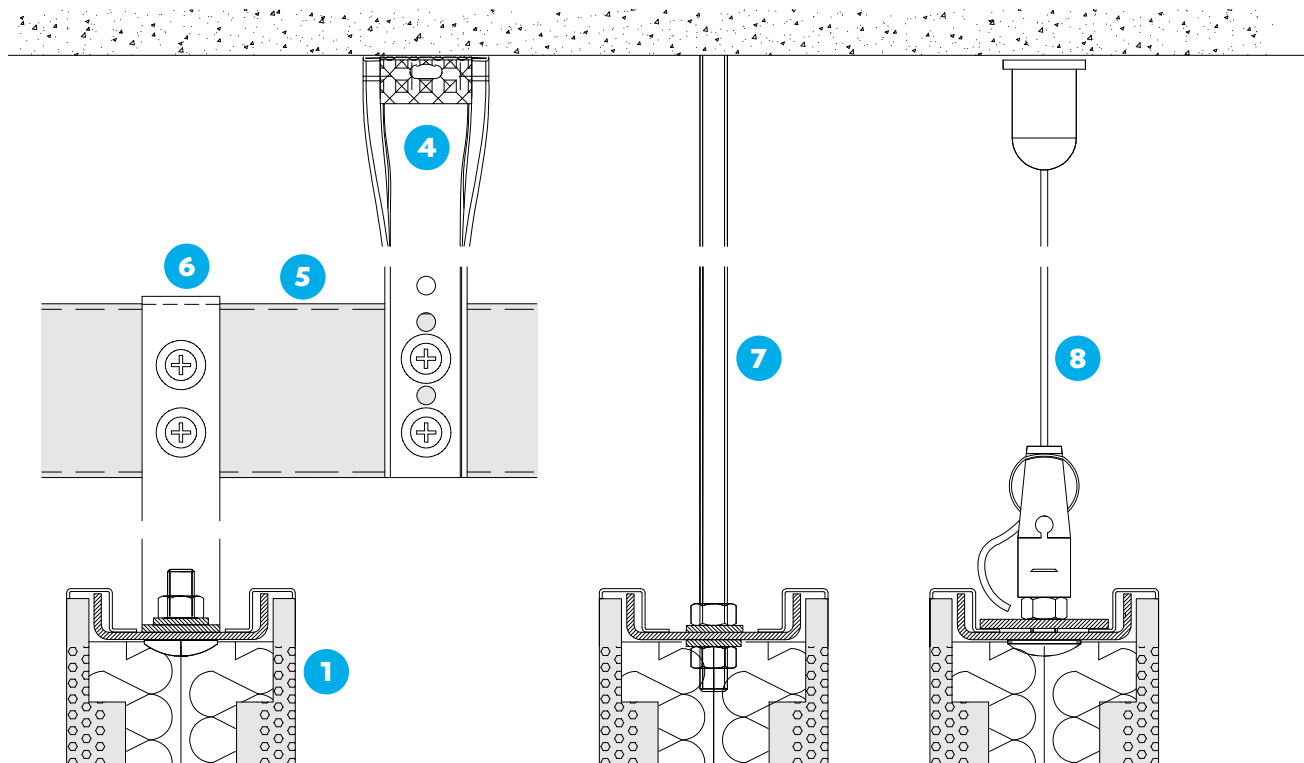
- 1 Baffle Light with Glare Control Lens
- 2 Driver Type 1 - 50 W Dali 24 V
- 3 3 m Extension Cable
- 4 Emac Hanger
- 5 Emac Grid
- 6 Baffle to Emac Hanger
- 7 M6 Threaded Rod
- 8 Cable Hanger



Grid Hanging

Threaded Rod Hanger

Cable Hanging

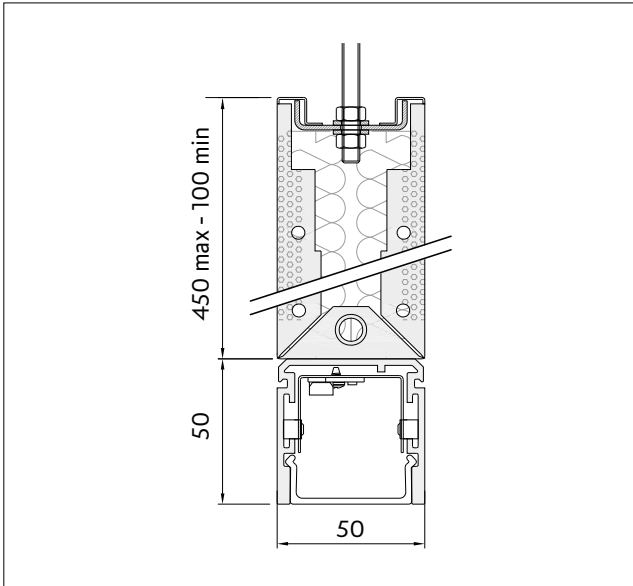


SAS500 Lighting

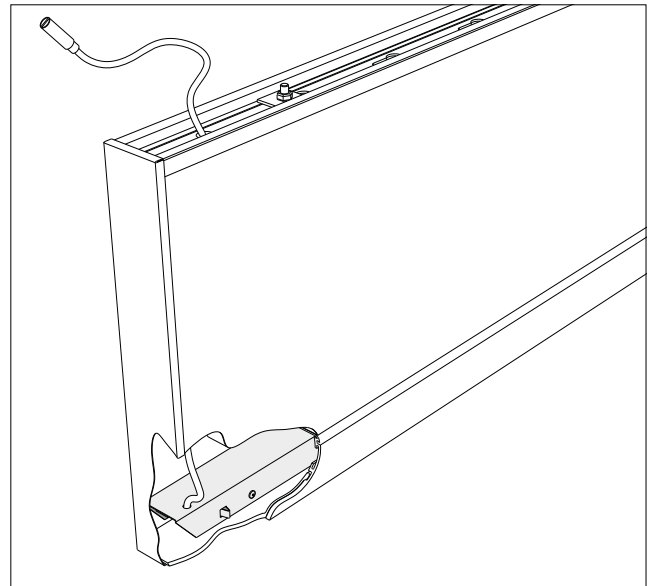


Light Modules

Product performance and control system integration are delivered to best practice guidelines recommended in industry standard documents.



Section Detail



Cut Away Diagram

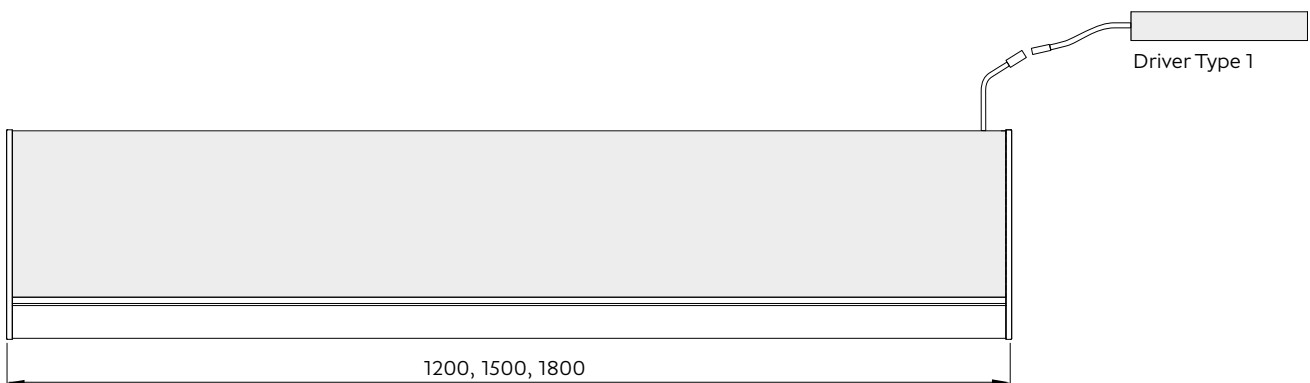
Baffle Light Modules

All baffle light modules are available in 1200 mm, 1500 mm and 1800 mm long by 150 mm to 500 mm deep modules.

Individual baffles are supplied assembled with end caps and a 200 mm flying lead. Drivers have a 500 mm flying lead and need to be mounted separately with connection to power and controls by others.

A separate 3000 mm extension cable is available if required.

Module Length	Module Depth
1200 mm	150 mm - 500 mm
1500 mm	150 mm - 500 mm
1800 mm	150 mm - 500 mm



Individual Modules

All dimensions are in mm.

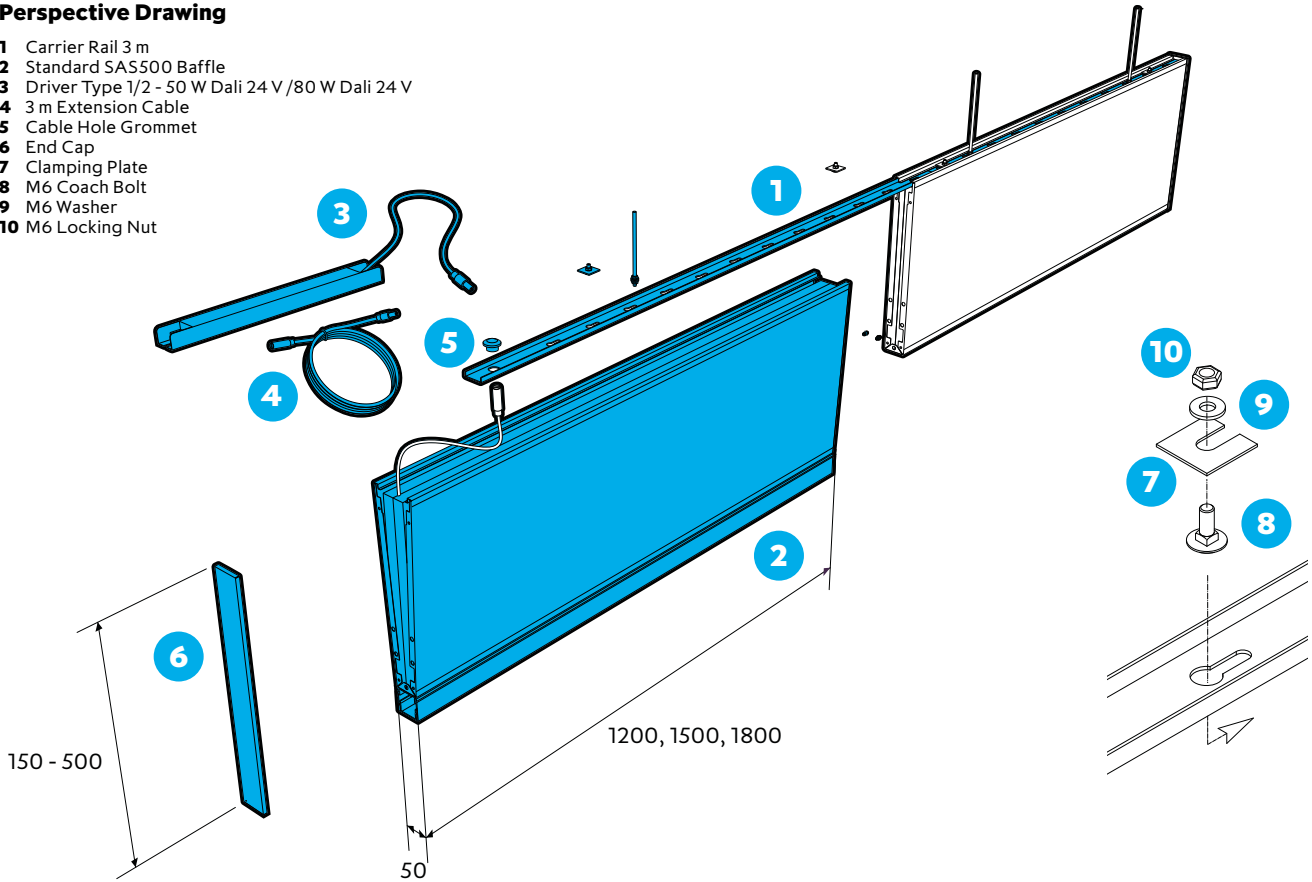


SAS500 Lighting



Perspective Drawing

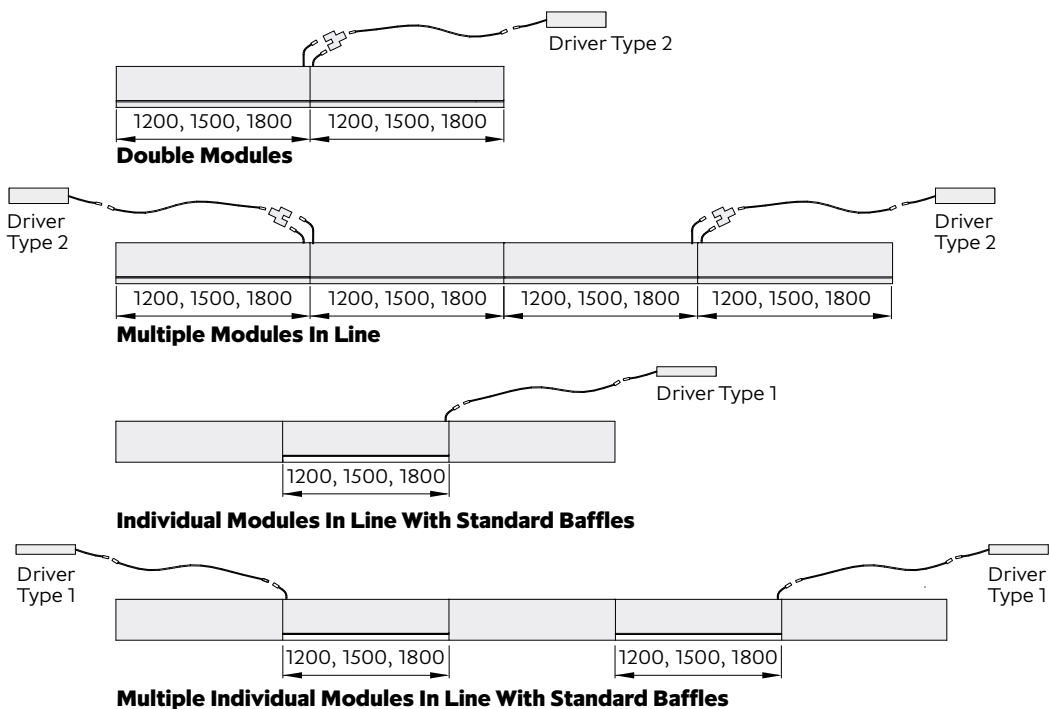
- 1 Carrier Rail 3 m
- 2 Standard SAS500 Baffle
- 3 Driver Type 1/2 - 50 W Dali 24 V / 80 W Dali 24 V
- 4 3 m Extension Cable
- 5 Cable Hole Grommet
- 6 End Cap
- 7 Clamping Plate
- 8 M6 Coach Bolt
- 9 M6 Washer
- 10 M6 Locking Nut



Baffle Light Modules

Baffle lights can be integrated into continuous runs with standard SAS500 baffles.

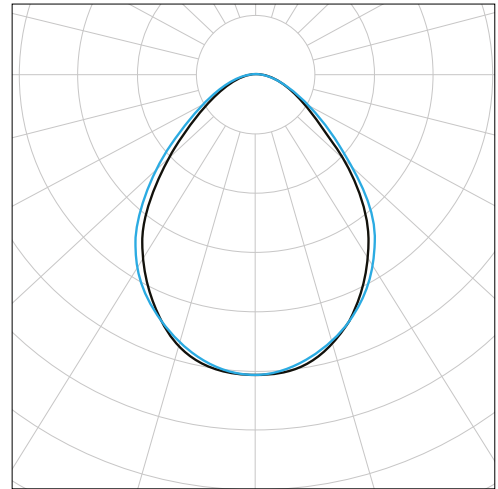
Drivers are all mounted separately and are available in Type 1 for single modules or Type 2 with a splitter for double module arrangements.





Key Performance Parameters

	OP Diffuser	GC Optic
Light output per linear metre	1340 lumens	1060 lumens
Circuit power per linear metre	17.5 W	17.5 W
Typical UGR value*	23 or less	21 or less
Luminance at 65 °	<7500 cd/m²	<4000 cd/m²
CCT	4000K	4000K
Colour Rendering Index	80 Ra	80 Ra
Colour Consistency	3 SDCM	3 SDCM
Emergency lumen package (where ordered)	306 lumens	242 lumens
Lighting Control Protocol	DALI	DALI
Nominal maximum run length (C16 MCB)*	37.5 m	37.5 m



* Guidance values only, full calculations to be undertaken by a qualified engineer

Lighting Design Guidance

The below values are provided as an indication of lighting performance in a typical application situation, they are not intended to replace the services of an experienced lighting design professional. All figures stated are representative of anticipated performance based on the parameters provided below. These are not guaranteed performance values.

Luminaire	Typical desk-height Light Level (lux)	Typical Task Area Uniformity	Lighting Load (W/m ²)	Typical Glare Value (UGR)	Mean Cylindrical Illuminance (lux)	Typical Modelling Index
SAS500 Light OP	400	0.92	5.78	<23	210	0.48
SAS500 Light GC	320	0.93	5.78	<21	160	0.46

These values are based on the following room properties:

Dimensions (L x W x H): 30 m x 15 m x 3.5 m. Baffle Depth: 500 mm. Surface reflectance values (C:W:F): 80:60:30. Maintenance Factor: 0.85

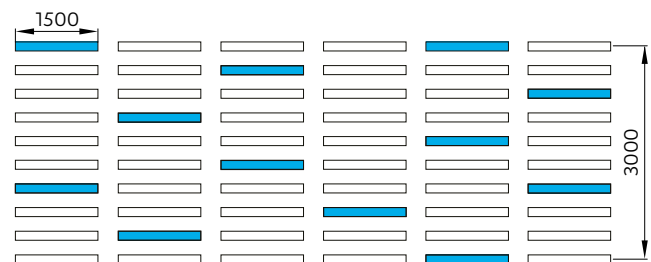
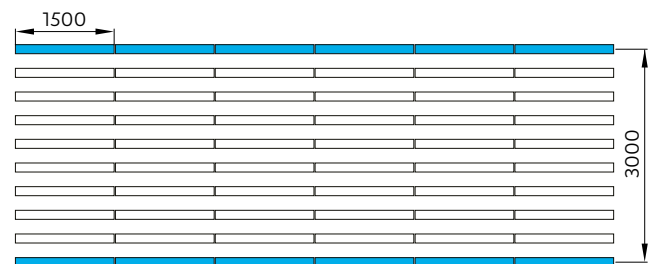
Specification: OP Diffuser option

- Linear suspended luminaire with acoustic absorptive properties, capable of long continuously lit runs.
- 50 mm wide source obscuration diffuser for a uniform lit appearance. Light output: 1340 lm/m, Connected load: 17.5 W/m, CCT: 4000K, Colour Rendering Index: Ra80 minimum, Service Life: 60,000 hours to L90.
- Luminaire body of white powder coated extruded aluminium. Complete with remote DALI addressable control gear. Remote 3 hour DALI addressable emergency versions available to order.

Specification: GC Optic option

- Linear suspended luminaire with acoustic absorptive properties, capable of long continuously lit runs.
- 50 mm wide low glare micro-prismatic optic with integral source obscuration for a uniform lit appearance. Light output: 1060 lm/m, Connected load: 17.5 W/m, CCT: 4000K, Colour Rendering Index: Ra80 minimum, Service Life: 60,000 hours to L90.
- Luminaire body of white powder coated extruded aluminium. Complete with remote DALI addressable control gear. Remote 3 hour DALI addressable emergency versions available to order.

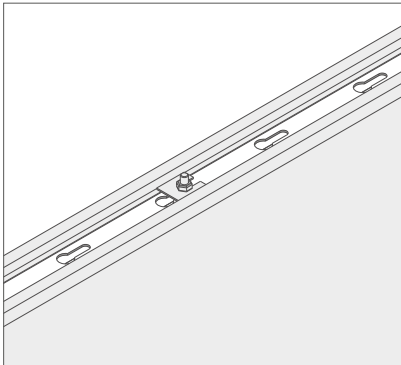
Typical Installation of SAS500 Lighting



All dimensions are in mm.

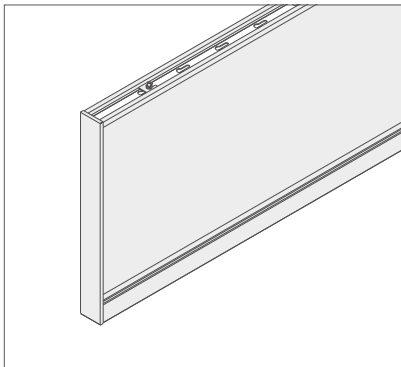


Clamp Plate and Keyhole Slots



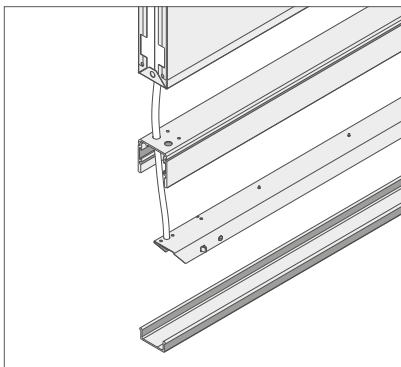
The clamp plate holds the baffle and the carrier rail together. The keyhole slots provide flexibility for hanging method on site.

End Cap



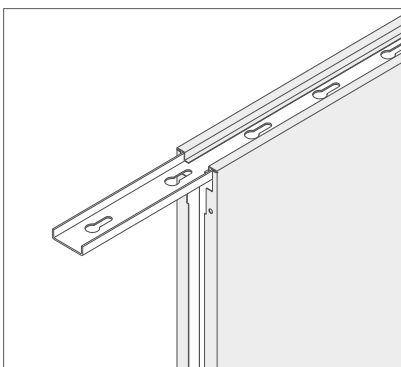
Pressed steel construction bonded onto the end(s) of the baffle. Powder coated to match both baffle and light.

LED Tray



A separate LED tray can be maintained in a white finish, regardless of the external colour of the baffle. This feature provides consistent light output. The tray is easily removable for simple maintenance.

Carrier Rail





Carrier rails provide strength for the individual baffles. On continuous runs the carrier is installed first and levelled. The baffles (inc. lights) are then hooked over the carrier.




SAS**740** Lighting

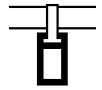
SAS740 Lighting

SYSTEM GROUP	SUSPENSION METHOD
	Slotted EMAC Grid EMAC Hanger suspension
Linear Profile Ceiling	

PROFILE	MATERIAL
	Aluminium
Bolt-on Rectilinear-as standard	

ACOUSTICS	APPLICATION	END CAPS
B-D	Interior and External	
Absorption class		

ACCESS	SYSTEM WEIGHT	LIFE EXPECTANCY
Full void access	2.5 kg/lm + 2 kg/lm for lights	Components 25Yr
In excess of electrical 60k to 100k hours		



SAS740 is the most versatile of SAS' integrated linear ceilings, able to accommodate complex geometry and void access. Unlike other continuous linear profile systems, SAS740 can intersperse with acoustic infill panels.

Now incorporating lighting, the aluminium system is suitable for spaces requiring a premium aesthetic alternative to suspended ceilings.

Profile Sizes

SAS740 is currently available in 50 mm x 200 mm x 3000 mm profile sizes with luminaires available at 1200, 1500, 1800, 2400 and 3000 mm units.

For sufficient quantity we will consider bespoke dimensions.

Finishes

SAS740 is available in all standard SAS finishes, please refer to page 105 of the metal ceilings brochure. Bespoke finishes are available on request, including polished and anodised.

Acoustic Materials

SAS740 can be specified with acoustic tiles in between linear profiles. 16 mm deep, 80 kg/m³ density mineral wool pad with black tissue face, foil back and sides. Other acoustic materials are available, please refer to page 20 of metal ceilings brochure.

Applications

SAS740 lights add an integrated general illumination capability to an SAS740 installation. Lit sections can be mounted individually or in a continuous fashion, with control gear mounted in the top of the profile (not visible from below.)

SAS740 lights are designed to deliver well balanced lit environments suitable for large spaces and central circulation areas.

The profile has space to allow up-lighting to be included with allowance for gaps at support brackets and driver locations.

Lifetime and maintenance

The LED light source used in the SAS740 will still deliver over 90% of their peak light output after 60,000 hours of operation. Electronic control gear will operate for 100,000 hours with a maximum 10% failure level.

Light modules can be accessed for maintenance from below by removing the diffuser, and easily demounted by releasing the retaining spring clips positioned in each corner.

Control gear may be replaced by unplugging the remote pack.

Emergency Lighting

Emergency lighting is provided through 3-hour maintained emergency versions of the light module. All emergency lighting provision calculations should be approved by a suitably qualified person.

Emergency gear must be mounted within 1 m of the luminaire separately on the support grid rather than within the profile.

Control System Compatibility

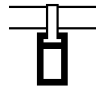
Each individual unit is supplied with DALI addressable and dimmable control gear. Modules with integrated emergency provision have an additional DALI addressable and reporting emergency converter.

Optic

Opal polycarbonate diffuser or glare control lens options available.

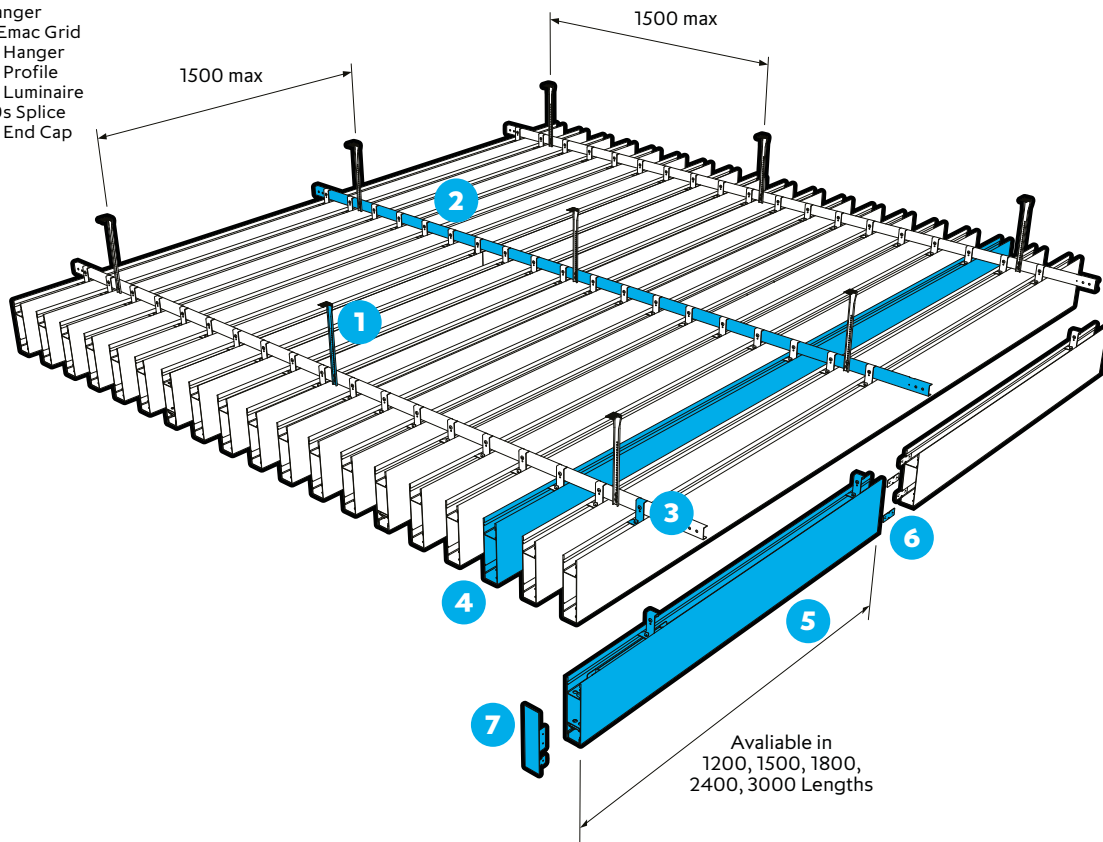
Technical Support

Please contact our technical team for all questions relating to access, bespoke features and service integration.

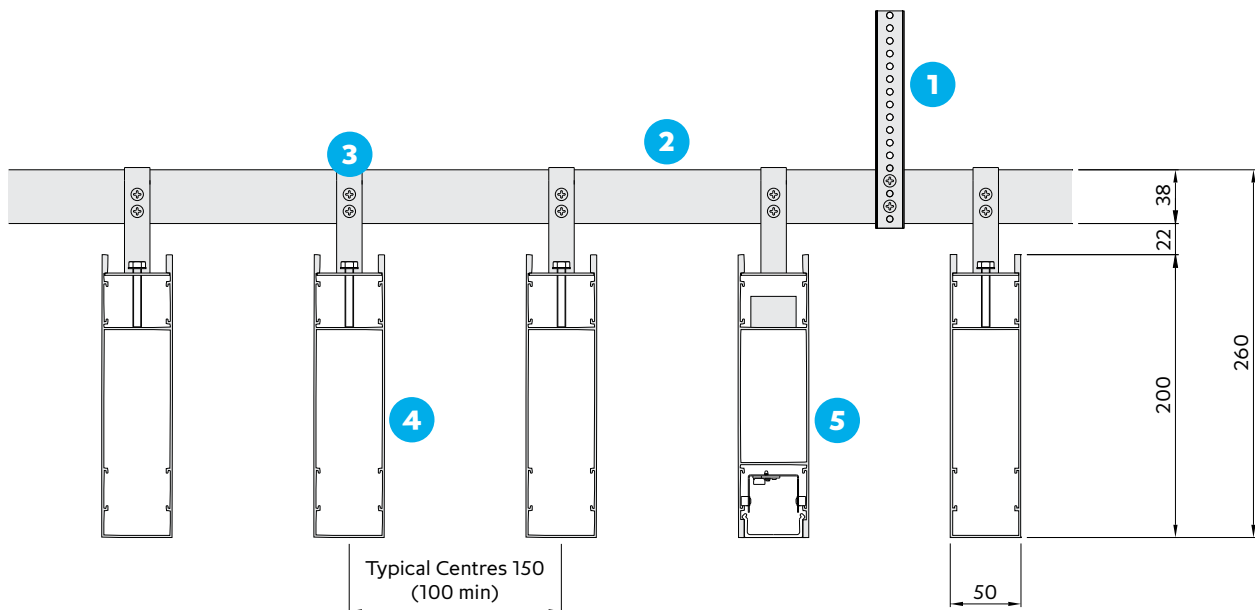


Perspective Drawing

- 1 Emac Hanger
- 2 Slotted Emac Grid
- 3 SAS740 Hanger
- 4 SAS740 Profile
- 5 SAS740 Luminaire
- 6 TCP 180s Splice
- 7 SAS740 End Cap



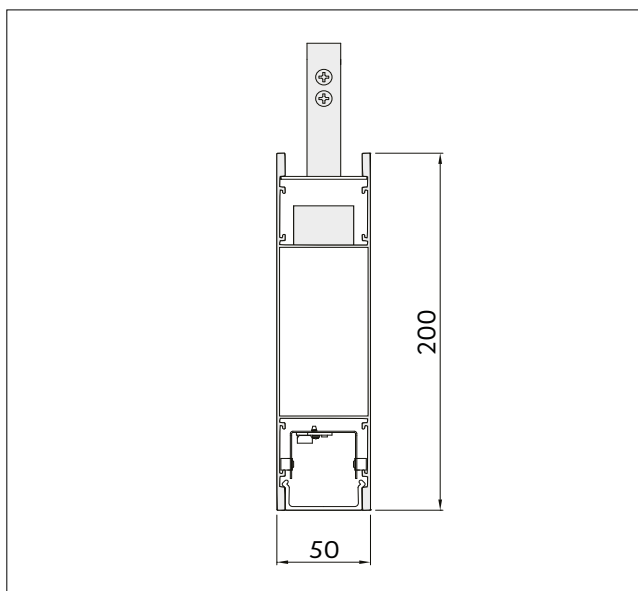
Section and detail drawings



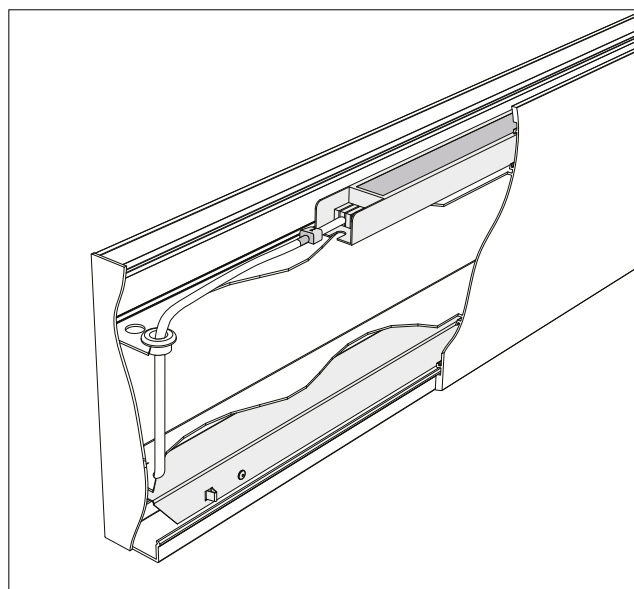


Light Modules

Light modules are available in standard lengths, fully assembled and ready to install.



Section Detail

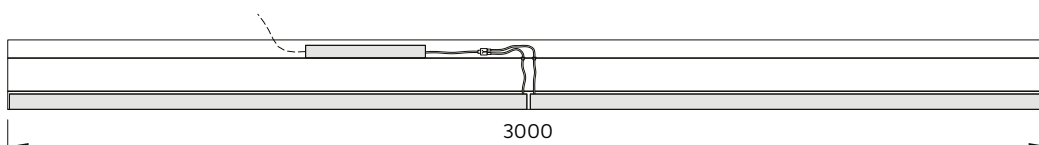


Cut Away Diagram

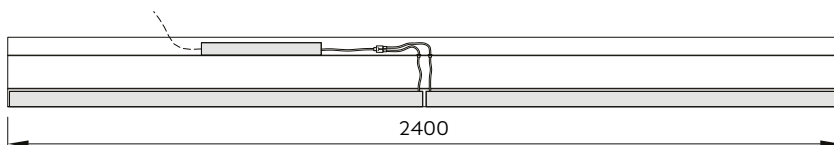
SAS740 Light Modules

All SAS740 light modules are available in 1200 mm, 1500 mm and 1800 mm 2400 mm and 3000 mm long.

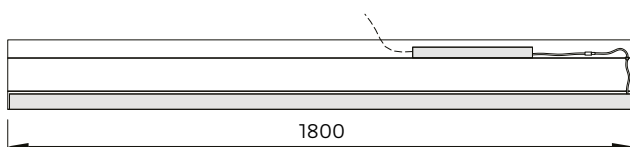
SAS740 lights come complete with DALI drivers. Connection to mains/controls by others directly into the DALI driver mounted into the top of the profile.



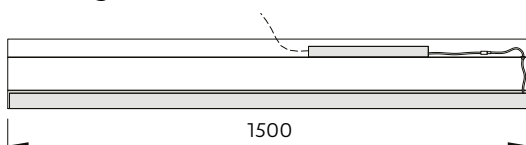
3m Double Module



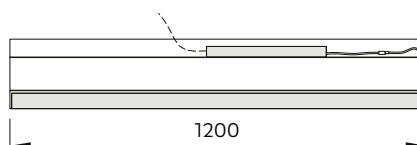
2.4m Double Module



1.8m Single Module

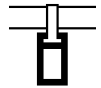


1.5m Single Module



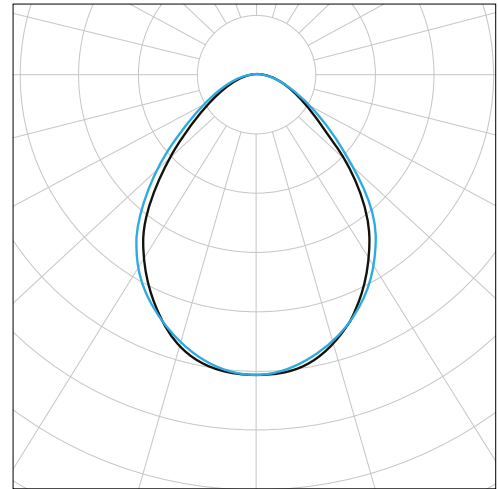
1.2m Single Module

All dimensions are in mm.



Key Performance Parameters

	OP Diffuser	GC Optic
Light output per linear metre	1340 lumens	1060 lumens
Circuit power per linear metre	17.5 W	17.5 W
Typical UGR value*	23 or less	21 or less
Luminance at 65 °	<7500 cd/m²	<4000 cd/m²
CCT	4000 K	4000 K
Colour Rendering Index	80 Ra	80 Ra
Colour Consistency	3 SDCM	3 SDCM
Emergency lumen package (where ordered)	306 lumens	242 lumens
Lighting Control Protocol	DALI	DALI
Nominal maximum run length (C16 MCB)*	37.5 m	37.5 m



* Guidance values only, full calculations to be undertaken by a qualified engineer

Lighting Design Guidance

The below values are provided as an indication of lighting performance in a typical application situation, they are not intended to replace the services of an experienced lighting design professional. All figures stated are representative of anticipated performance based on the parameters provided below. These are not guaranteed performance values.

Luminaire	Typical desk-height Light Level (lux)	Typical Task Area Uniformity	Lighting Load (W/m ²)	Typical Glare Value (UGR)	Mean Cylindrical Illuminance (lux)	Typical Modelling Index
SAS740 OP	400	0.92	5.78	< 23	210	0.48
SAS740 GC	320	0.93	5.78	< 21	160	0.46

These values are based on the following room properties:

Dimensions (L x W x H): 30 m x 15 m x 3.5 m. Mounting Height: 500 mm. Surface reflectance values (C:W:F): 80:60:30. Maintenance Factor: 0.85.

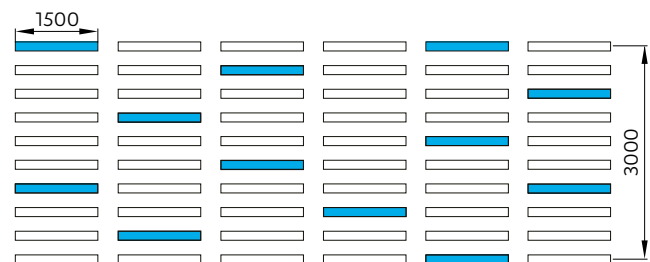
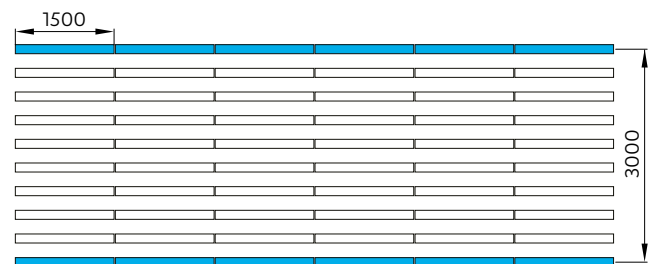
Specification Text: OP Diffuser

- Linear suspended luminaire with acoustic absorptive properties, capable of long continuously lit runs.
- 50 mm wide source obscuration diffuser for a uniform lit appearance. Light output: 1340 lm/m, Connected load: 17.5 W/m, CCT: 4000 K, Colour Rendering Index: Ra80 minimum, Service Life: 60,000 hours to L90.
- Luminaire body of white powder coated extruded aluminium. Complete with remote DALI addressable control gear. Remote 3 hour DALI addressable emergency versions available to order.

Specification Text: GC Optic

- Linear suspended luminaire with acoustic absorptive properties, capable of long continuously lit runs.
- 50 mm wide low glare micro-prismatic optic with integral source obscuration for a uniform lit appearance. Light output: 1060 lm/m, Connected load: 17.5 W/m, CCT: 4000K, Colour Rendering Index: Ra80 minimum, Service Life: 60,000 hours to L90.
- Luminaire body of white powder coated extruded aluminium. Complete with remote DALI addressable control gear. Remote 3 hour DALI addressable emergency versions available to order.




Typical Installation of SAS740

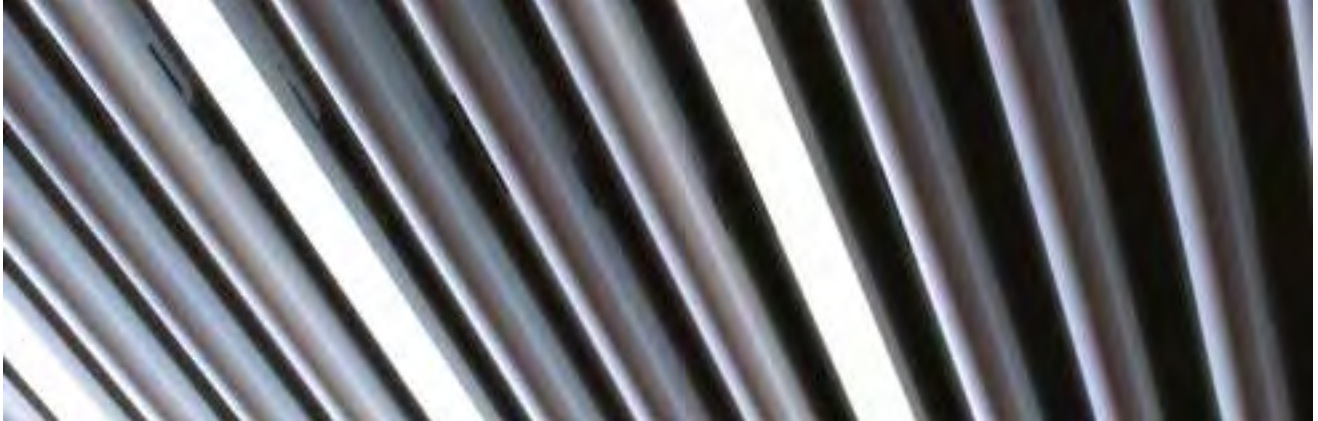
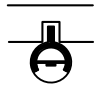




SAS**750** Lighting

SAS750 Lighting

SYSTEM GROUP		SUSPENSION METHOD
		SAS Carrier Rail Threaded Rod suspension
Linear Profile Ceiling		
PROFILE	MATERIAL	
	Aluminium	
Tubular – as standard		
APPLICATION	END CAPS	
Interior		
ACCESS	SYSTEM WEIGHT	LIFE EXPECTANCY
Full void access	3.5 kg per 3 m light module	Components 25Yr
In excess of electrical 60k to 100k hours		



SAS750 luminaires are designed to integrate seamlessly with the SAS Tubeline ceiling system. Available in two sizes, Tubeline lighting fosters dynamic, impactful design and overcomes practical considerations such as access and service integration. Lumen packages and optics have been specifically selected to address the lighting requirements of large, open plan circulation spaces.

Access

Void access can be achieved through demounting profiles or integrated access hatches.

Profile Sizes

Standard Length **3000 mm**
Lit Portion **1.5 m**
2.8 m

Finishes

SAS750 is available in all standard SAS finishes, please refer to page 105 of the Metal Ceilings Brochure. Bespoke finishes are available on request, including polished and anodised.

Applications

SAS750 luminaires combine with standard Tubeline systems to offer the specifier a completely integrative lighting option. 1.5 m and 2.8 m option can be mounted individually or as part of 3 m runs. (Drivers are external to the luminaire).

Lifetime and Maintenance

The LED light source used in the Tubeline system will still deliver over 90% of their peak light output after 60,000 hours of operation. Electronic control gear will operate for 100,000 hours with a maximum 10% failure level.

Light modules do not contain user serviceable parts and will require module replacement. Drivers may be replaced by unplugging the remote pack.

Emergency

Emergency lighting is provided through 3-hour maintained emergency versions of the light module. All emergency lighting provision calculations should be approved by a suitably qualified person.

Control System Compatibility

Each individual unit is supplied with DALI addressable and dimmable control gear. Modules with integrated emergency provision have an additional DALI addressable and reporting emergency converter.

Optic

Opal polycarbonate diffuser for optimum source obscuration

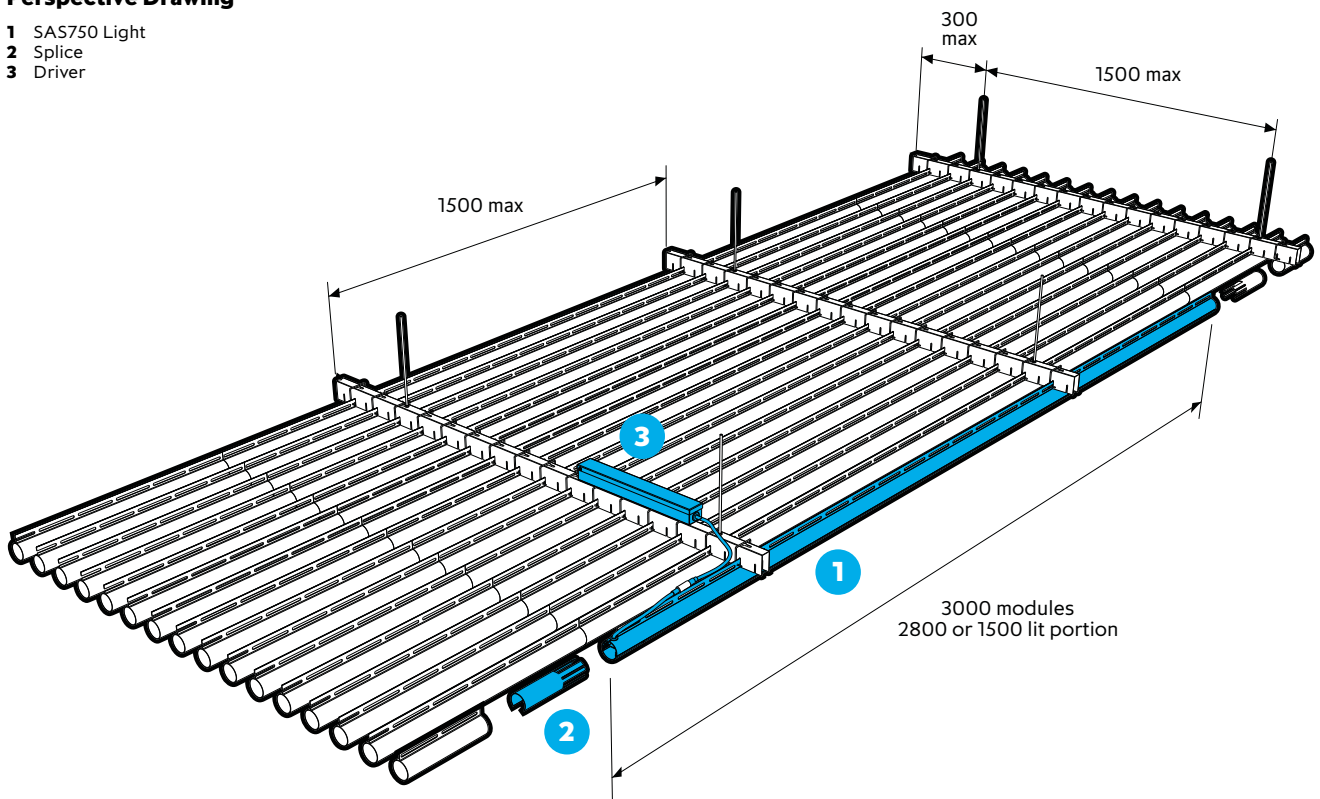
Technical Support

Please contact our technical team for all questions relating to access, bespoke features and service integration.

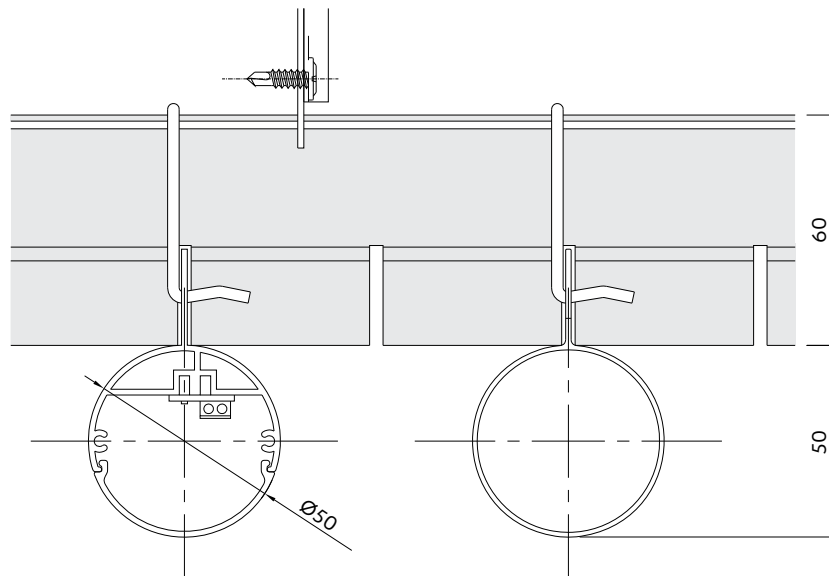


Perspective Drawing

- 1 SAS750 Light
- 2 Splice
- 3 Driver

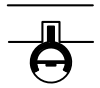


Section and detail drawings



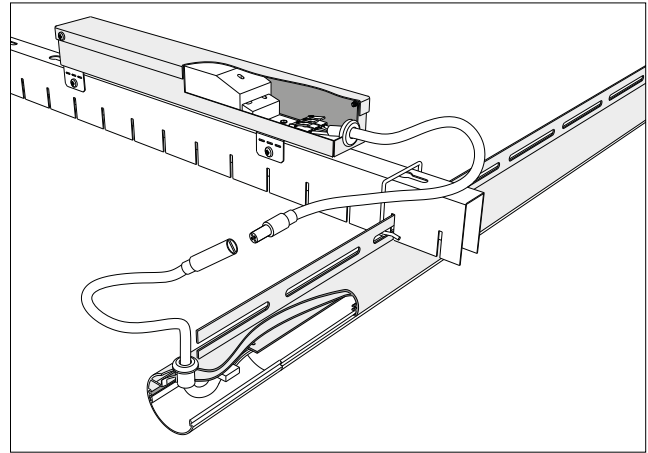
Section Through SAS750 Luminaire

SAS750 Lighting



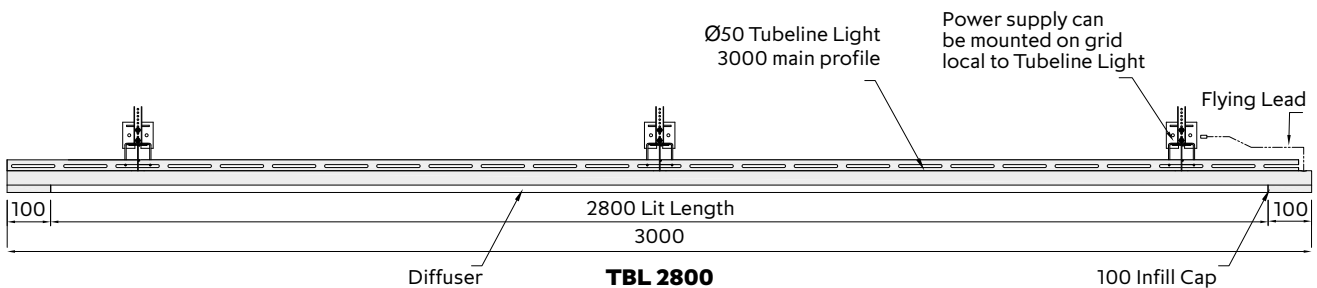
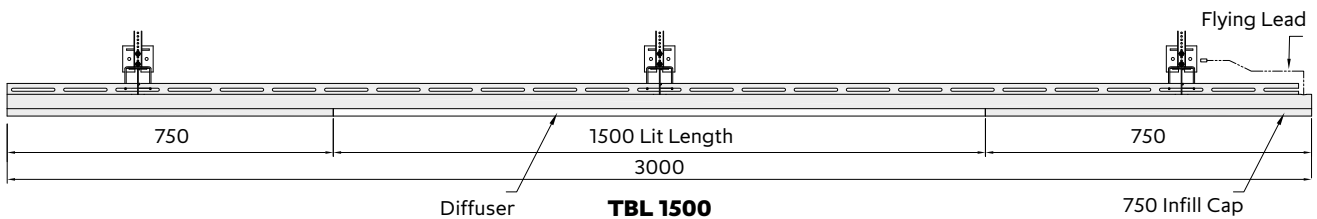
Light Modules

Product performance and control system integration are delivered to best practice guidelines recommended in industry standard documents.



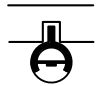
Cut Away Diagram

Standard Sizes



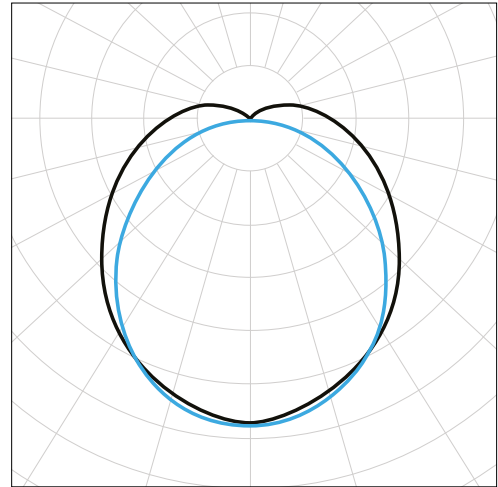
All dimensions are in mm.

LLED



Key Performance Parameters

	1500 mm lit portion	2800 mm lit portion
Light output per linear metre	750 lumens	1400 lumens
Circuit power per linear metre	8.7 W	16 W
Typical UGR value*	22 or less	22 or less
Luminance at 65 °	<6000 cd/m²	<6000 cd/m²
CCT	4000 K	4000 K
Colour Rendering Index	80 Ra	80 Ra
Colour Consistency	3 SDCM	3 SDCM
Emergency lumen package (where ordered)	345 lumens	345 lumens
Lighting Control Protocol	DALI	DALI
Nominal maximum run length (C16 MCB)*	60 m	60 m



* Guidance values only, full calculations to be undertaken by a qualified engineer

Lighting Design Guidance

The below values are provided as an indication of lighting performance in a typical application situation, they are not intended to replace the services of an experienced lighting design professional. All figures stated are representative of anticipated performance based on the parameters provided below. These are not guaranteed performance values.

Luminaire	Typical floor-height Light Level (lux)	Typical Task Area Uniformity	Lighting Load (W/m ²)	Typical Glare Value (UGR)	Mean Cylindrical Illuminance (lux)	Typical Modelling Index
1500 mm	175	0.98	2.89	< 22	115	0.64
2800 mm	310	0.98	5.33	< 22	210	0.59

These values are based on the following room properties:

Dimensions (L x W x H): 30 m x 15 m x 3.5 m. Ceiling Height: 3.2 m. Surface reflectance values (C:W:F): 20:60:30. Maintenance Factor: 0.85.

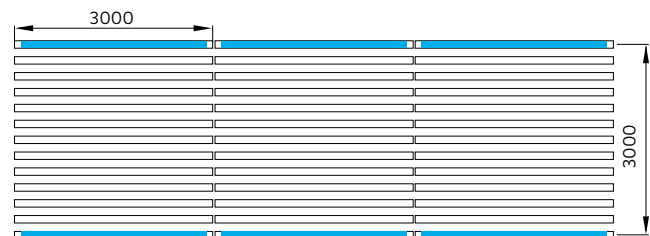
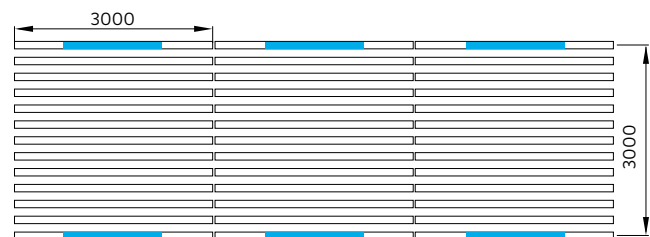
Specification Text: 1500 mm Lit Portion

- Linear suspended luminaire with tubular form factor, 3000 mm long with a central 1500 mm lit portion.
- Curved 50 mm wide source obscuration diffuser for a uniform lit appearance. Light output: 2250 lm, Connected load: 26 W, CCT: 4000K, Colour Rendering Index: Ra80 minimum, Service Life: 60,000 hours to L90.
- Luminaire body of white powder coated extruded aluminium. Complete with remote DALI addressable control gear. Remote 3 hour DALI addressable emergency versions available to order.

Specification Text: 2800 mm Lit Portion

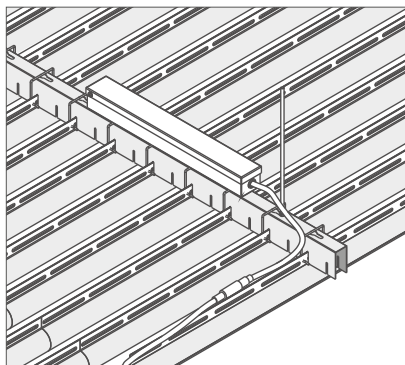
- Linear suspended luminaire with tubular form factor, 3000 mm long with a central 2800 mm lit portion.
- Curved 50 mm wide source obscuration diffuser for a uniform lit appearance. Light output: 4200 lm, Connected load: 48 W, CCT: 4000 K, Colour Rendering Index: Ra80 minimum, Service Life: 60,000 hours to L90.
- Luminaire body of white powder coated extruded aluminium. Complete with remote DALI addressable control gear. Remote 3 hour DALI addressable emergency versions available to order.

Typical installation of SAS750 Lights in a linear arrangement





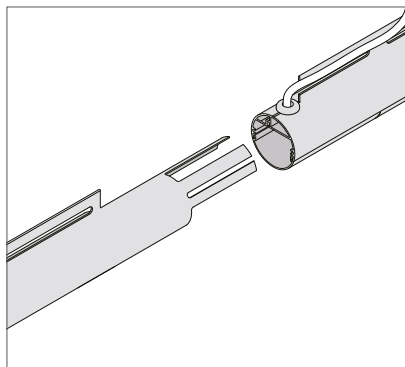
Grid Mounted Driver



SAS750 Light driver is mounted on the grid local to the light profile and connected via a flying lead.

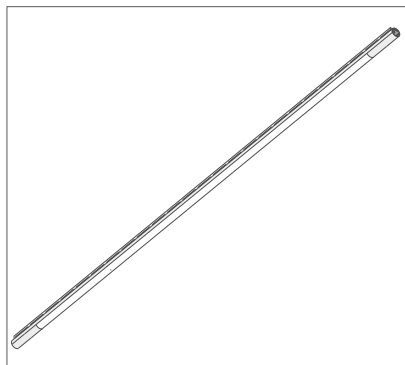
Connection to the mains is by others.

SAS750 Light Splice



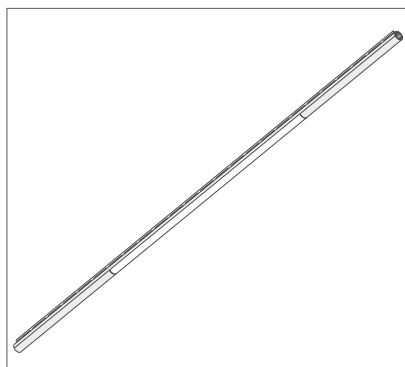
Splice enables alignment between luminaire and standard SAS750 Tubeline profiles.

3 m Module 1.5 m Lit Portion

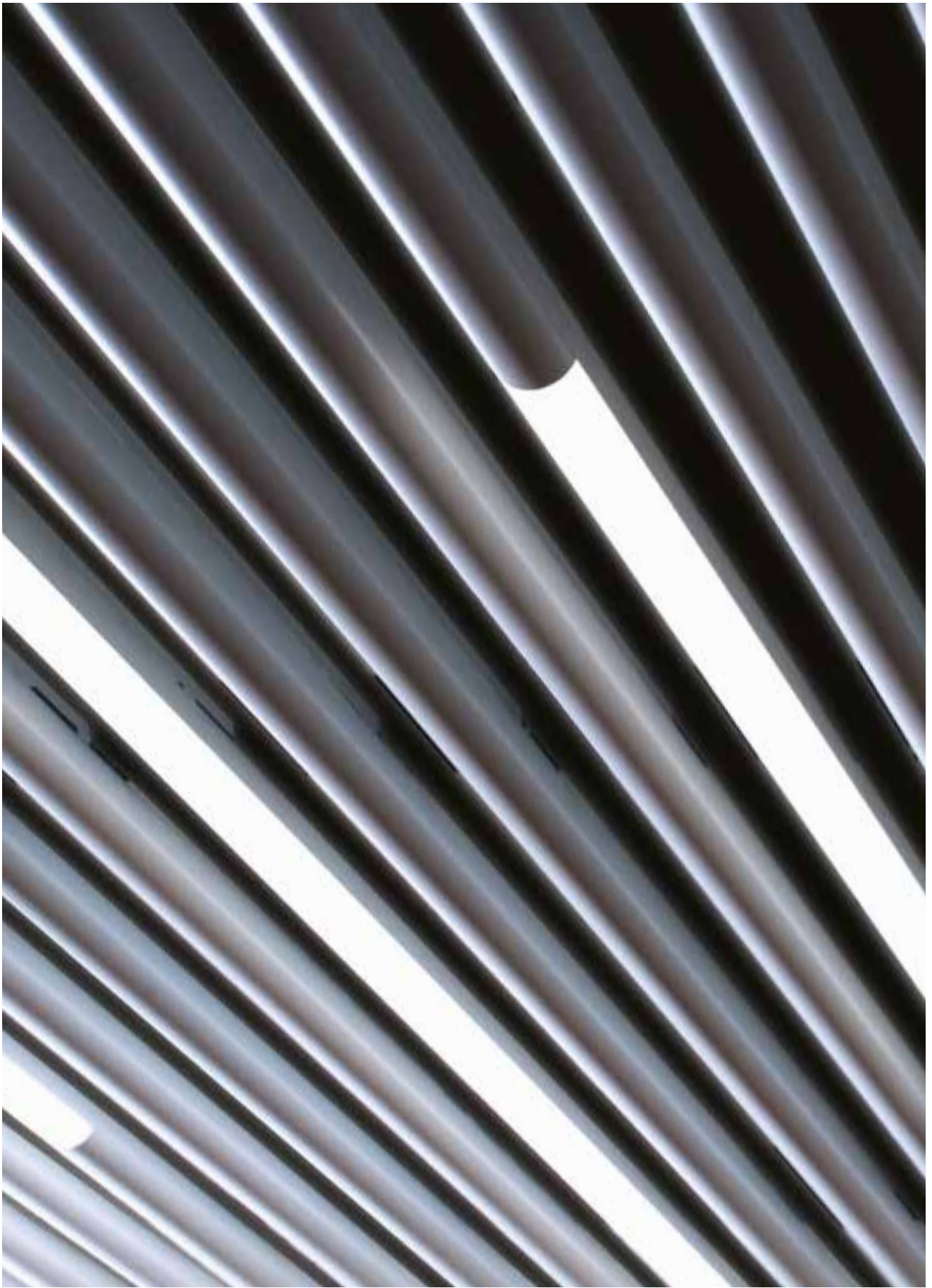


3 m light module with 1.5 m lit portion designed to be installed in line with standard SAS750 Tubeline profile.

3 m Module 2.8 m Lit Portion



3 m light module with 2.8 m lit portion designed to be installed in line with standard SAS750 Tubeline profile.



SAS**750** Lighting

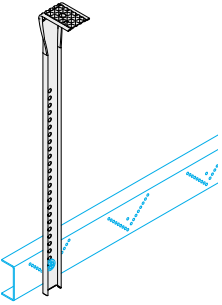
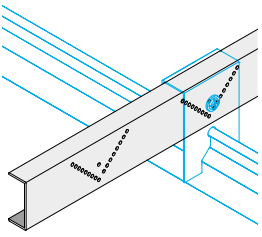
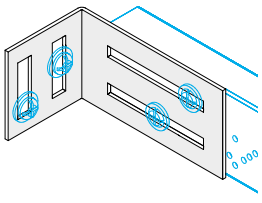
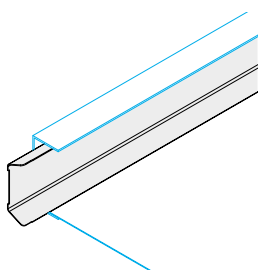


SAS**750** Lighting

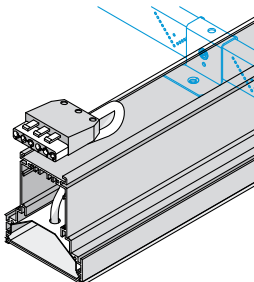
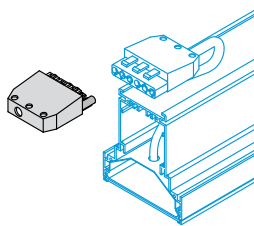
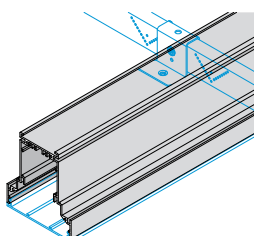
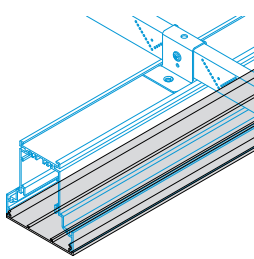
Components

The background is a dark green color with a fine, repeating geometric pattern of small squares. Overlaid on this are several thin, dark lines that intersect to form a network of triangles and quadrilaterals. Four prominent, glowing, lime-green shapes are scattered across the page, each resembling a stylized, elongated arrow or a brushstroke pointing towards the right. These shapes are semi-transparent and have a soft, blurred edge, giving them a sense of motion or light trails.

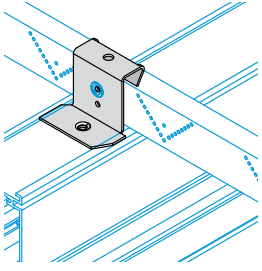
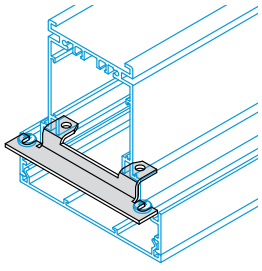
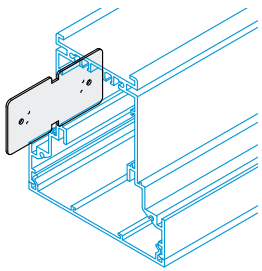
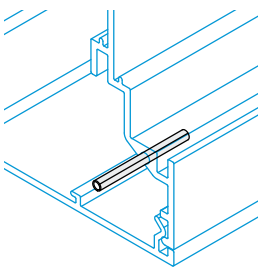
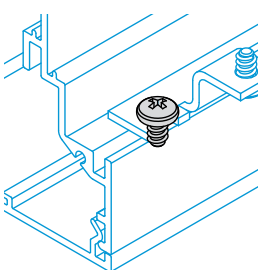
Components | Emac suspension

	Item No	Item Description	Folded Length (mm)	Gauge (mm)	Colour (% Gloss)	Units
EMAC SUSPENSION COMPONENTS						
	10188	Emac Hanger	300	-	Mill	50 no.
	10189	Emac Hanger	400	-	Mill	50 no.
	10190	Emac Hanger	500	-	Mill	50 no.
	10191	Emac Hanger	600	-	Mill	50 no.
	10192	Emac Hanger	800	-	Mill	50 no.
	10185	Emac Hanger	1000	-	Mill	50 no.
	10186	Emac Hanger	1200	-	Mill	50 no.
	10187	Emac Hanger	1500	-	Mill	50 no.
	79374	Emac Hanger	2000	-	Mill	50 no.
	22974	Emac Channel	4000	1.2	Mill	1 no.
	111675	Emac Channel	3000	1.5	Mill	1 no.
	22975	Emac Channel	4000	1.5	Mill	1 no.
	12097	Emac Wall Anchor	-	-	Mill	100 no.
	10178	Border Wedge	-	-	Mill	100 no.

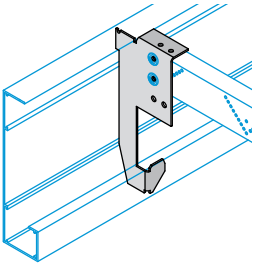
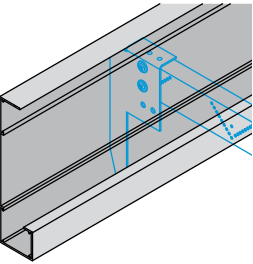
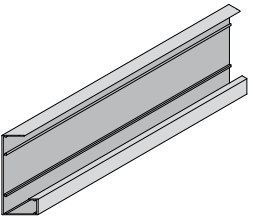
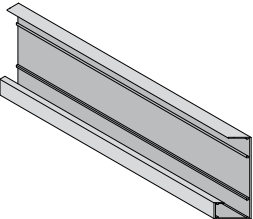
Components | SAS330i

	Item No	Item Description	Length (mm)	Width (mm)	Colour (% Gloss)	Units
SAS330i LIGHTING COMPONENTS						
	326132	3 m Assembled Light Module With DALI Driver	3000	100	RAL 9010 (20%)	1 no.
	326133	3 m Assembled Light Module With DALI Driver + Emergency	3000	100	RAL 9010 (20%)	1 no.
	326134	1.5 m Assembled Light Module With DALI Driver	1500	100	RAL 9010 (20%)	1 no.
	326135	1.5 m Assembled Light Module with DALI Driver + Emergency	1500	100	RAL 9010 (20%)	1 no.
	326136	0.5 m TO 3 m Assembled Terminator Light Module with DALI Driver (Note: reference number is template only, ordering to a specified length will generate a unique ref)	To Order	100	RAL 9010 (20%)	1 no.
	326137	0.5 m TO 3 m Assembled Terminator Light Module with DALI Driver + Emergency (Note: reference number is template only, ordering to a specified length will generate a unique ref)	To Order	100	RAL 9010 (20%)	1 no.
	331810	6 Core connector ready to wire by other for connection on site. 1No required per circuit of "Daisy chained" SAS i Light Modules (up to 16 Amps)	65	55	Black	1 no.
	299795	SAS330_I Main Profile 3 m	3000	100	RAL 9010 (20%)	1 no.
	299796	SAS330_I Main Profile 1.4 m	1400	100	RAL 9010 (20%)	1 no.
	299797	SAS330_I Blank Cap Infill 3 m	3000	100	RAL 9010 (20%)	1 no.
	299798	SAS330_I Blank Cap Infill 1.5 m	1400	100	RAL 9010 (20%)	1 no.

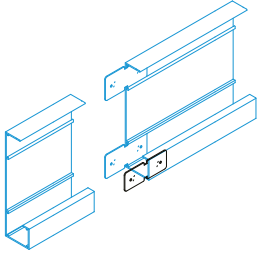
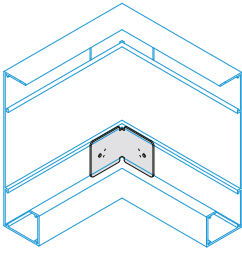
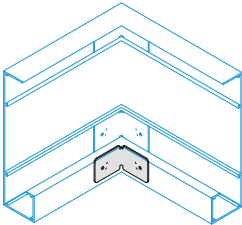
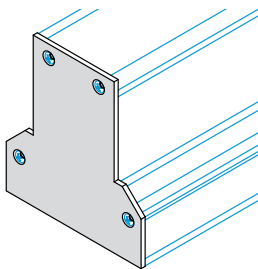
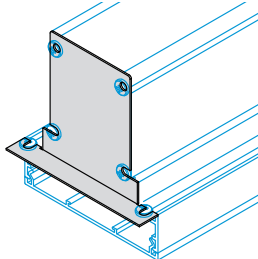
Components | SAS330i

	Item No	Item Description	Length (mm)	Width (mm)	Colour (% Gloss)	Units
SAS330i LIGHTING COMPONENTS						
	299802	SAS330_I Emac Hook Over Bracket	45	55	Natural	1 no.
	299803	SAS330_I Noggin Shoulder Bracket	95	33	Natural	1 no.
	10534	TCP 180 Splice	70	35	Natural	1 no.
	324807	3 mm x 20 mm Coil Pin Splice	20	3	Natural	1 no.
	208649	No10 x 5-16 Posi Pan Self Tapper	16	5	Natural	1 no.

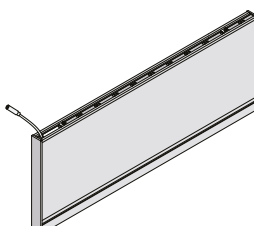
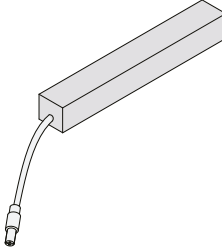
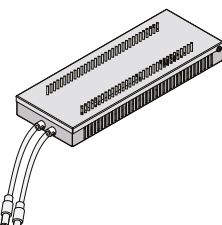
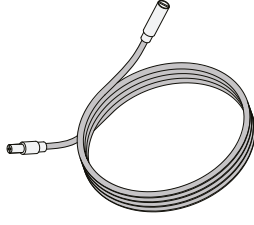
Components | SAS330i

	Item No	Item Description	Length (mm)	Width (mm)	Colour (% Gloss)	Units
SAS330i LIGHTING COMPONENTS						
	299805	Bracket to suit Perimeter Trim TCA 0862	150	64	Natural	1 no.
	299794	Perimeter Trim TCA 0862 150 mm deep x 40 mm wide 3 m length	3000	40	RAL 9010 (20%)	1 no.
	331907	Perimeter Trim TCA 0862 150 mm deep x 40 mm wide 500 mm Pre Mitred Left Hand	500	40	RAL 9010 (20%)	1 no.
	331906	Perimeter Trim TCA 0862 150 mm deep x 40 mm wide 500 mm Pre Mitred Right Hand	500	40	RAL 9010 (20%)	1 no.

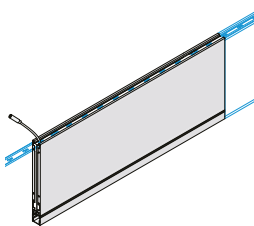
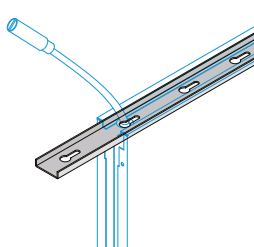
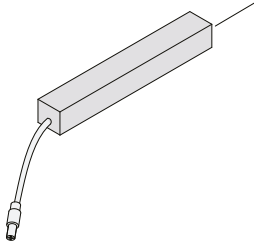
Components | SAS330i

	Item No	Item Description	Length (mm)	Width (mm)	Colour (% Gloss)	Units
SAS330i LIGHTING COMPONENTS						
	14042	TCP180s Splice	70	27	Natural	100 no.
	10536	TCP 90 Splice	35	35	Natural	100 no.
	14047	TCP 90s Splice	35	27	Natural	100 no.
	300433	SAS330i Screw on End cap - 3 mm Aluminium Note requires 4No 6 self tapping CSK screws 293605)	110	100	RAL 9010 (20%)	1 no.
	328060	SAS330_I - Screw on Part End Cap with Shoulder Flange Note requires 6No No10 x 5-16 Posi Pan Self Tappers 208649)	81	100	Natural	1 no.

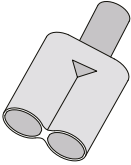
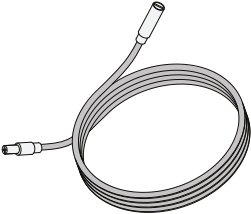
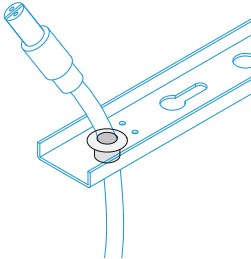
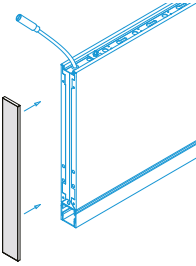
Components | SAS500 Lighting

	Item No	Item Description	Length (mm)	Depth (mm)	Colour (% Gloss)	Units
SAS500 LIGHTING INDIVIDUAL MODULE COMPONENTS						
	Varies	SAS500 Light Baffle, made to suit. Lengths available 1200 mm, 1500 mm, 1800 mm. Depth between 150 mm and 500 mm. Choice between diffuser or with Glare Control Lens, example modules as follows	To suit	To suit	To suit	1 no.
	328639	Baffle Light 1200 x 500 individual module - with glare control lens	1200	500	RAL 9010 (20%)	1 no.
	328640	Baffle Light 1500 x 500 individual module - with glare control lens	1500	500	RAL 9010 (20%)	1 no.
	328641	Baffle Light 1800 x 500 individual module - with glare control lens	1800	500	RAL 9010 (20%)	1 no.
	331627	Baffle Light 1200 x 500 individual module - with opal diffuser	1200	500	RAL 9010 (20%)	1 no.
	331628	Baffle Light 1500 x 500 individual module - with opal diffuser	1500	500	RAL 9010 (20%)	1 no.
	331626	Baffle Light 1800 x 500 individual module - with opal diffuser	1800	500	RAL 9010 (20%)	1 no.
	335462	Baffle Light 1200 x 500 individual module - with glare control lens - emergency version	1200	500	RAL 9010 (20%)	1 no.
	335463	Baffle Light 1500 x 500 individual module - with glare control lens - emergency version	1500	500	RAL 9010 (20%)	1 no.
	335464	Baffle Light 1800 x 500 individual module - with glare control lens - emergency version	1800	500	RAL 9010 (20%)	1 no.
	335465	Baffle Light 1200 x 500 individual module - with opal diffusers - emergency version	1200	500	RAL 9010 (20%)	1 no.
	335466	Baffle Light 1500 x 500 individual module - with opal diffusers - emergency version	1500	500	RAL 9010 (20%)	1 no.
	335467	Baffle Light 1800 x 500 individual module - with opal diffusers - emergency version	1800	500	RAL 9010 (20%)	1 no.
	328652	Driver Type 1 - Suitable for individual Baffles up to 2 m 50 W DALI 24 V - Supplied loose for remote mounting by others	345	32	White	1 no.
	331943	Emergency Driver Remote Box 100 W DALI 24 V 0.25 m leads - 355 x 135 x 40 mm	355	40	Black	1 no.
	328654	3 m Extension Cable - Optional	3000	n/a	White	1 no.

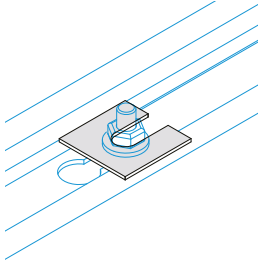
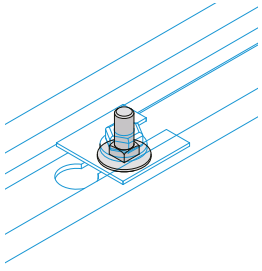
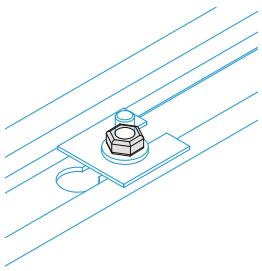
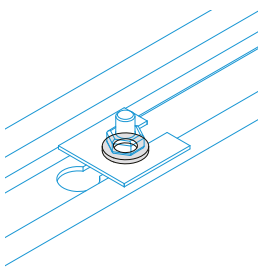
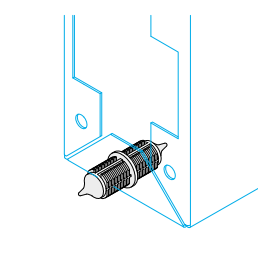
Components | SAS500 Lighting

	Item No	Item Description	Length (mm)	Depth (mm)	Colour (% Gloss)	Units
SAS500 LIGHTING CONTINUOUS COMPONENTS						
	Varies	SAS500 Light Baffle, made to suit. Lengths available 1200 mm, 1500 mm, 1800 mm. Depth between 150 mm and 500 mm. Choice between plain diffuser or with Glare Control Lens, example modules as follows	To suit	To suit	To suit	1 no.
	328642	Baffle Light 1200 x 500 module for continuous - with Glare Control Lens	1200	500	RAL 9010 (20%)	1 no.
	328643	Baffle Light 1500 x 500 module for continuous - with Glare Control Lens	1500	500	RAL 9010 (20%)	1 no.
	328644	Baffle Light 1800 x 500 module for continuous - with Glare Control Lens	1800	500	RAL 9010 (20%)	1 no.
	331629	Baffle Light 1200 x 500 module for continuous - with opal diffuser	1200	500	RAL 9010 (20%)	1 no.
	331630	Baffle Light 1500 x 500 module for continuous - with opal diffuser	1500	500	RAL 9010 (20%)	1 no.
	331631	Baffle Light 1800 x 500 module for continuous - with opal diffuser	1800	500	RAL 9010 (20%)	1 no.
	336430	Baffle Light 1200 x 500 module for continuous- with glare control lens - emergency version	1200	500	RAL 9010 (20%)	1 no.
	336431	Baffle Light 1500 x 500 module for continuous- with glare control lens - emergency version	1500	500	RAL 9010 (20%)	1 no.
	336432	Baffle Light 1800 x 500 module for continuous- with glare control lens - emergency version	1800	500	RAL 9010 (20%)	1 no.
	336433	Baffle Light 1200 x 500 module for continuous- with opal diffuser - emergency version	1200	500	RAL 9010 (20%)	1 no.
	336434	Baffle Light 1500 x 500 module for continuous- with opal diffuser - emergency version	1500	500	RAL 9010 (20%)	1 no.
	336435	Baffle Light 1800 x 500 module for continuous- with opal diffuser - emergency version	1800	500	RAL 9010 (20%)	1 no.
		229452	Carrier Rail 3 m (Slots at 100 mm Centres)	3000	38	Natural
	328652	Driver Type 1 - Suitable for Individual Baffles up to 2 m 50 W DALI 24 V	345	32	White	1 no.
	328653	Driver Type 2 - Suitable for Two Baffles - Requires Splitter 80 W DALI 24 V	345	32	White	1 no.

Components | SAS**500** Lighting

	Item No	Item Description	Length (mm)	Depth (mm)	Colour (% Gloss)	Units
SAS500 LIGHTING CONTINUOUS COMPONENTS						
	328646	Cable 2 Way Splitter (only required for double modules with driver type 2)	n/a	n/a	White	1 no.
	328654	Extension Cable - Optional	3000	n/a	White	1 no.
	328656	Cable Hole Grommet	n/a	n/a	Black	1 no.
	Varies	End Cap - Manufactured to Suit	To suit	To suit	To suit	1 no.

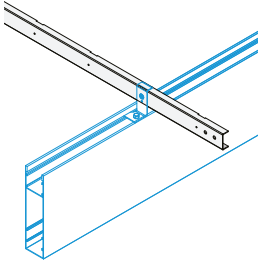
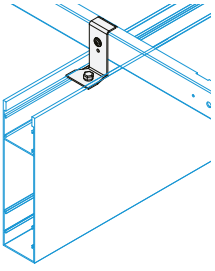
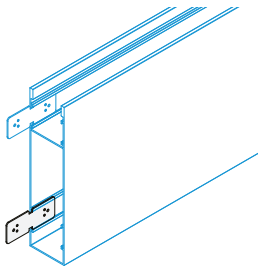
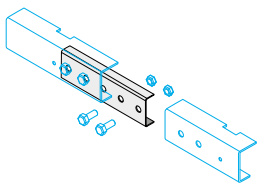
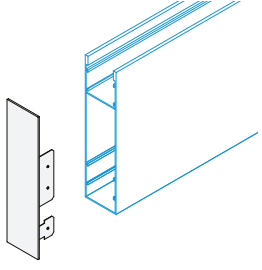
Components | SAS**500** Lighting

	Item No	Item Description	Length (mm)	Depth (mm)	Colour (% Gloss)	Units
SAS500 LIGHTING CONTINUOUS COMPONENTS						
	229865	Clamping Plate	-	-	Natural	100 no.
	31690	M6 Coach Bolt	-	-	Natural	100 no.
	10170	M6 Locking Nut	-	-	Natural	100 no.
	33835_B	M6 Washer	-	-	Natural	100 no.
	124654_B	Fir Tree Joiner	-	-	White	100 no.

Components | SAS740 Lighting

	Item No	Item Description	Size (mm)	Length (mm)	Colour (% Gloss)	Units
SAS740 LIGHTING INDIVIDUAL COMPONENTS						
	332905	Linear Profile	200 x 50	3000	RAL 9010 (20%)	1 no.
	<hr/>					
	332908	Light Module - With glare control lens	200 x 50	1200	RAL 9010 (20%)	1 no.
	332909	Light Module - With glare control lens	200 x 50	1500	RAL 9010 (20%)	1 no.
	332910	Light Module - With glare control lens	200 x 50	1800	RAL 9010 (20%)	1 no.
	332911	Double Light Module - With glare control lens	200 x 50	2400	RAL 9010 (20%)	1 no.
	332912	Double Light Module - With glare control lens	200 x 50	3000	RAL 9010 (20%)	1 no.
	332913	Light Module - With Opal Diffuser	200 x 50	1200	RAL 9010 (20%)	1 no.
	332914	Light Module - With Opal Diffuser	200 x 50	1500	RAL 9010 (20%)	1 no.
	332915	Light Module - With Opal Diffuser	200 x 50	1800	RAL 9010 (20%)	1 no.
	332916	Double Light Module - With Opal Diffuser	200 x 50	2400	RAL 9010 (20%)	1 no.
	332917	Double Light Module - With Opal Diffuser	200 x 50	3000	RAL 9010 (20%)	1 no.
	337208	Light Module - With glare control lens - Emergency Version	200 x 50	1200	RAL 9010 (20%)	1 no.
	337209	Light Module - With glare control lens - Emergency Version	200 x 50	1500	RAL 9010 (20%)	1 no.
	337210	Light Module - With glare control lens - Emergency Version	200 x 50	1800	RAL 9010 (20%)	1 no.
	337211	Double Light Module - With glare control lens - Emergency Version	200 x 50	2400	RAL 9010 (20%)	1 no.
	337212	Double Light Module - With glare control lens - Emergency Version	200 x 50	3000	RAL 9010 (20%)	1 no.
	337214	Light Module - With Opal Diffuser - Emergency Version	200 x 50	1200	RAL 9010 (20%)	1 no.
	337215	Light Module - With Opal Diffuser - Emergency Version	200 x 50	1500	RAL 9010 (20%)	1 no.
	337216	Light Module - With Opal Diffuser - Emergency Version	200 x 50	1800	RAL 9010 (20%)	1 no.
	337217	Double Light Module - With Opal Diffuser - Emergency Version	200 x 50	2400	RAL 9010 (20%)	1 no.
	337218	Double Light Module - With Opal Diffuser - Emergency Version	200 x 50	3000	RAL 9010 (20%)	1 no.

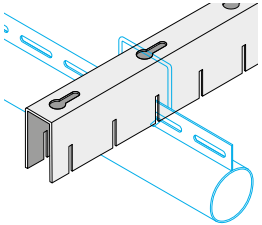
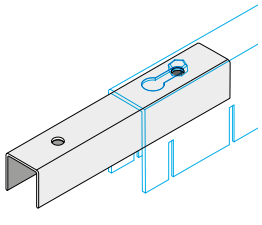
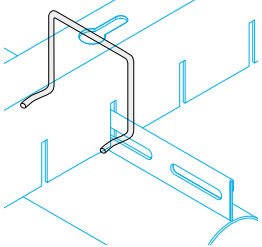
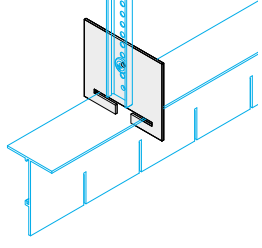
Components | SAS740 Lighting

	Item No	Item Description	Size (mm)	Length (mm)	Colour (% Gloss)	Units
SAS740 LIGHTING INDIVIDUAL COMPONENTS						
	249012	Slotted Emac Grid (150 mm centres)	38 x 16	3000	RAL 9005 (30%)	1 no.
	332918	Hanger Bracket	71	46	RAL 9005 (20%)	100 no.
	14042	TCP 180s straight splice to suit 26.8 mm keyway	26 x 50	-	Natural	100 no.
	249267	Carrier Splice	38 x 150	-	RAL 9005 (30%)	100 no.
	332920	End Cap	200 x 50	-	RAL 9010 (20%)	1 no.

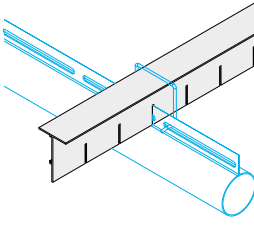
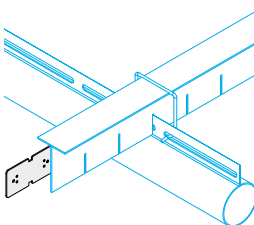
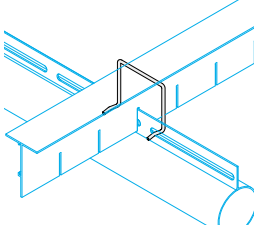
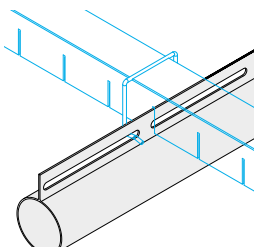
Components | SAS740 Lighting

	Item No	Item Description	Length (mm)	Depth (mm)	Colour (% Gloss)	Units
SAS740 LIGHTING INDIVIDUAL COMPONENTS						
	328652	Driver Type 1 - Suitable for individual units up to 2 m	345	32	White	1 no.
	328653	Driver Type 2 - Suitable for double units - requires splitter	345	32	White	1 no.
	331943	Emergency Driver Remote Box 100 W DALI 24 V 0.25 m leads - 355 x 135 x 40 mm	355	40	Black	1 no.
	328646	Cable 2 Way Splitter (only required for double modules with driver type 2)	n/a	n/a	White	1 no.
	328654	3 m Extension Cable - Optional	3000	n/a	White	1 no.

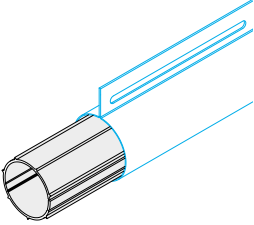
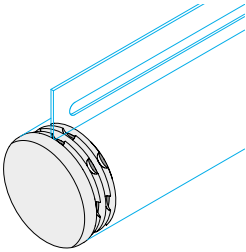
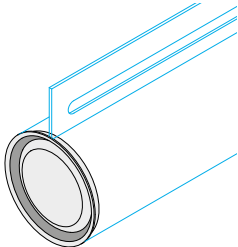
Components | SAS750 Lighting

	Item No	Item Description	Tube Centres (mm)	Length (mm)	Colour (% Gloss)	Units
SAS750 LIGHTING COMPONENTS – STEEL						
	226254	Tubeline Universal carrier notched – Universal at 50 mm centres	50	3000	RAL 9005 (30%)	1 no.
	226274	Tubeline Splice	-	-	RAL 9005 (30%)	100 no.
	10537	Wire Clips	-	-	RAL 9005 (30%)	100 no.
	10532	SAS750 Bracket	-	-	RAL 9005 (30%)	100 no.

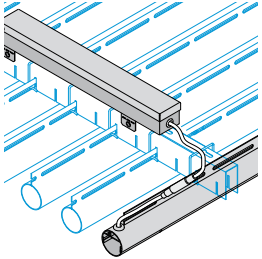
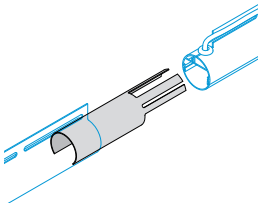
Components | SAS750 Lighting

	Item No	Item Description	Tube Centres (mm)	Length (mm)	Colour (% Gloss)	Units
SAS750 LIGHTING COMPONENTS – ALUMINIUM						
	22411	Tubeline Carrier (TCA0219)	50	3000	RAL 9005 (30%)	1 no.
	22412	Tubeline Carrier (TCA0219)	100	3000	RAL 9005 (30%)	1 no.
	22413	Tubeline Carrier (TCA0219)	150	3000	RAL 9005 (30%)	1 no.
	22414	Tubeline Carrier (TCA0219)	200	3000	RAL 9005 (30%)	1 no.
	164207	Tubeline Splice (TCP180)	-	-	RAL 9005 (30%)	100 no.
	10537	Wire Clips	-	-	RAL 9005 (30%)	100 No
	14125	50 mmØ Tube Aluminium *	-	3000	RAL 9010 (20%)	1 No.


Components | SAS750 Lighting

	Item No	Item Description	Diameter (mm)	Length (mm)	Colour (% Gloss)	Units
SAS750 LIGHTING COMPONENTS						
	14128	50 mmØ Tubeline Splice	-	-	Mill	100 no.
	10569	50 mmØ Plastic End Cap *	-	-	White	1 no.
	226266	50 mm Aluminium Flat End Cap	-	-	RAL 9010 (20%)	1 no.

Components | SAS750 Lighting

	Item No	Item Description	Diameter (mm)	Length (mm)	Colour (% Gloss)	Units
SAS750 LIGHTING COMPONENTS						
	259870	SAS750 Luminaire TBL1500, 3 m long profile with 1.5 m lit portion Complete with 24 V DALI driver	3000	50	RAL9010 (20%)	1 no.
	259869	SAS750 Luminaire TBL2800, 3 m long profile with 2.8 m lit portion Complete with 24 V DALI driver	3000	50	RAL9010 (20%)	1 no.
	257405	SAS750 Luminaire to standard aluminium tubeline splice.	175	50	RAL 9005 (30%)	1 no.

Lighting Integration Projects



SAS International welcomes the opportunity to collaborate on projects requiring our standard integrated lighting products and fully bespoke installations.

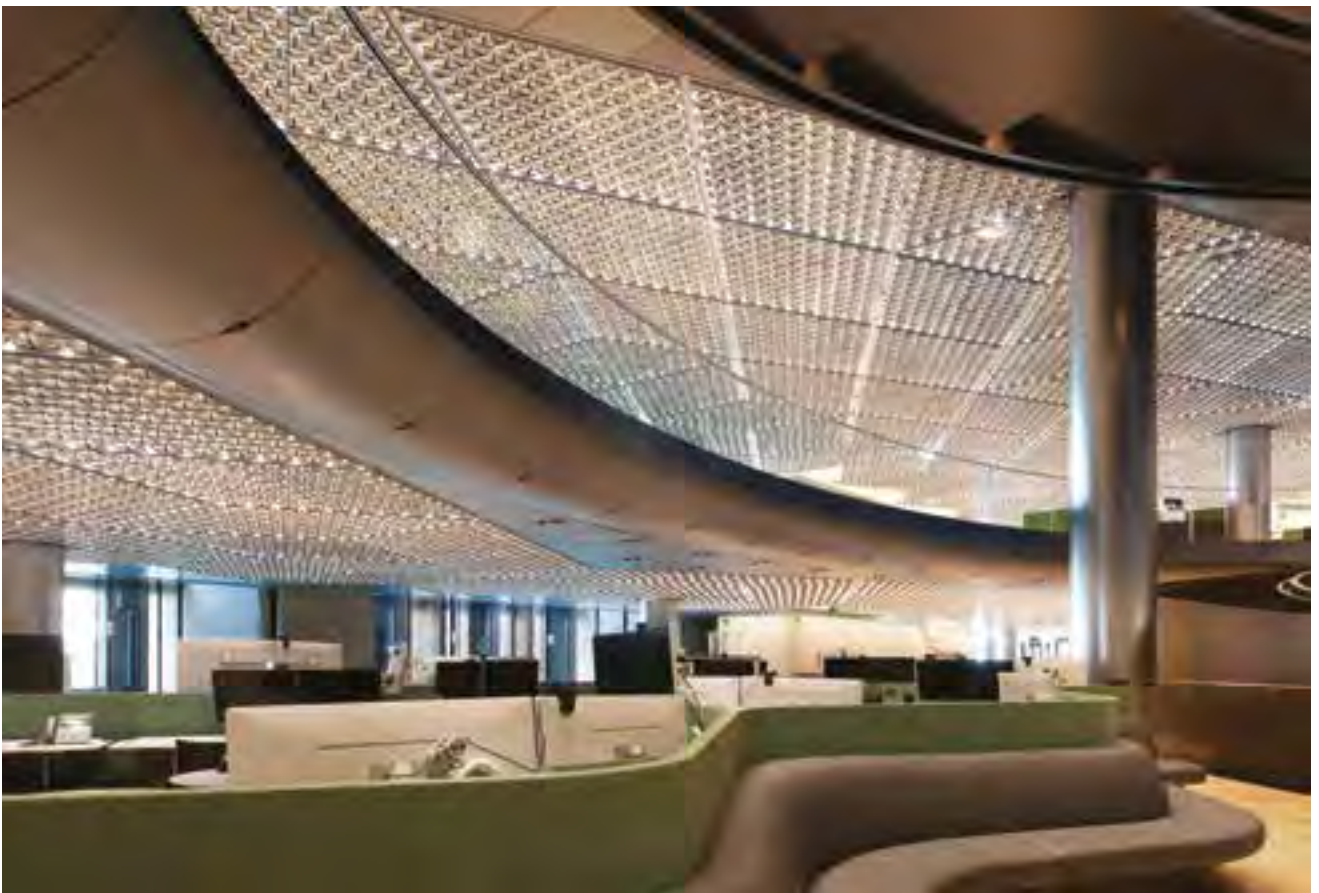
Our new lighting offering combines the best in metal ceiling manufacturing with beautiful lighting integration. Designed and quality controlled by SAS International throughout the manufacturing process, our integrated lighting systems offer complete peace of mind.

The following pages* demonstrate our knowledge and design capabilities when integrating lighting to create beautiful performance interiors. We look forward to revealing more of our lighting capabilities in the near future.

***Note: The projects presented on the following pages do not always show SAS International lighting products. Some are collaborations with third party lighting manufacturers as specified originally. All ceilings are designed and manufactured by SAS International to allow for third party lighting integration.**



Projects



Bespoke **Lighting**



Bloomberg

Location
London, UK
Architect
Foster + Partners

Contractor
Sir Robert McAlpine
Purpose
Commercial



Bespoke **Lighting**



Grand Central

Location
Birmingham, UK
Architect
Haskoll Architects

Contractor
Mace Limited
Purpose
Retail



Integrated **Lighting**

20 Fenchurch Street

Location
London, UK
Architect
Various

Contractor
Various
Purpose
Commercial



Integrated **Lighting**

LSQ

Location
London, UK
Architect
Make Architects

Contractor
Brookfield Multiplex
Purpose
Commercial



Integrated **Lighting**

Skype HQ

Location
Luxembourg, Europe
Architect
**Walker & Martin
Architects**

Contractor
Skype
Purpose
Commercial



Integrated **Lighting**

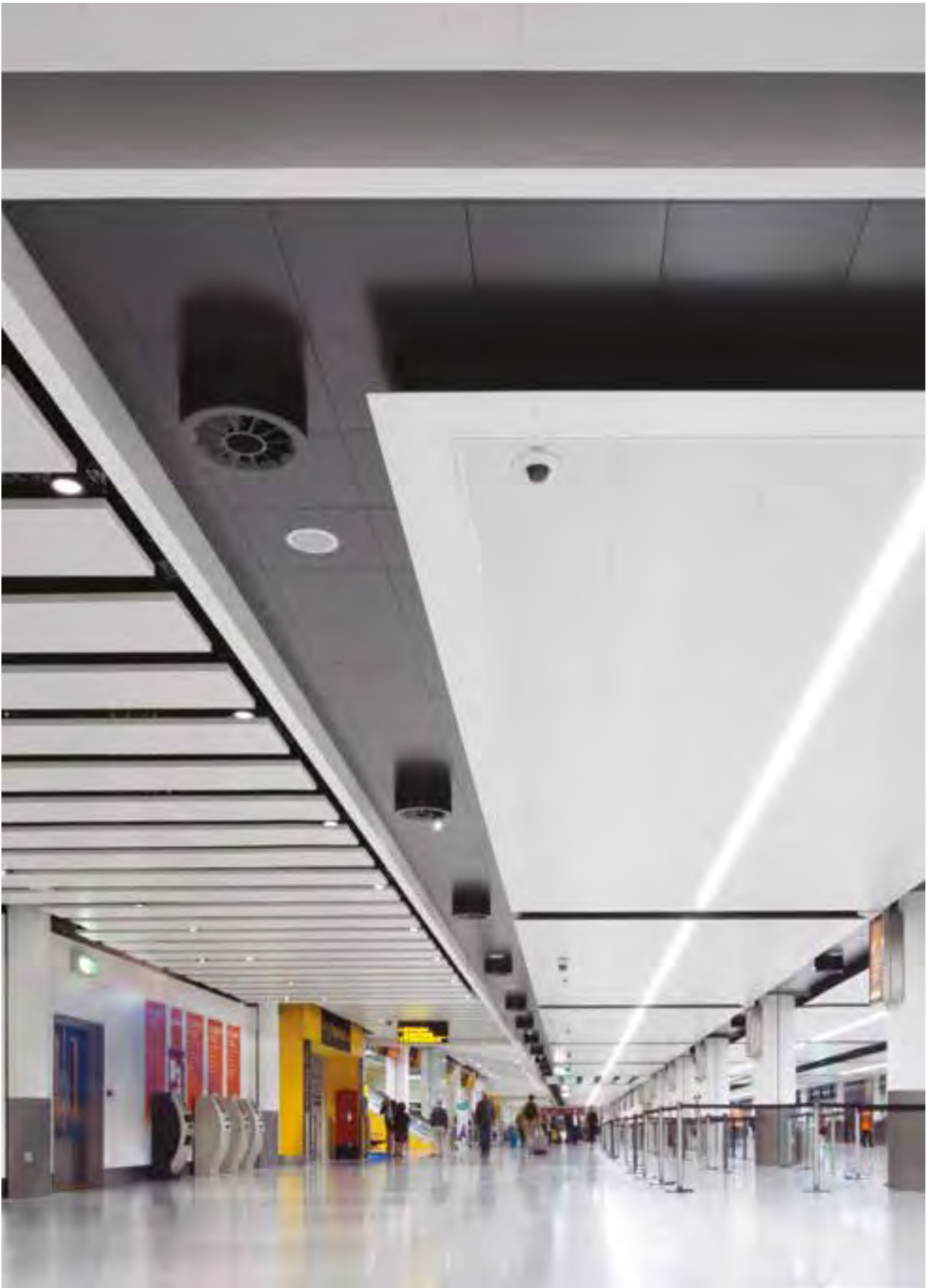
Vodafone Oporto

Location
Portugal, Europe
Architect
Barbosa & Guimarães

Contractor
Nonio Hiro
Purpose
Commercial



Integrated **Lighting**



Gatwick Airport

Location
London, UK
Architect
Atkins

Contractor
Balfour Beatty
Purpose
Transport



Integrated **Lighting**



122 Leadenhall Street

Location
London, UK
Architect
HLW International

Contractor
StructureTone Ltd
Purpose
Commercial



Integrated **Lighting**

The Zig Zag Building

Location
London, UK
Architect
HLW International

Contractor
BW Interiors Ltd
Purpose
Commercial



Integrated **Lighting**

University of Birmingham Library

Location
Birmingham, UK
Architect
Associated Architects

Contractor
Carillion Plc
Purpose
Education

SAS International® manufactures a broad range of durable, sustainable and aesthetically-driven products, meeting international design, performance and integration requirements.

We lend our manufacturing expertise to the following product groups:

Metal ceilings	Integrated lighting	Architectural metalwork
Room comfort systems		Fully bespoke interior solutions

SAS has a proud manufacturing heritage, establishing the industry benchmark and furthering the reputation of British engineering at its best.

Being self-sufficient is integral to the SAS manufacturing process. We consider every aspect of this process, producing the highest quality products as sustainably and cost-effectively as possible. We fabricate our own tooling and maintain our own machinery, minimising lead times and maximising quality.



Factories

SAS owns and operates three state of the art factories within the UK, manufacturing building products for our international customers. Our multi-site production capacity allows us to successfully supply the most ambitious scale projects internationally.

Our continuous investment in manufacturing facilities and technologies maintains our leadership status. We deploy leading manufacturing theory to ensure our people and processes are safe, efficient and cost-effective with minimal environmental impact.

These factories are at the core of our approach and available for stakeholders to experience first-hand as a guided tour.

Each factory is ISO 9001 (quality management), ISO 14001 (environmental management) and OHSAS 18001 (health and safety management) accredited.

Quality Control

Our quality control teams consist of experts in manufacturing design, materials, machining, and production processes. Constant communication between these experts ensures the highest quality standards are met and 'SAS quality' shipped at all times.

With total control of the entire manufacturing process, from design to production, we maintain product quality and ensure maximum value.

Lighting Performance

Our lighting products are designed specifically for integration with SAS systems, with performance characteristics suitable for modern professional interiors. Photometric data is available in a wide range of formats suitable for both manual and software based calculations.

Acoustic Performance

Our reverberation room enables us to undertake research and development into sound absorbing materials and products. The structurally isolated room exhibits non-parallel walls and is accurate above 250 Hz. It is ideal for new ideas to be evaluated quickly and efficiently. It is also the perfect complement to our Finite Element modelling of designs.

Structural Performance

Our independently designed test rig facility assesses our ceiling components in accordance with BS EN 13694. This ensures our systems are structurally sound, offer best possible spanning characteristics and minimal deflection. Testing also helps minimise material content, weight and waste. The test rig supports innovation and is key to the development of new and existing products.

Room Comfort

SAS room comfort products are developed in our class leading test centre laboratory. We invested significantly in our labs in 2011 which can simulate large areas such as airports or shopping malls. Having two labs allows us to undertake client project testing and ongoing product development concurrently. All instrumentation and sensors undergo regular and independent calibration.

Value Engineering

SAS understands how to integrate building elements and services to deliver outstanding design solutions. Our in-house design and manufacturing expertise delivers client aesthetic and performance demands in an efficient and cost-effective manner.

Wherever possible we look to provide value engineering through better design, ease of installation, minimal waste and

improved manufacturing efficiencies. Our approach delivers your vision to specification and budget.

Offsite Preforming and Factory-fitting

Integration of services at the design stage is key for improved aesthetics and speed of installation onsite.

Apertures can be formed during manufacturing to provide an engineered product for site installation. This alleviates the onsite labour costs and aesthetic implications associated with manual cutting. Services can also be factory-fitted offsite without the risk of damage associated during installation.

Products can be pre-fitted with services and systems, supplied as one integrated unit for ease of shipment and installation. This co-ordination reduces the number of trades required onsite, minimising installation time, labour costs, waste and risk.

Mock-ups

Ceilings are usually designed to integrate with many different products, particularly mechanical and electrical services. Mock-ups offer a fantastic opportunity to fully experience both the ceiling and integrated products.

Our factories are able to fabricate full scale mock ups for review. They demonstrate our commitment and investment to the design and review process for specifiers, clients and project teams. This investment ensures the most complex projects can be managed more effectively prior to onsite installation. The team is able to review and approve the design, or make amends prior to installation. This process significantly improves the successful and timely delivery of projects.

A major driver of global construction is client aspiration and government legislation to provide ever more sustainable buildings. This includes every aspect of the building from design, construction and waste management to end of life and beyond.

SAS International is ISO 14001:2015 accredited.

We achieve these demands through better design, responsible sourcing of materials and innovative manufacturing techniques. Our approach provides clients with solutions to achieve environmental accreditations such as well BREEAM, LEED, SKA, Green Tag and Estidama.

Whole Life Costing

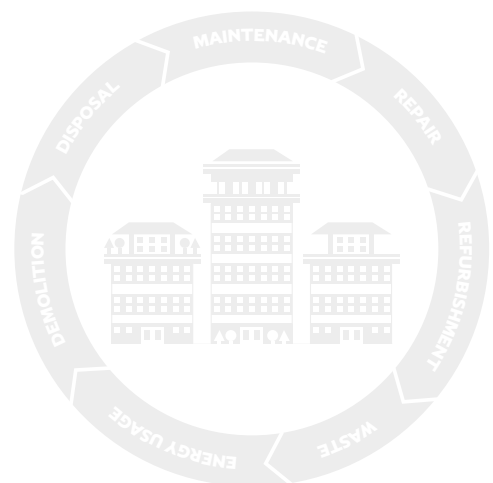
From a sustainable perspective, a key design and construction consideration for any building is whole life costing. Many factors have to be taken into account including maintenance, repair, refurbishment, waste, energy consumption, demolition and disposal.

A building's 'whole life cost' also includes the energy required to manufacture the construction materials and deliver them to site. This is represented by 'embodied carbon' and is key to understanding a building's sustainability credentials.

When specifically considering electrical equipment, the energy consumed in use can vastly outweigh the energy used in production. This is certainly true of lighting, which can consume as much as 20% of a commercial building's overall energy use.

SAS luminaires employ LEDs which deliver efficiencies far in excess of commercial lighting technology common only a few years ago. This dramatically reduces life cycle costs when directly compared to non-LED technology in a comparable application. In practice, this means minimum energy performance thresholds are easily surpassed*.

*Such as those outlined in the Building Regulations Part L or required by the Enhanced Capital Allowance scheme



Responsible Sourcing of Materials

As an electrical item, SAS luminaires are by necessity comprised of a wide range of materials and components. SAS International will only source materials and components from suppliers with a progressive and innovative approach to sustainable material manufacturing.

Aluminium

Our premium linear integrated ceiling systems are manufactured using aluminium. 25% of all aluminium is used by the global construction industry. It is valued for being light, strong, durable, flexible, impermeable, thermally and electrically conductive and non-corrosive.

The metal is manufactured from bauxite, one of the most abundant materials in the Earth's crust. It is also infinitely recyclable, 75% of all aluminium ever produced is still in use today, with no quality degradation.

Recycling aluminium uses only 5% of the energy required to manufacture new and produces only 5% of the greenhouse gasses. It also produces none of the waste associated with primary production.

SAS International sources aluminium from suppliers using 90-95% recycled material.

Luminaire Components

Non-metal components within SAS Luminaires include plastic diffuser materials, wiring insulation and electronic components. Whilst established end-of-life recycling processes exist for each of these groups individually, the luminaire as a whole falls into the category of WEEE (Waste Electrical and Electronic Equipment). WEEE must be disposed of in a controlled manner and ultimately processed by an authorised treatment facility.

Steel

Our grid, suspended tile and panel integrated ceiling systems are manufactured using steel. Steel is 100% recyclable and currently the most recycled material in the world. In 2015, an estimated 585 million tonnes were recycled. To put this into context, it is the equivalent of 220 Eiffel Towers being recycled every day.

Globally, the construction industry consumes 50% of all new steel produced. This steel contains a minimum of 20% recycled metal, but in theory could contain up to 100% reused material. The amount of recycled content varies as it is dependent on scrap availability at the time of production. (The high demand for steel coupled with its inherent long life often outstrips the availability of scrap steel for construction use).

The majority of new SAS steel contains 20-25% recycled material, depending on scrap availability and region. Globally, 80% of scrap steel is recycled. In the UK an estimated 94% of steel used in construction is recovered.

Every tonne of steel recycled makes the following environmental saving:

- 1.5 tonnes of iron ore
- 0.5 tonnes of coal
- 40% of the water required in production
- 75% of the energy needed to make steel from virgin material
- 1.28 tonnes of solid waste
- Reduction of air emissions by 86%
- Reduction of water pollution by 76%

Other metal advantages include no associated landfill costs and significant residual value at end of life. The rising costs of landfill taxes provide obvious reasons to use steel.

Polyester Powder Coatings (PPC)

The majority of our integrated ceiling systems are finished in PPC. The coating is known for durability, colourfastness and consistent quality. What should be communicated more clearly is it is also a highly sustainable, environmentally friendly and energy efficient material.

SAS International sources PPC suppliers with impeccable sustainability and quality credentials, who submit themselves to Ecological Efficiency Analysis (EEA). Our selected PPC environmental benefits include:

- Zero Volatile Organic Compounds (VOCs)
- Zero toxic heavy metals, for example lead or chromium (VI)
- Virtually no waste, as overspray can be collected and either recycled or reprocessed
- Long lasting surface protection, maximising product lifecycles (min. 25 years)
- Lower curing temperatures, minimising energy consumption and CO2 emissions
- Less natural resource consumption during application through reduced film build up

Waste Reduction

Reducing waste is not just about recycling site waste and ethical sourcing of materials. The key is to formulate strategies to stop producing it in the first place.

Working with the project team and including client requirements, SAS can develop and adopt a best practice approach. This includes establishing a sustainable logistics procedure, including the reuse of delivery packaging.

Another important aspect is the system design for manufacturing. We design our systems to minimise waste through efficient cutting of material. Any waste produced can be collected and recycled, reused or repurposed. Preforming apertures for lighting and other services during manufacturing also reduces on site wastage, in addition to labour costs.

Factory finished metal products installed in accordance with our recommendations provide a durable product. Given appropriate use and maintenance, SAS systems can be expected to remain serviceable for a minimum of 25 years.

Thermal Mass Cooling

Buildings designed to use thermal mass to realise energy reduction through passive heating and cooling efficiencies are well documented. SAS International has designed a number of systems ideal for acoustic control and service integration which leave the soffit exposed. Please refer to SAS500, SAS510, SAS600 and our Integrated Service Modules for SAS systems suitable for thermal mass applications.

SAS International is committed to improving the sustainability of both the built environment and our own manufacturing approaches. Our ISO 14001:2015 accreditation testifies this commitment and offers an internationally recognised validation of our ongoing efforts.





All SAS luminaires are designed, manufactured and tested in full accordance with BS EN 60598. This is a requirement of all UK-based luminaire manufacturers.

BS EN 60598-1:
2015 –
Luminaires.
General
requirements and
tests

Harmonised European Standards

As a harmonised European standard, BS EN 60598 provides a set of detailed construction guidelines to which a wide range of luminaires may be designed and manufactured. Conformity to BS EN 60598 ensures a minimum level of electrical safety for lighting products.

Such standards are developed by technical experts from the European Standardisation Organisations (CEN/CENELEC). They offer a common technical language accessible to all parties in the manufacturing sector.

From a manufacturer's point of view, they are a recognised declaration of a product's general safety. From a specifier's point of view, they verify compliance with requirements and demands.

CE Marking

Part of BS EN 60598 requires that the CE mark should be shown on all accompanying commercial documents, including product labelling. Implemented under European Union Council Directive 93/68/EC, each document should carry the manufacturer's name, trade mark or identification mark.

CE marking has been implemented by SAS International in accordance with these directives.



International Quality Benchmarks

SAS International has a committed programme to operate best in class manufacturing and production facilities. We have invested significant sums into making sure our production quality, capacity and capabilities lead the global market.

Each factory has a dedicated site manager responsible for implementing, auditing and maintaining our ISO and OHSAS accreditations.

ISO 9001 Accredited ✓ (Quality Management System)

Each SAS factory has achieved ISO 9001 accreditation, independently assuring quality procedures are met and maintained. This accreditation ensures consistency and ongoing improvements to working practices.

ISO 14001 Accredited ✓ (Environmental Quality System)

Each SAS factory has achieved ISO 14001 accreditation, indicating our commitment to reducing the environmental impact of our manufacturing processes.

OHSAS 18001 Accredited ✓ (Occupational Health & Safety Management System)

Each SAS factory has also achieved OHSAS 18001 accreditation, demonstrating a culture of safety and wellbeing, driving our quality output.



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