Contents

About

SAS International is a British manufacturer of interior products, delivering the ever increasing demands of clients and specifiers worldwide.

We are solution led, driven by delivering quality, design innovation and maximum value in an ethical and sustainable manner.

Our ongoing investment in manufacturing facilities and processes ensures we provide value-engineered solutions across the built environment.

Our Values

Since 1968, SAS International has become recognised as a leading global manufacturer of interior fit-out solutions. Best known for our award-winning metal ceiling systems, our interior products can be seen in landmark projects worldwide.

Our approach is guided by our core values:

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 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.

Manufacturing

SAS International is a leading building products manufacturer, producing award-winning interior fit out solutions since 1968. We manufacture a broad range of durable, sustainable and aesthetically-driven products, meeting international design, performance and integration requirements.

Acoustic Performance note (opposite page) This facility doesn't replace the accredited testing carried out in independent laboratories.

We lend our manufacturing expertise to the following product groups:

Metal ceilings	**Architectural metalwork**
Room comfort systems	**Fully bespoke interior solutions**

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.

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

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.

Product Testing
The quality and performance of our products is paramount to the success of our business. Where appropriate we ensure that products and systems are tested in accordance with client specifications.

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 250Hz. 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.

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.

Sometimes an off the shelf system will suffice perfectly well, but often, the architecturally-minded insist on something more. Welcome to SAS Plus.

First and foremost, SAS International is a manufacturer of leading metal ceiling systems and associated products. We have manufactured ceilings for nearly 50 years and in that time have honed our skills and expertise. SAS combines hundreds of years of collective knowledge and is arguably the most technologically advanced ceiling manufacturer globally.

This expertise goes beyond the best way to bend metal in a cost effective and sustainable manner. Our value add includes every stage of the design, manufacture and installation process.

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 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.

Metal Ceilings

Occupant productivity, wellbeing, comfort and flexibility of space are key considerations for the long term commercial viability of buildings.

Metal Ceilings offer the client and specifier a flexible, aesthetically-led solution to acoustic control, service integration and maintenance demands.

SAS International has established itself as the world leader in the design and manufacture of performance metal ceiling systems. Our interior solutions are beautiful, durable and sustainable. Long term, there is no alternative material that offers a more cost-effective solution to contemporary interior demands.

Why metal?

As a ceiling manufacturer, we are often asked why we concentrate on metal as a manufacturing material. The simple answer is:

- **Steel and aluminum are two of the most sustainable materials used in construction.**
- **Metal is a high quality material, offering improved aesthetics through design flexibility.**
- **Highly durable and robust, metal maintains its appearance long after other materials need replacing.**
- **Long term, metal is far more cost effective than alternative materials.**
- **To date, there is no better performing material that meets all building regulations and customer demands.**

SAS Plus offers the system designer access to SAS' in-house design team to collaborate on bespoke ceiling specification. Systems can be variants of standard SAS offerings, or completely bespoke designs. Please see page 6 for more details.

SAS PLUS

SAS Suspended Ceilings

Clip-in
Ceiling tiles simply clip into the ceiling grid, offering a concealed grid aesthetic.
Examples
SAS**120**
SAS**150**

Lay-in
Flanges on the ceiling tile edges lay onto the ceiling grid, exposing the grid as an intrinsic aesthetic element. Both tegular and flush options are available.
Examples
SAS**130**
SAS**320**
SAS**330**
SAS**380**

Torsion Spring
A torsion spring ceiling system with convenient hinge-down access.
SAS**170**

Hook-on
Perimeter hooks suspend the tiles, concealing the grid. An advantage of hook-on systems compared to clip-in is an increased load capacity.
Examples
SAS**200**
SAS**205**

SAS Baffle Ceilings

Straight
Suspended from the soffit via wires, rods or hangers, baffles offer an alternative acoustic treatment to suspended ceilings.
Examples
SAS**500**

Curved
Performance of curved baffles is directly comparable to straight, the obvious difference being curved and waveform options.
Examples
SAS**510**

SAS Raft & Modular Ceilings

Rafts and modules can form standalone canopies, islands or continuous runs. Applications can be purely aesthetic, acoustic control or fully integrated service options.
Examples
SAS**600**
SAS**610**

SAS Linear Ceilings

Linear ceilings are suspended from the soffit via rods, hangers or wires. Typical applications are for exposed soffit areas and smoke extraction.

Box Profile Examples	Plank Profile Examples	Tubular / Shaped Profile Examples
SAS**700**	SAS**720**	SAS**730**
SAS**710**		SAS**750**
SAS**740**		

Waveform
Examples
SAS**740**
SAS**750**

SAS Open Cell Ceilings

Open cell ceilings resemble rectilinear and triangular honeycomb grid structures aesthetically treating smoke extraction zones.
Examples
SAS**800**
SAS**810**

Polynodal Ceilings

An adjustable nodal ceiling system used to create multi-faceted ceiling designs.
Examples
SAS**900**

Sustainability

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.

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 LEED, WELL Building Standard, BREEAM, SKA, Green Tag and Estidama.

SAS International is ISO 14001:2015 accredited.

Whole Life Costing

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

SAS International partnered a recognised quantity surveying practice to conduct research into the overall lifetime costs of ceiling materials. The report highlighted significant benefits of metal in the context of the whole life costs of a building.

Based on a 20-year lifespan, the report projected achievable cost savings of 47% using SAS systems compared with non-metal alternatives. In addition, the industry consensus was that non-metal products would be considered unserviceable after a period of 10–15 years.

Responsible Sourcing of Materials

Metal offers not only considerable long term capital savings, but also long term sustainable benefits. SAS International will only source materials from suppliers with a progressive and innovative approach to sustainable material manufacturing.

Steel

Our grid, suspended tile and panel 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 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 specify steel.

Aluminum

Our premium linear ceiling systems and trims are manufactured using aluminum. 25% of all aluminum 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 aluminum ever produced is still in use today, with no quality degradation.

Recycling aluminum 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 aluminum from suppliers using 40-60% recycled material depending on market conditions.

Mineral Wool

The vast majority of SAS acoustic infill pads are manufactured from mineral wool. This material is manufactured from diabase rock, which is continually replenished naturally within the earth. The material is also 100% recyclable, so no mineral wool should enter landfill at end of life.

Polyester Powder Coatings (PPC)

The majority of our ceiling systems are finished in PPC. The coating is known for durability, color-fastness 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 life cycles (min. 25 years)**
- **Lower curing temperatures, minimising energy consumption and CO2 emissions**
- **Less natural resource consumption during application through reduced film build up**

EPD's

For further information please refer to section on website

Sustainability

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 re-purposed. 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, SAS610 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.

bsi. ISO 14001 Environmental Management

EMS504170

Reaction to Fire

SAS metal ceilings are tested and certified in accordance with UK, European, American and Australian Standards:

ASTM E84 / UL723

Standard Test Method for Surface Burning Characteristics of Building Materials

ASTM International Building Standards

SAS metal ceilings are tested and certified in accordance with American ASTM Standards.

ASTM's fire and flammability standards are involved in the testing and evaluation of the ignition, burning, or combustion characteristics of certain materials. These fire and flammability standards are instrumental in the establishment of building codes, insurance requirements, and other fire regulations that govern the use of building materials.

Test Standard

ASTM E84/UL723: Standard Test Method for Surface Burning Characteristics of Building Materials

Aluminium linear profiles have achieved a Class A ASTM E84-18 / UL723 rating.

SAS Plain and Perforated Galvanised Steel Ceiling Panels have achieved a Class A ASTM E84-18 / UL723 rating.

Classifications

Interior wall and ceiling finish materials shall be classified in accordance with ASTM E84 or UL 723 - 10th Ed. 2008. Such interior finish materials shall be grouped in the following classes in accordance with their flame spread and smoke-developed indexes.

- **Class A: Flame spread index 0 - 25; smoke-developed index 0 - 450.**
- **Class B: Flame spread index 26 - 75; smoke-developed index 0 - 450.**
- **Class C: Flame spread index 76 - 200; smoke-developed index 0 - 450.**

Reaction to Fire

SAS metal ceilings are tested and certified in accordance with UK, European, American and Australian Standards:

AS ISO 9705

Classification by group number indicating the time taken for materials to reach flashover

Classification: Group 1

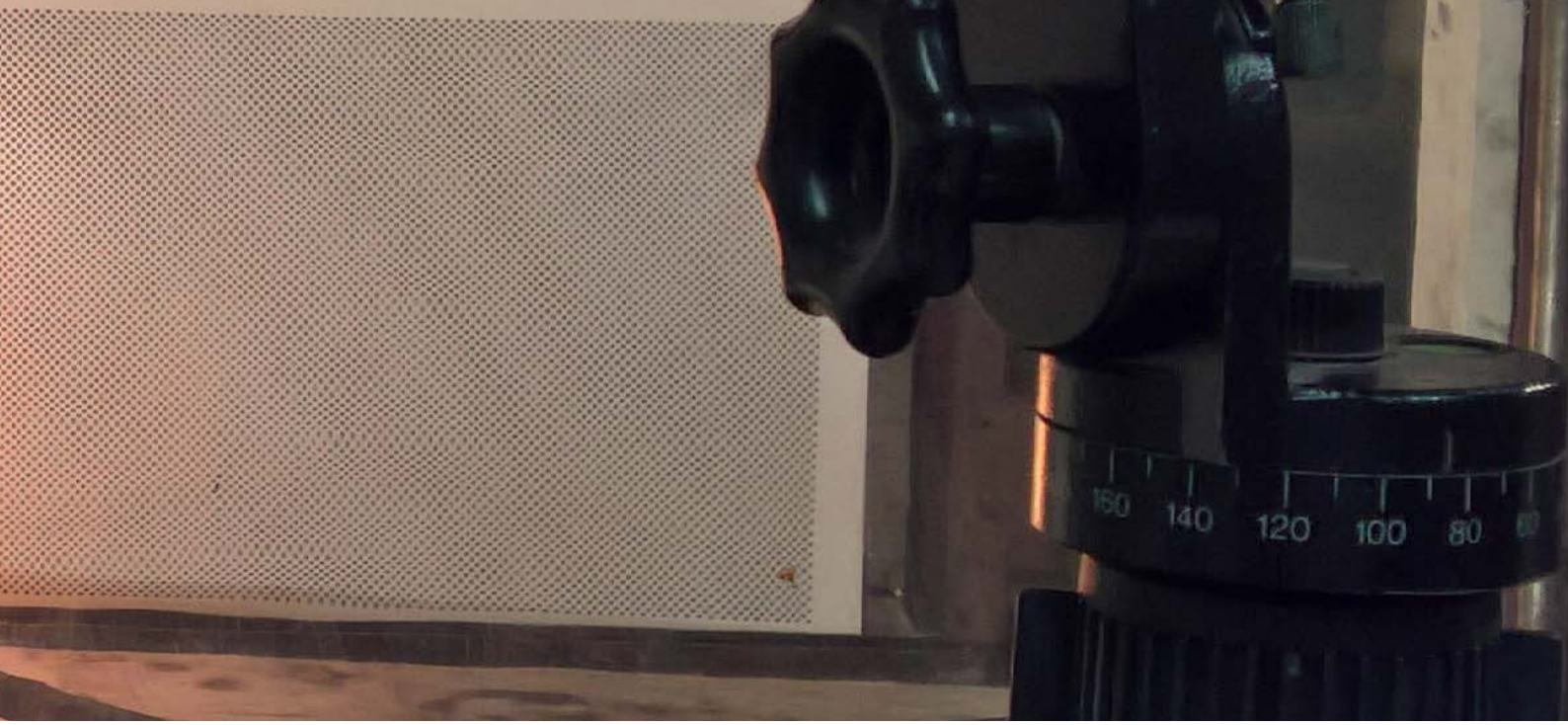
Australian National Construction Code (NCC) Fire Testing

The National Construction Code of Australia (NCC) and AS 5637.1:2015 stipulates the classification of materials by Group Number, which indicates the amount of time taken for the material being tested to reach flashover under AS ISO 9705 — 2003 test conditions. The NCC and AS 5637.1:2015 define flashover to be a Heat Release Rate of 1 MW, so materials are classified, in accordance with NCC 2016 spec Cl.10 and AS 5637.1 2015, by the time taken for the Heat Release Rate, as measured during the AS ISO 9705 test, to reach 1 MW per the scheme below;

- **Group 1 — Materials classified as Group 1 do not reach flashover after ten minutes exposure to a heat source delivering 100 kW immediately followed by a further ten minutes exposure to 300 kW.**
- **Group 2 — Materials classified as Group 2 reach flashover after ten minutes of exposure to a 100 kW heat source.**
- **Group 3 — Materials classified as Group 3 reach flashover after 2 minutes, but before 10 minutes of exposure to a 100 kW heat source.**
- **Group 4 — Materials are classified as Group 4 is they reach flashover before 2 minutes of exposure to a 100 kW heat source. The NCC and AS 5637.1:2015 also define the smoke growth rate index, or SMOGRARC as a quantity which may be obtained from the smoke obscuration measurements obtained in the AS ISO 9705 test SAS International Ceiling System classification SAS International have carried out a series of Fire Tests in accordance with the above standard for our metal ceiling systems and associated products including:**
- **Perforated (Up to 22% free area) polyester powder coated metal panels**
- **Up to 2 3/16" thickness mineral wool acoustic inlays (5 lbs/ft³ density) and/or Acoustic Fleece backing**

The material subjected to this AS ISO 9705 test did not reach a Heat Release Rate of 1 MW during the 1200 second exposure period. Therefore the system has achieved a classification and smoke growth rate:

Classification: Group 1.
SMOGRARC 4.4m2s-2 x 1000



SAS metal ceilings are tested and certified in accordance with UK, European, American and Australian Standards:

EN 13501-1

Fire classification of construction products and building elements

UK Building Regulations

The Building Regulations' 'Approved Document B' for fire safety sets out minimum requirements for the performance of ceilings within buildings. The requirements are tested to European standards (EN 13501-1).

European Standards (EN 13501-1)

SAS ceiling tiles* have a European Class performance of:

A2-s1, d0

The first figure sets out the fire behaviour of the product, with a result ranging from A to F:

- **A1** Product does not contribute to fuelling the fire at any stage
- **A2** Product does not significantly contribute to the fire load nor spread
- **B** Product has limited lateral spread of flame with sufficiently delayed and limited heat release

The second figure ('**s**'), relates to the smoke behaviour, with three classifications:

- **s1** Product emits negligible smoke emissions
- **s2** Product emits a limited amount of smoke
- **s3** No limitation set for emissions

The third figure ('**d**') relates to the volume of flaming droplets or particles, with classifications of d0-d2:

- **d0** Classification requires that no droplets or particles occur at any time during the test
- **d1** Stipulates a minimum period of time where no flaming droplets or particles can persist
- **d2** Classification does not limit the performance required

*Based on up to 22% open area

Please note A suspended ceiling is a non-structural element of the building. SAS does not recommend that any suspended ceiling should be relied upon to protect the structural elements of a building. Nor do we recommend a suspended ceiling being relied upon as part of a fire control strategy.
If you require any further information please do not hesitate to contact our technical department or your fire safety officer.

Quality Standards

All SAS metal ceilings are designed, manufactured and tested in full accordance with BS EN 13964. This is a requirement of all UK-based ceiling manufacturers.

International Quality Benchmarks
Each division has a dedicated site manager responsible for implementing and maintaining our ISO and OHSAS certifications. Our group compliance team ensure all requirements, international standards, legislation and governance are met.

ISO 9001 Certified ✓
(Quality Management System)
This certification ensures consistency of products and services and promotes a culture of continuous Improvement.

ISO 14001 Certified ✓
(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 Certified ✓
(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.

Acoustics

Quick Selection Guide

Sound Absorption Class	Sound insulation D_{nfw} 21–30	31–40	40+	n/a
A	120 130 150 200 320 330			500 510 600* 610*
B	740*			500 510
C		120 130 150	200 320 330	500 510
D			120 130 150 200	

* For further information please refer to product pages

SAS PLUS

HAVE A QUESTION?

Configurable with other products. Call us.
Contact us on enquiries@sasint.us

Specification Criteria

The science of acoustics 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.

Sound Absorption

This is a measure of how much sound is absorbed by a surface. The remaining sound is reflected back into the space. In the absence of sound absorbing surfaces a room will become noisy and reverberant, because the sound keeps 'bouncing around'. This results in a number of undesirable effects - poor clarity of speech and excessive loudness being among the most important. As more sound absorption is introduced to a space, so the noise level will reduce and the sound decay more quickly.

Sound absorption is defined as a coefficient between 0 and 1, where the latter means that all sound is absorbed by the surface – thus none is returned to the room. The sound absorption of a surface is not the same for all types of sound. Porous materials are more efficient at absorbing mid and high pitched (or high frequency) sound than low frequency. Thankfully, we are normally less concerned about these low sounds because speech occupies the mid-high frequency range.

The international standard BS EN ISO 11654:1997 defines sound absorption in varying degrees of detail. The Sound Absorption Coefficient (α_s) and Practical Sound Absorption Coefficient (α_p) both describe how sound is absorbed at different frequencies. The Sound Absorption Rating (α_w) simplifies this data further by expressing it as a single figure, obtained by comparison with a weighting curve. In addition, the standard defines Sound Absorption Class, which ranks the effectiveness of a surface from A to E, where A is the most sound absorbing.

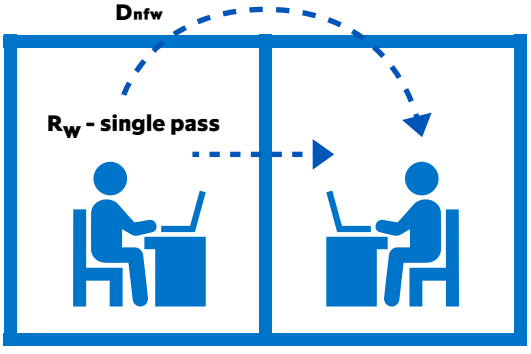
Initial selection of a sound absorbing product can normally be based on the single figure α_w or the Sound Absorption Class. Generally, it is only an acoustician that needs more detailed information.

Sound Insulation

This is the measure of how effectively sound is limited when passing through a building element. Sound insulation is important for glazing, partitioning and ceiling systems where the passage of sound from one space to another needs to be controlled. Two definitions of sound insulation are used depending on the product and its installation.

The first of these definitions is sound reduction, which is a measure of how effectively sound is blocked by an element – a 'single pass'. As with sound absorption, it is not the same for all types of sound and is normally worst at the low frequencies. If the sound reduction performance is stated as a single figure it uses the R for reduction and a subscript 'w' which stands for 'weighted'. As such, a R_w figure is a simplified indication of how much direct sound is stopped from getting through a building element. It is used to describe glazing and partitions.

In addition to the direct 'straight through' definition, sound insulation is also quantified in terms of a 'flanking' route – the so-called 'double pass'. The abbreviation used is D_{nfw} which means a sound level difference via a flanking route that is normalized and weighted (this supersedes D_{ncw} where the 'c' is an abbreviation for ceiling). It basically defines how much sound is blocked by passing through the same element twice. This is a relevant metric for ceilings which span more than one room and have a common void.



SAS products are tested in accordance with BS EN ISO standards, which differ slightly from the respective ASTM standards.

For sound absorption, research has shown that the difference in results when tested to BS EN ISO 354 vs ASTM 423 is only +/- 3%. As such, the SAA based on the BS EN ISO can be considered equivalent to the value based on ASTM 423.

The difference in BS EN ISO and ASTM flanking sound level difference standards is more fundamental. The specified size of laboratory and sound absorption therein is different, as is the calculation methodology. SAS has undertaken laboratory tests of the same sample testing in accordance with both standards. We have concluded that the laboratory environment makes about a 1.5dB difference and the calculation methodology a further 0.8dB. This means that the CAC tested in accordance with ASTM E1414 will be 2-2.5dB greater than the same sample tested in accordance with BS EN ISO 20140-9.

ASTM E1111 describes the test procedure to establish the Articulation Class of a ceiling. Given that this test quantifies the sound transmission over a barrier, in the presence of a sound absorbing ceiling plane, it is not surprising to find that the Articulation Class is related to the sound absorption of the ceiling. Research has shown that straightforward formulations connect AC and SAA. As such, SAS are able to provide an accurate estimate of Articulation Class based on the sound absorption of our products.

The Science Explained

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

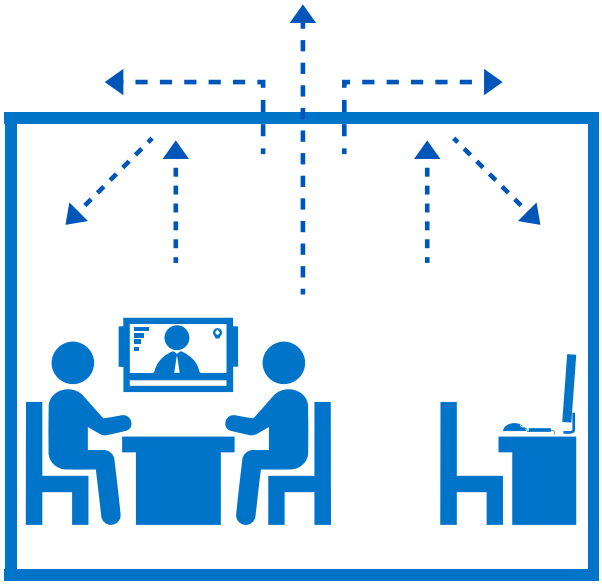
Sound Absorption
SAS products absorb sound using an open-cell porous material faced with a perforated metal sheet. The perforated metal offers no acoustic function other than to be 'transparent' to the incident sound. This is achieved by forming numerous holes of appropriately large diameter. Acoustic transparency is limited as the hole diameter approaches the thickness of the metal sheet. Similarly, perforation areas of less than 10% result in the higher frequency sound being reflected as it 'sees' too much metal and not enough hole. There is limited benefit in using perforation areas greater than 25%.

Most ceiling tiles rely entirely on the porous material behind the perforated metal to absorb the sound. Micro-perforated tiles are the exception and can offer sound absorption without a distinct porous backing. In both cases, sound is absorbed because the air particles have to vibrate within a medium that limits this movement. Porous absorbers are most effective when they coincide with air that is vibrating a lot. However, the vibration of air particles is not the same at every frequency or in every location within a room. As such, the effectiveness of a sound absorber is dependent on where it is placed.

Suspended Ceilings
Suspended ceilings are positioned a small distance from a sound reflecting surface which means that the air particle vibration (or particle velocity, as it is called) is easily predicted. It also means that the particle velocity is high, at a given frequency, which results in efficient absorption. This optimum placement is the reason why very thin porous materials can offer significant absorption. Nevertheless, thicker porous linings are generally more effective than thin ones.

Wall Panels
Wall panels are similar to suspended ceilings in terms of being close to a sound reflecting surface. The sound absorption is often poorer at low frequencies because the gap between the panel and wall is less than a typical suspended ceiling void.

Baffles and Rafts
Baffles and rafts are similar in design to wall panels. The main difference is in terms of their position and orientation within the room. Baffles and rafts are placed a long distance from the soffit and as such are 'in the room' and acoustically do not act like one of its surfaces. The particle velocity in these locations is not easily predicted and not likely to exhibit high magnitudes. However, because these elements are 'in the room' they are an acoustic 'object' not merely a surface. The larger contact area and diffractive effects at the edges result in sound absorption that is greater than the same single-sided area placed parallel and close to a soffit. It is an oversimplification to assume that it will exhibit twice the sound absorption in line with a doubling of 'visible' area. This argument ignores the importance of it's position in the room and the low frequency transmission through the raft/baffle.

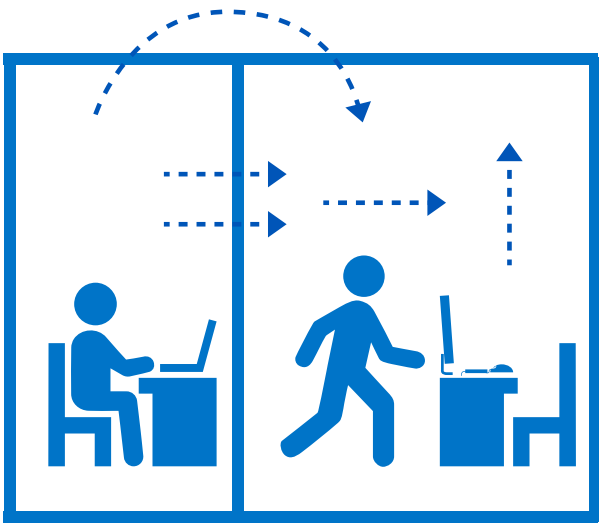


Commonly Asked Questions

Sound Insulation
Sound is able to pass through solid elements like doors and partitions. This is possible because the vibrating air particles cause the solid element to vibrate also, albeit on a very small scale. The vibrating element then causes the air particles on the opposite side to vibrate and this is perceived as sound.

It can be intuitively understood that heavier elements will offer more sound insulation because they are more difficult to move (Newton's second law of motion). In fact there are well established relationships between mass/area and sound insulation.

Sound energy is dissipated and reflected as it moves from one medium to another. For this reason, multi-layered constructions are efficient at providing sound insulation even if they are lightweight. A plasterboard partition is a good example of a laminate construction which can offer similar sound insulation to an homogeneous element that is much heavier, like a concrete block wall.



Acoustic Performance of Metal
It is a common misconception that perforated metal is a poor sound absorbing material, outperformed by alternatives such as mineral fibre. Through careful specification of the size and number of perforations, metal tiles with mineral wool infills offer sound absorption equal to or greater than other commonly specified materials.

Test Data
The acoustic tests undertaken by SAS quantify the performance of the tiles, not the complete system. The reason for this is that it is infeasible to test the multiplicitous combinations of tile and suspension system. It is the perforation type, infill and cavity depth that govern the acoustic performance of a system – other variables have very little affect.

Change in Ceiling Void Depth
Most SAS systems are laboratory tested using a 1'3" void depth. If other void depths are used then the sound absorption performance will change at the low frequencies. As the cavity depth decreases, so the low frequency limit of sound absorption increases. For example, the sound absorption at 800Hz associated with a 3 ⁵⁄₁₆" will be similar to the absorption at 200Hz due to a 1'3" cavity. The effect of not employing a cavity can be seen by considering the performance of a tile backed with plasterboard or a steel plate.

Effect of Borders Around Perforated Area
There are options for different border widths around the perforated tile area. Whilst a larger border will theoretically result in less sound absorption, the effect in practice is minimal.

Effect of Tile Size
Larger tiles provide greater sound absorption at low frequencies. This is because they exhibit lower stiffness and as such support flexural waves, also termed panel absorption.

Ceiling Tile Acoustic Performance

Sound Absorption

				Hz						
Perforation	**Inlay**	α_w	**NRC**	**125**	**250**	**500**	**1K**	**2K**	**4K**	**Class**
1522/1820	Thin Acoustic pad	1.00	1.00	0.60	0.95	0.90	1.00	1.00	1.00	**A**
1511		0.85	0.85	0.55	0.85	0.75	0.95	1.00	0.80	**B**
1522/1820	Thin Acoustic pad + plasterboard	0.60	0.70	0.30	0.30	0.60	0.95	1.00	0.80	**C**
1511		0.60	0.70	0.30	0.30	0.60	0.95	1.00	0.80	**C**
Ultramicro		0.60	0.75	0.35	0.45	0.70	1.00	0.85	0.45	**C**
1522/1820	Thick Acoustic pad + plasterboard	0.75	0.80	0.35	0.45	0.80	1.00	1.00	1.00	**C**
1511	Thick Acoustic pad + plasterboard	0.70	0.80	0.30	0.40	0.85	1.00	1.00	0.95	**C**
1522 / 1820	Thick Acoustic pad	1.00	1.00	0.55	0.90	0.95	1.00	1.00	1.00	**A**
1511		1.00	1.00	0.55	0.85	0.90	1.00	1.00	0.95	**A**
1522/1820	Fleece	0.80	0.80	0.55	0.95	0.75	0.80	0.85	0.85	**B**
1511		0.80	0.80	0.55	0.95	0.75	0.80	0.85	0.80	**B**

Tested in accordance with BS EN ISO 354:2003.

Sound Insulation

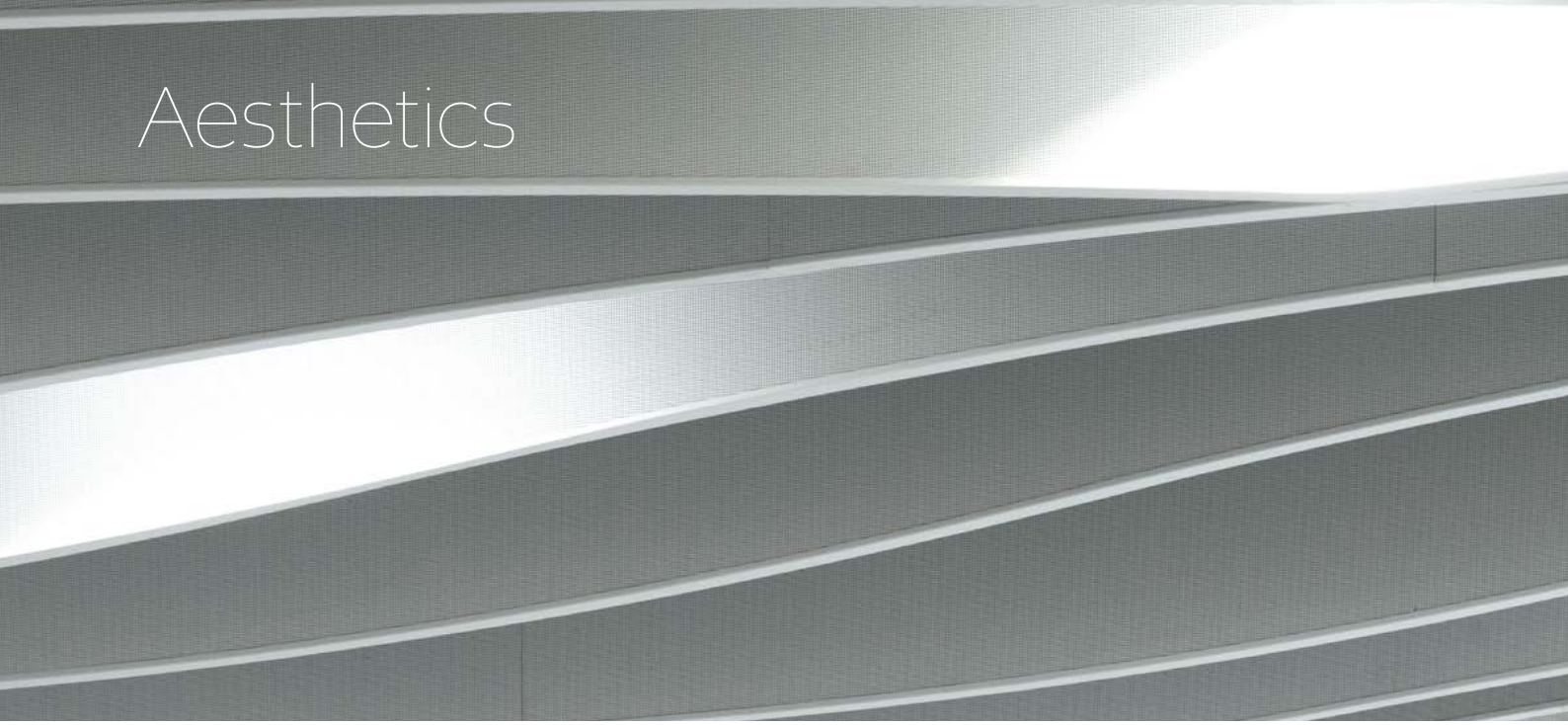
				Hz						
Perforation	**Inlay**	**D_{ncw}**	**D_{nfw}**	**125**	**250**	**500**	**1K**	**2K**	**4K**	**Class**
1522/1820	Acoustic pad	27	–	11	19	24	27	30	36	–
Ultramicro		33	–	19	23	29	33	43	47	–
1522/1820	Acoustic pad + plasterboard	49	–	28	38	46	60	63	62	–
1511		48	–	26	37	46	58	63	61	–
Ultramicro		40	–	19	30	35	45	54	58	–
1522/1820	Fleece	–	15	12	14	15	14	15	15	–
Ultramicro		18	–	14	18	17	16	19	23	–
Plain	None	43	–	23	34	40	46	50	47	–

Tested in accordance with BS EN ISO 20140-9:1994.

All SAS products are tested independently by a UKAS accredited laboratory.

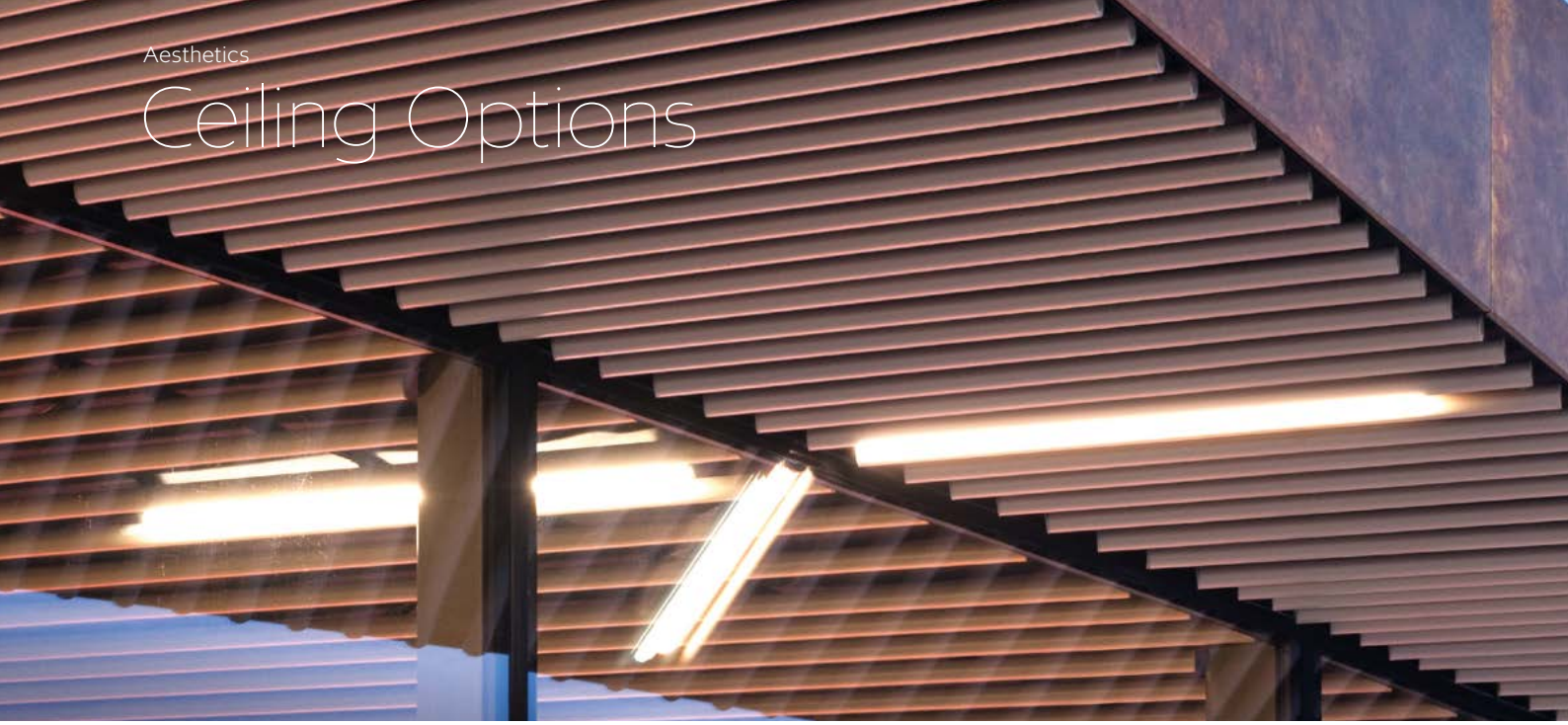
Aesthetics

Aesthetics



Strategic investment in quality aesthetics offers a significant return. On average, 80% of operational spend within an organisation can be attributed to staff-related costs. Beautiful interiors attract staff, increase their retention, positively improve employee wellbeing and communicate the right values to potential clients. A desirable building in the right location minimises these staff-related costs, improving profitability for both occupiers and owners.

Ceiling Options



Ceilings can have a dramatic impact upon an interior, both complimenting and accentuating the overall design. There are numerous ceiling types to consider, each with its own unique aesthetic. Each SAS system, regardless of design preference, benefits from the inherent material properties of metal.

SAS systems are designed for flexibility and offer the specifier scope to be creative. All systems are compatible and can be configured differently, from simply changing the tile size to complete bespoke solutions.

Suspended Ceilings

Grid

There are two main types of ceiling grid, exposed and concealed. The choice of grid is typically dictated by aesthetic preference.

Exposed grids can be flush with the ceiling plane, or recessed, and tiles can be modular or manufactured to modules. Exposed grid systems such as SAS330 allow for services to be integrated into the grid as well as the tile. Exposed grids can also be linear (one directional) or tartan (multi-directional, typically but not necessarily perpendicular).

Concealed grids, as the name would suggest, reflect just the tiles to form a flush, monolithic appearance.

Tiles

SAS manufactures tiles to common module sizes, such as 2'6"x2'6" and 2'x2'. The system designer is not limited to this and can specify ceilings in numerous shapes and sizes.

Suspended ceiling tiles can be manufactured to any triangular, rectilinear or trapezoidal shape up to 3'*****.

Please note *Tile sizes over 2.5ft^2 are considered large format (SAS Mega Panels). To remain within industry tolerances, large format tiles are typically no greater than 3ft^2.

Tile sizes greater than 3ft^2 are technically possible, but may need additional manufacturing processes to remain within tolerances. Large format tiles are only suitable for certain systems, please contact our technical services team for guidance.

Ceiling Options

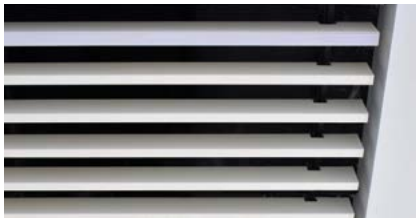
Ceiling Baffles

In exposed soffit applications, baffles offer an effective and attractive acoustic alternative to a more traditional suspended ceiling. Baffles can be rectilinear or waveform, with further bespoke options available.

Baffles offer impressive absorption characteristics and can be continuous, ideal for wide span applications such as atria. Other services can be integrated.

Linear Ceilings

Offering a completely different aesthetic again, linear systems can also be used in smoke extraction applications. Typical applications, however, are largely aesthetic in nature (although SAS740 and SAS750 can offer acoustic performance too).



Polynode

Polynode is an adjustable nodal ceiling system used to create multi-faceted ceiling designs. This polynodal system meets the demand of increasingly varied and complex ceiling surfaces in modern building design.

Simple equilateral triangle tiles can create a near infinite variety of polyhedral ceiling forms. Our patent-pending nodal system can also be used to transition from ceiling to wall.

Ceiling Rafts and Modules

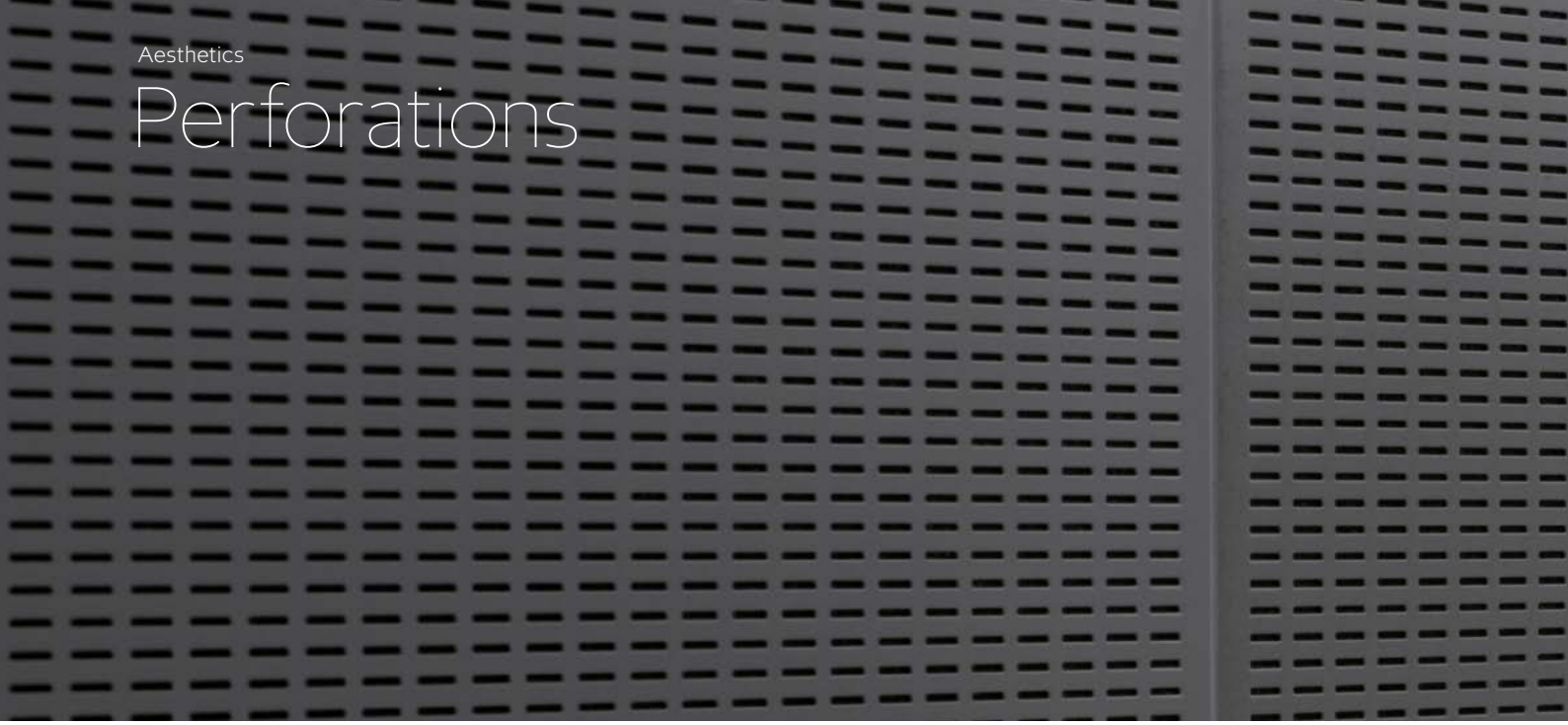
Typically used in exposed soffit applications, rafts and modules tend to be specified where designated zones require acoustic control.

Individual panels (rafts) or islands (raft/module clusters) offer a variety of design and installation options. Rafts can be shaped or rectangular and can also integrate services.

Open Cell Ceilings

Smoke extraction applications require a considerable open area within a ceiling to function, ideally serviced by open cell systems. With a distinctive appearance open cell ceilings can be used to great effect in other applications to visually draw attention.

Perforations



From virtually unnoticeable to strong design feature, perforations can have a significant impact upon the overall ceiling aesthetic.

The choice of perforation is largely dependent on acoustic demands and restricted to a required % open area. However, there are numerous choices to enhance the overall design within each % range and bespoke options are also available. So long as it can be punched through metal sheet, any pattern or design is theoretically possible. Alternatively, plain panels can be specified in areas requiring acoustic reflectance.

Perforation Borders
Tiles and panels can either be completely perforated, or specified with defined borders. Plain borders typically have a nominal width of 3/8". Alternative border widths can be manufactured within the constraints of the perforation pattern and panel size.

Larger border sizes can be used to create a tartan effect or provide a plain visual grid for partition layouts.

Apertures within Plain Zones
Perforated tiles with service apertures can be modified to include plain border frames around services.

Bespoke Perforations
Our in house tooling department is able to manufacture perforation tooling to meet any bespoke perforation requirement.

Perforations

Things to Consider when Specifying Perforations

Direction
Some perforations are directional and will appear differently depending on viewing direction. This feature can be used to alter the visual appearance of a ceiling, for example creating a checkerboard pattern.

Patterns
Perforations can be grouped into squares to create distinctive geometric patterns across the tile face.

Different perforation groups can be manufactured within the same tile, giving the impression of a number of smaller tiles.

Color
Perforations will have an impact on color tone and light reflectance values.

Sound Absorption
For effective sound absorption, we would recommend a perforation with an open area no less than 10%.

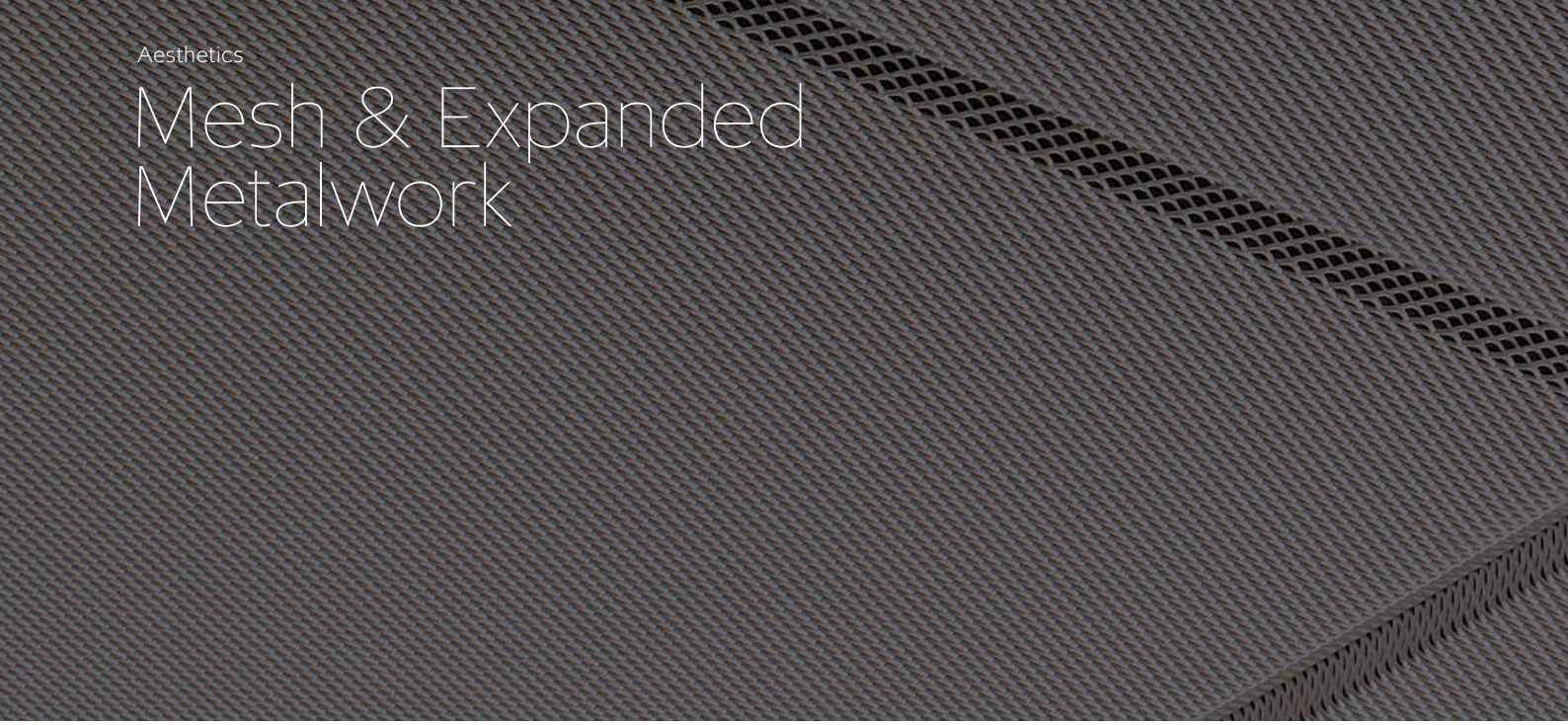
Multi-service Panels
Several services can be integrated within a single ceiling tile, each with appropriate borders and spacing.

Integration with Diffusers
Perforated panels can be used to accommodate a range of airflow requirements including air conditioning and displacement ventilation.

SAS can integrate air diffusers into the ceiling plane with a change of perforation to the appropriate ceiling tile.

Complete flexibility on perforation subject to acoustic requirements, please contact the technical design team.

Mesh & Expanded Metalwork



Whether driven by aesthetic needs or smoke extraction requirements, mesh is an increasingly popular tile option. SAS has been manufacturing expanded metalwork for decades and recently launched a new range of mesh options.

Our standard mesh options are available for SAS330. Configurable options are also available for SAS130, SAS170, SAS200, SAS205, SAS320, SAS330 and SAS600.

Non-standard bespoke options can also be manufactured to specification. For more information on bespoke mesh systems or patterns, please contact our technical design team.

Coatings & Finishes

Typically, SAS ceiling systems are finished in polyester powder coat (PPC), for the quality of finish and durability. PPC offers excellent protection, affording a minimum life expectancy of 25 years.

Color Choice

The vast majority of SAS projects specify white (RAL9010), which is why it has become our standard. In reality, any RAL color can be specified in PPC to suit project requirements.

We are also able to offer PPC finishes with metallic flecks, pearlescent sheens, or light textures.

Please refer to page 110 for more information.

Alternative Finishes

Specifications are not necessarily limited to flat RAL colors, either. A host of special effect finishes are also available, including but not limited to, polished metal, wood and ceramic effects.

Aluminum systems can also be anodised, opening up another range of aesthetic options.

Please refer to page 110 for more information.

Performance Coatings

SAS supplies non-standard coatings for specific applications, such as Anti-Microbial coatings for healthcare, or fine-textured coatings for pure matte requirements. If you have a specific niche application, please contact our technical design team for more information.

Please refer to page 110 for more information.

Border & Perimeter Trims

Interior spaces are greatly enhanced when proper consideration is given to the finer details. Inadequate interface detailing detracts from the overall quality of the solution, drawing unwanted attention to these unnecessary imperfections.

Page 215 has full details of SAS trims and system compatibilities.

Edge details effectively 'finish' the ceiling, completing the perimeter or transitioning into other materials such as plasterboard surrounds. This is an important design consideration and numerous trims are available, including floating edge, shadow gap and flush options.

Simple to install, SAS border and perimeter trims create a clean, crisp finish to a ceiling edge or transition. Our extensive range of aluminum trims offers the system designer a highly flexible approach to ceiling design. In addition to standard trims, we design and manufacture custom made extrusions for specific demands

Standard Finish

Exterior quality Polyester Powder Coat (PPC) adhering to AA MA 2603 - 13 specification BS EN 12306-1:2004

RAL9010 (white) 20% gloss

1000 hour (min.) salt spray test performance

Alternative colors can be selected from the BS and RAL color ranges

Special Finishes

SAS FT – a finely textured matte finish to mimic plasterboard surfaces

SAS AM – an anti-microbial coating for healthcare or lab applications

Aluminum trims can be anodised (any available color)

Aluminum trims can also be polished and chemically brightened (silver, gold, copper or brass)

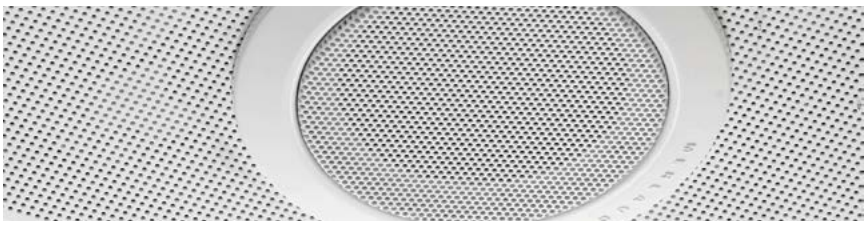
Optional high porosity primers – providing greater adhesion for drywall jointing and finishing compounds

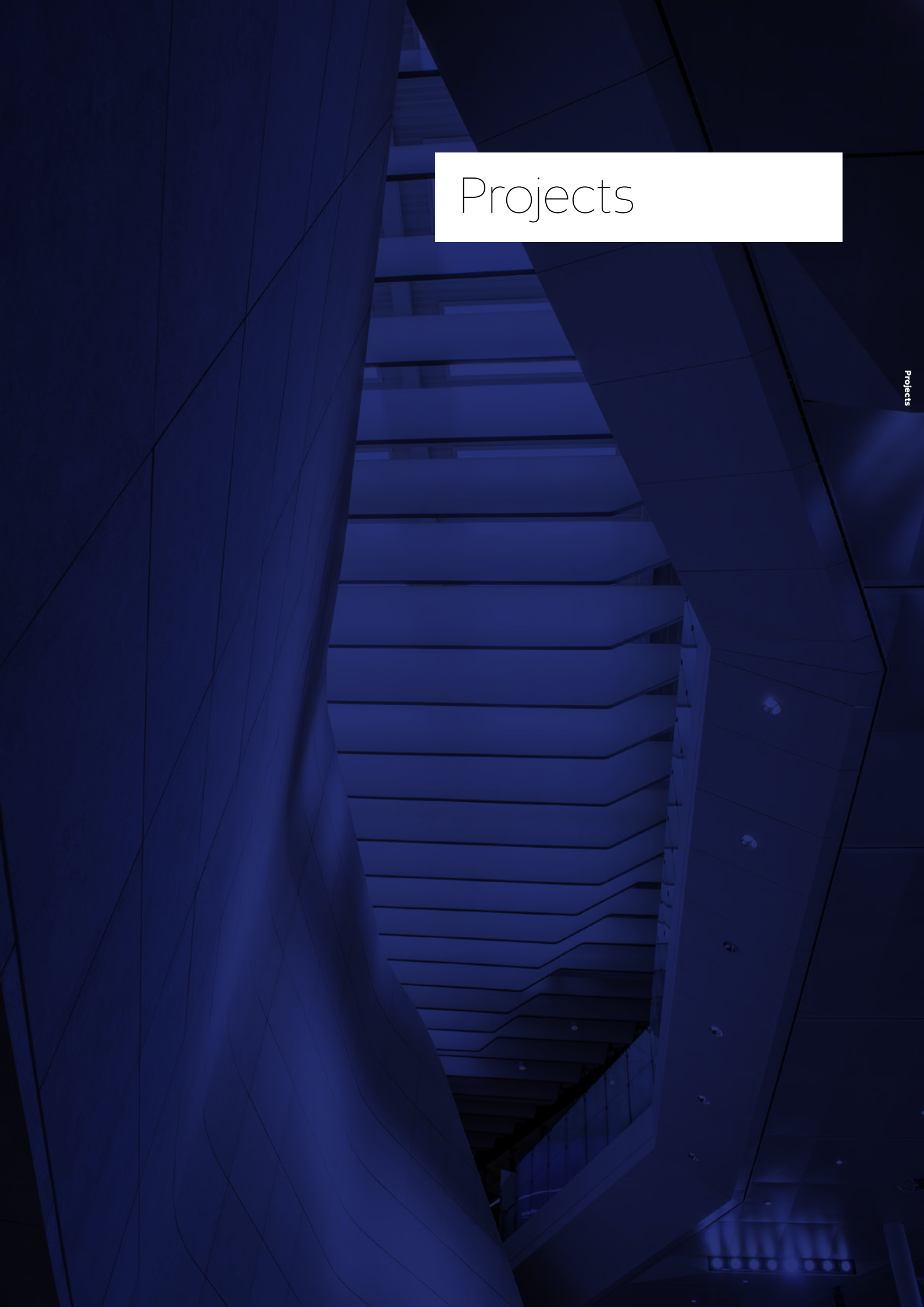
Please note Trims can be finished in any coating available for SAS ceiling tiles. Please consult our technical design team for more information.

Integration

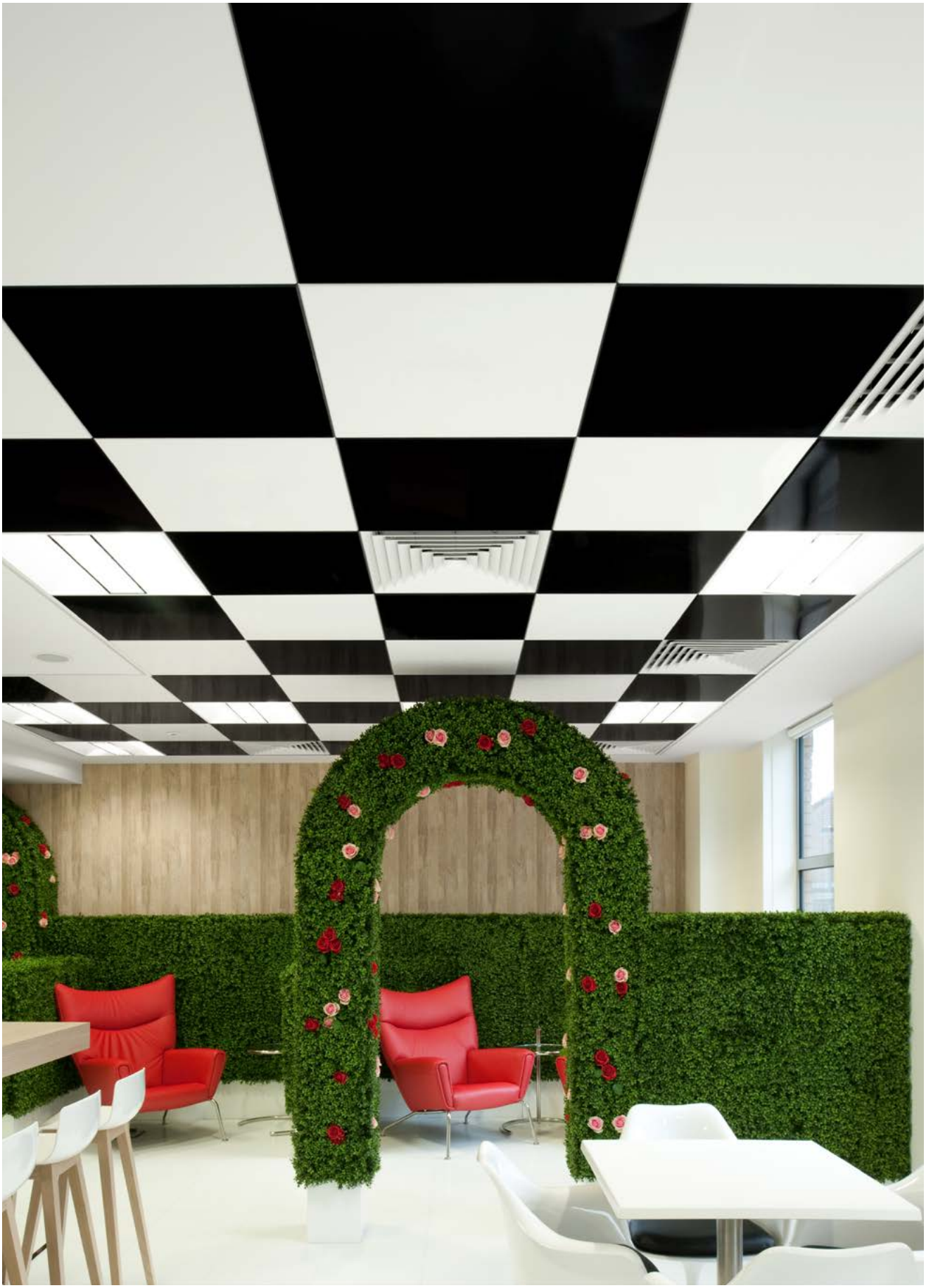
One of the most significant design benefits of metal is the ability to fully integrate M&E services within the ceiling. Anything from lighting, speakers and sprinkler systems to chilled and heated ceiling elements. Detailing is controlled in an aesthetically pleasing manner, integral to the overall design concept. Apertures can be pre-formed during manufacturing to ensure the installation mirrors the design intent.

Please Note Unless otherwise stated, each ceiling system is designed to support its own weight only. If significant weight is being added through integration with third party products, additional or independent support may be required. Please contact our technical design team for advice.





Projects



SAS**120**

@waterloo

Location
London, UK
Architect
Magyar Marsoni Architects

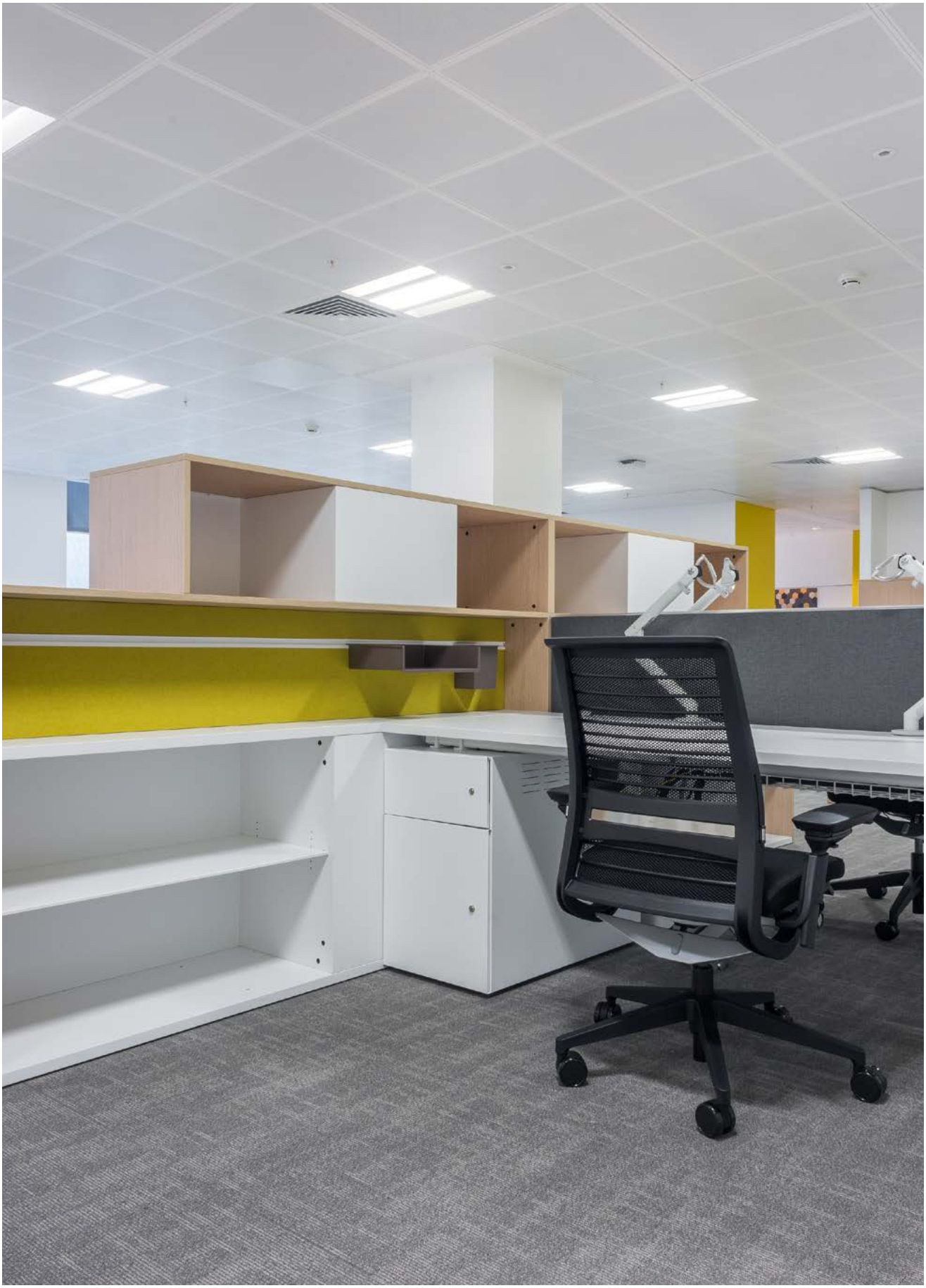
Contractor
BW Interiors Ltd
D&B Contractor
Peldon Rose Ltd
Purpose
Commercial

SAS**120**

Porsche Centre, Solihull

Location
Solihull, UK
Architect
Axis 3 Design

Contractor
Talbot Construction
Purpose
Retail



SAS**130**

DLA Piper, 1 St Peters Square

Location
Manchester, UK
Architect
TP Bennett

Contractor
COMO
Purpose
Commercial

SAS**130**

Slater Gordon, 58 Mosley Street

Location
Manchester, UK
Architect
Harmsen Tilney Shane

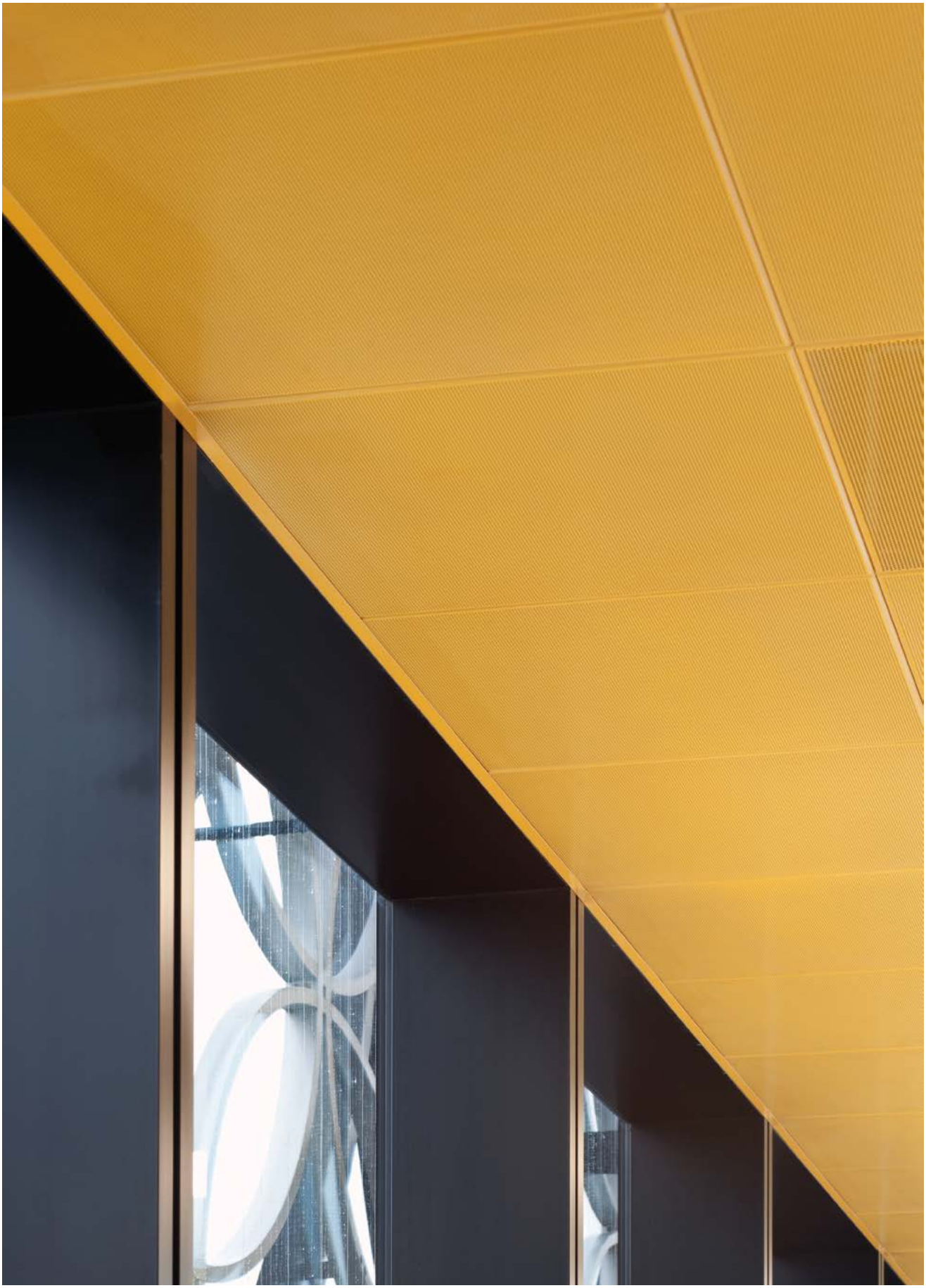
Contractor
Eric Wright Group Limited
Purpose
Commercial

SAS**150**

Aldar HQ

Location
Abu Dhabi, UAE
Architect
MZ and Partners

Contractor
ALDAR Laing O'Rourke Construction LLC
Purpose
Commercial



SAS**150**

Library of Birmingham

Location
Birmingham, UK
Architect
Mecanoo Architecten

Contractor
Carillion Plc
Purpose
Leisure

SAS**150**

Top

ADNEC, International Tower

Location
Abu Dhabi
Architect
Artillery Architecture & Interior Design

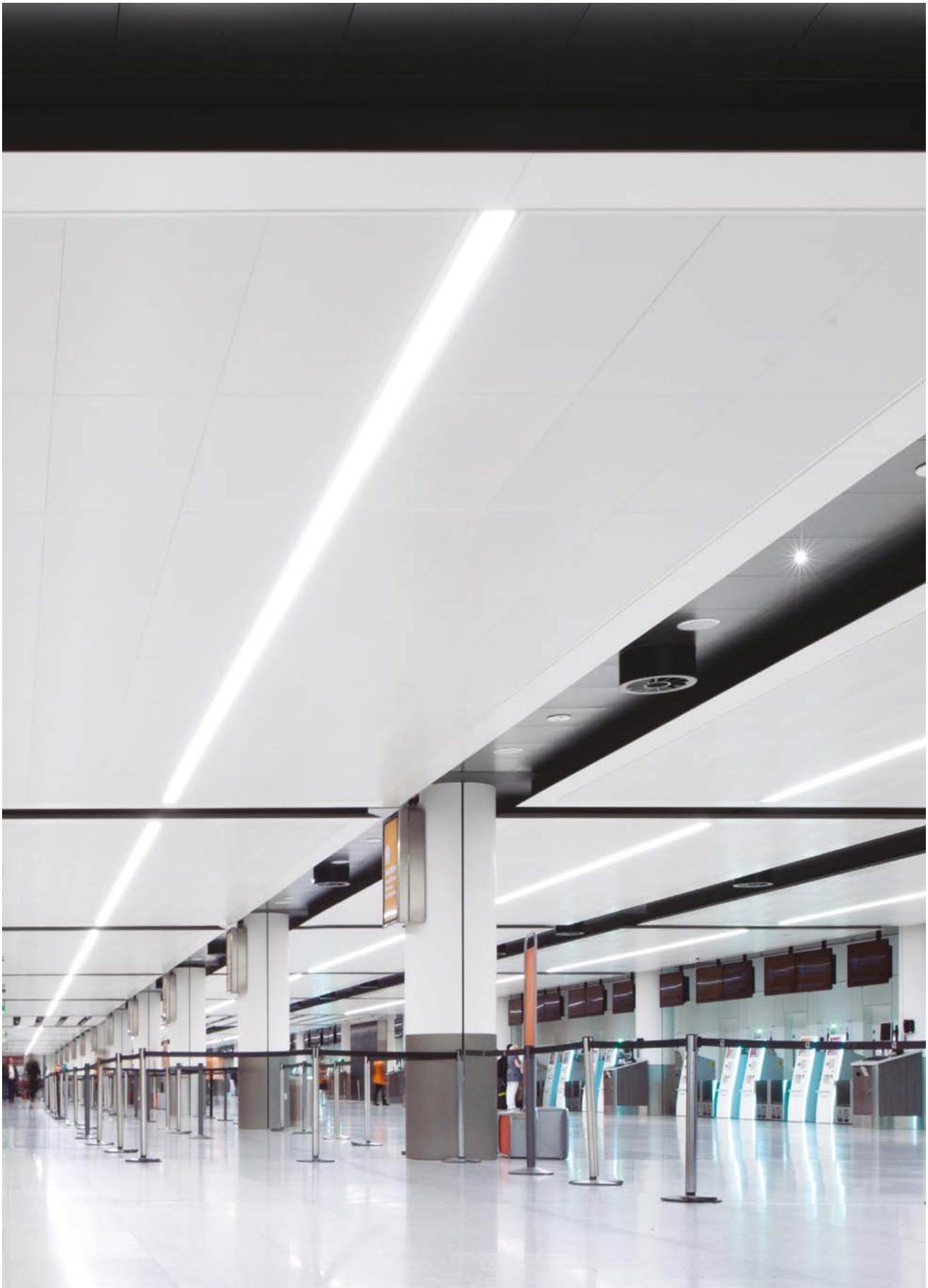
Contractor
Group 3 Engineers and Contractors
Purpose
Commercial

Bottom

BBC Broadcasting House

Location
20 Portland Place, London, UK
Architect
Sheppard Robson/ MJP Architects

Contractor
Lend Lease
Purpose
Commercial



SAS**200**

Gatwick Airport North Terminal

Location
London, UK
Architect
Atkins

Contractor
Belfour Beatty
Purpose
Transport

SAS**200**

Audi, Milton Keynes

Location
Milton Keynes, UK
Architect
SDA Architects

Contractor
BDB Design Build Ltd
Purpose
Retail

SAS**205**

University of Technology, Sydney

Location
Sydney, Australia
Architect
BVN Architecture

Contractor
Richard Crookes Construction
Purpose
Education

SAS**205**

Hospital General de Asturias, Oviedo

Location
Oviedo, Spain
Architect
Herraiz Arquitectura, S.L./Navarro Baldeweg Asociados S.L.P

Contractor
Constructora San Jose/ Sacyr Vallehermoso/ UTE Huca
Purpose
Healthcare

SAS**320**

Grand Central, Birmingham

Location
Birmingham, UK
Architect
Haskoll Architects

Contractor
Mace Limited
Purpose
Retail

SAS**330**

Zig Zag Building, London

Location
London, UK
Architect
HLW International

Contractor
BW Interiors Ltd
Purpose
Commercial

SAS**330**

Bouygues Telecom HQ

Issy Mozart

Location
Paris, France
Architect
Arquitectonica

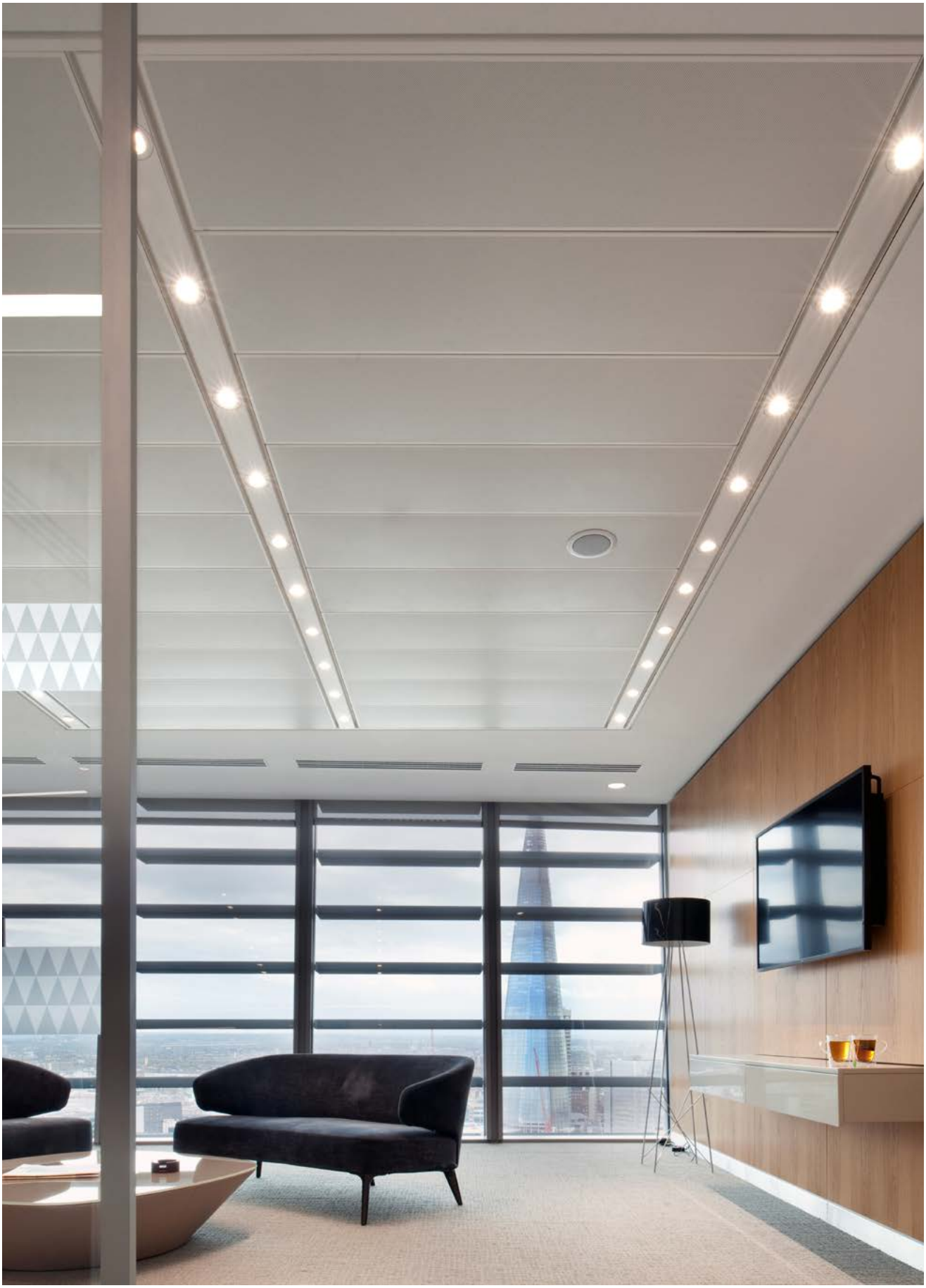
Contractor
Bouygues Construction Privée
Purpose
Commercial

SAS**330**

Academy House

Location
London, UK
Architect
John Robertson Architect

Contractor
ISG
Purpose
Commercial



SAS**330**

20 Fenchurch Street

Location
London, UK
Architect
Various

Contractor
Various
Purpose
Commercial

SAS**330** Chilled

Tour Majunga

Location
Paris, France
Architect
Jean - Paul Vijuier & S.A. D'Architecture

Contractor
Bouygues Construction
Purpose
Commercial

SAS**330** Radiant Cooling

Médéric

Location
Paris, France
Architect
2/3/4 architecture

Contractor
Dumez Ile de France SAS
Purpose
Commercial

SAS**500**

Leopardstown Racecourse

Location
Dublin, Ireland
Architect
Wejchert Architects

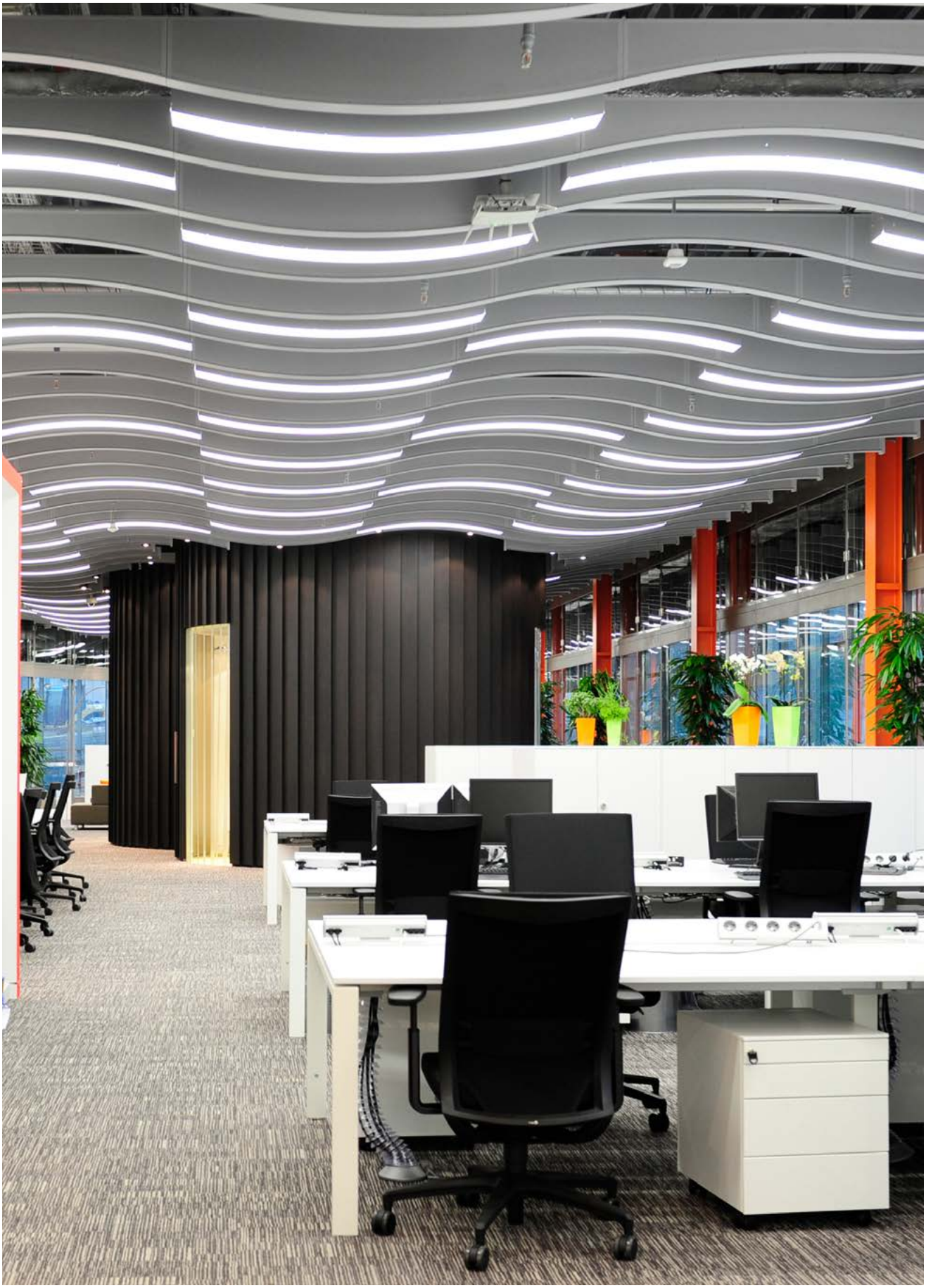
Contractor
Duggan Brothers
Purpose
Leisure

SAS**500**

City of Westminster College

Location
London, UK
Architect
Schmidt Hammer Lassen

Contractor
McLaren Construction
Purpose
Education

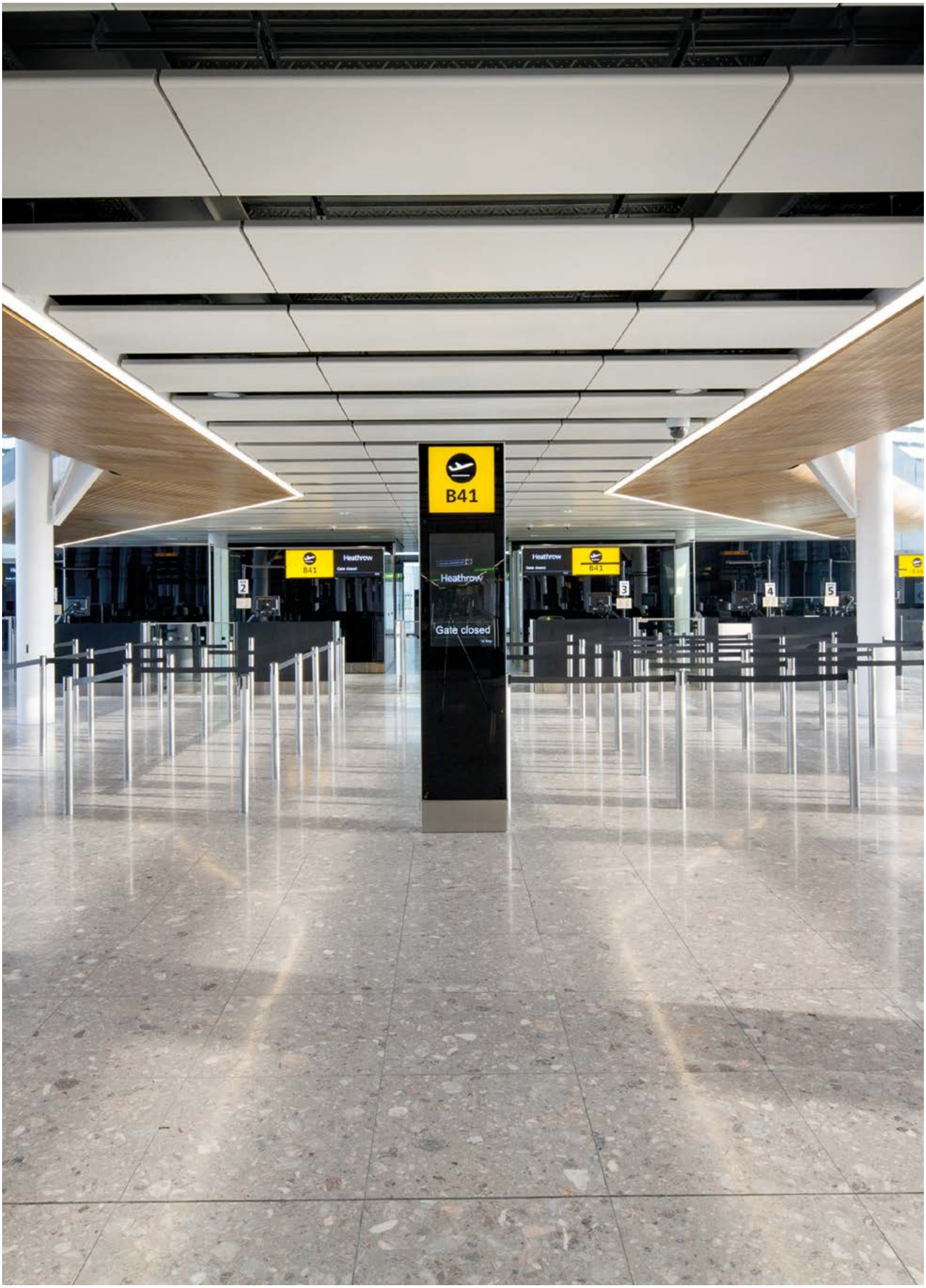


SAS**510**

Skype HQ

Location
Luxembourg
Architect
Walker & Martin Architects

Contractor
Skype
Purpose
Commercial



SAS**600**

Heathrow Airport T2

Location
London, UK
Architect
Nicholas Grimshaw & Partners Ltd

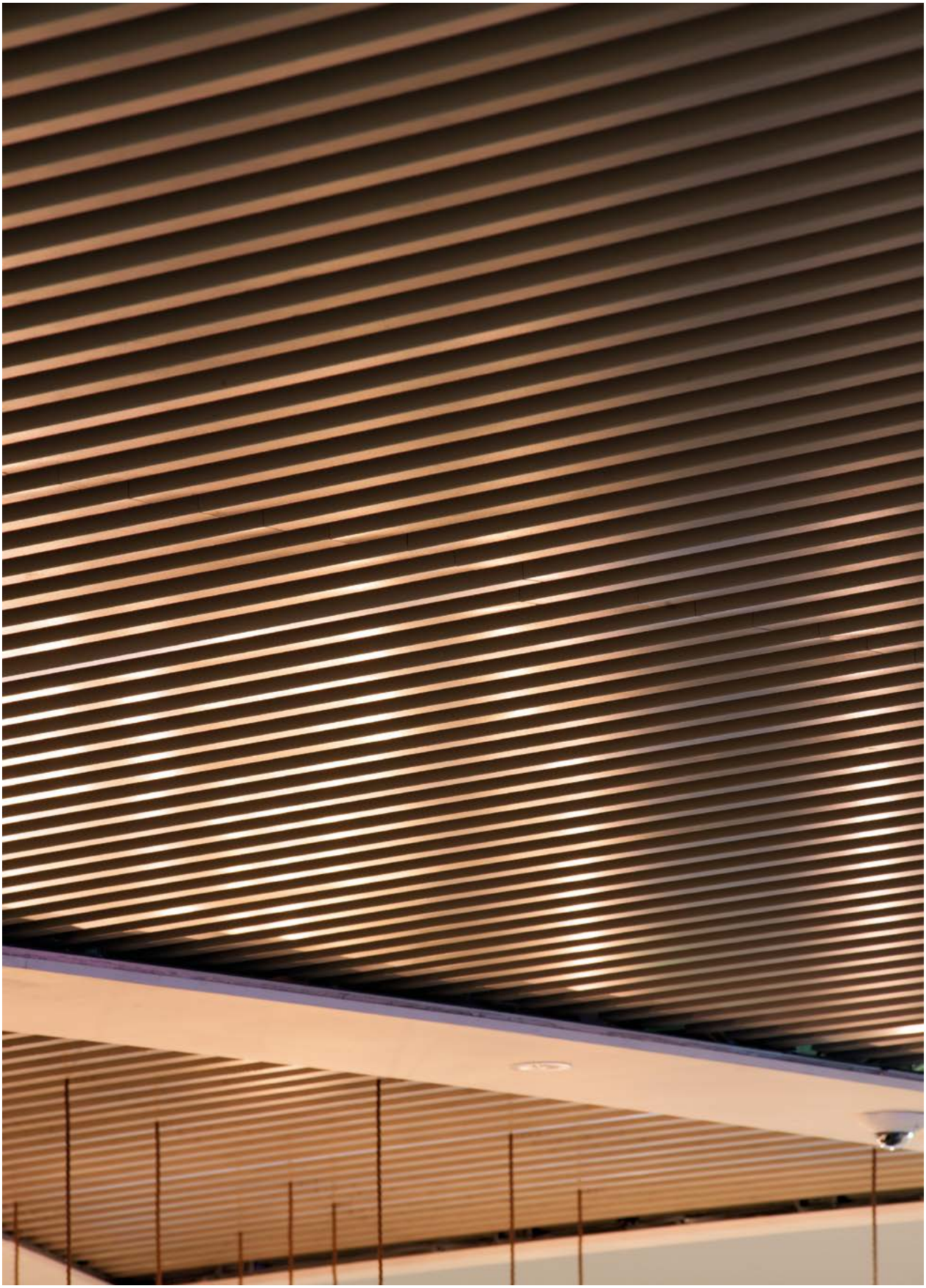
Contractor
Balfour Beatty
Purpose
Transport

SAS**600**

V&A Museum

Location
Dundee, Scotland
Architect
Kengo Kuma & Cre8 Architecture

Contractor
BAM Construction Ltd: Scotland
Purpose
Leisure



SAS**700**

Grand Central, Birmingham

Location
Birmingham, UK
Architect
Haskoll Architects

Contractor
Mace Ltd
Purpose
Retail

SAS**710**

The Friary Centre

Location
Guildford, UK
Architect
Hadfield Cawkwell Davidson & Partners

Contractor
Westfield Shoppingtowns Ltd
Purpose
Retail

SAS**720**

Zig Zag Building, London

Location
London, UK
Architect
HLW International

Contractor
BW Interiors Ltd
Purpose
Commercial

SAS**720**

Top

Hamilton Square Station

Location
Liverpool, UK
Architect
Lend Lease

Contractor
Miller Construction
Purpose
Transport

Bottom

KPMG, Sovereign Street

Location
Leeds, UK
Architect
Sheppard Robson

Contractor
Morgan Sindell/ISG Interior Exterior
Purpose
Commercial

SAS**720**

University of Aberdeen Library

Location
Aberdeen, UK
Architect
Schmidt Hammer Lassen

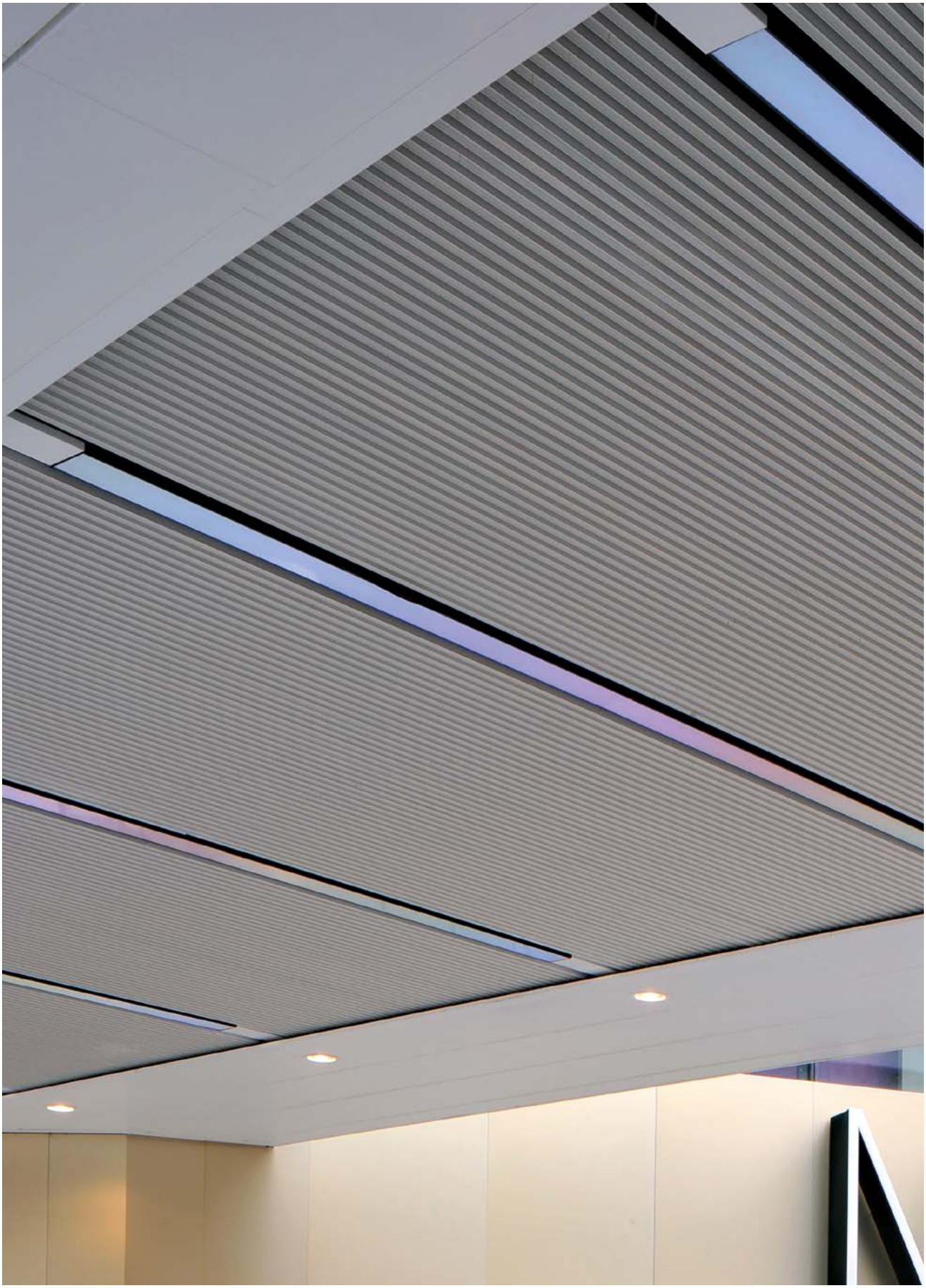
Contractor
PIHL UK
Purpose
Education

SAS**720**

Standard Chartered

Location
Dublin, Ireland
Architect
MCA Architects

Contractor
T&I Fitouts
Purpose
Commercial

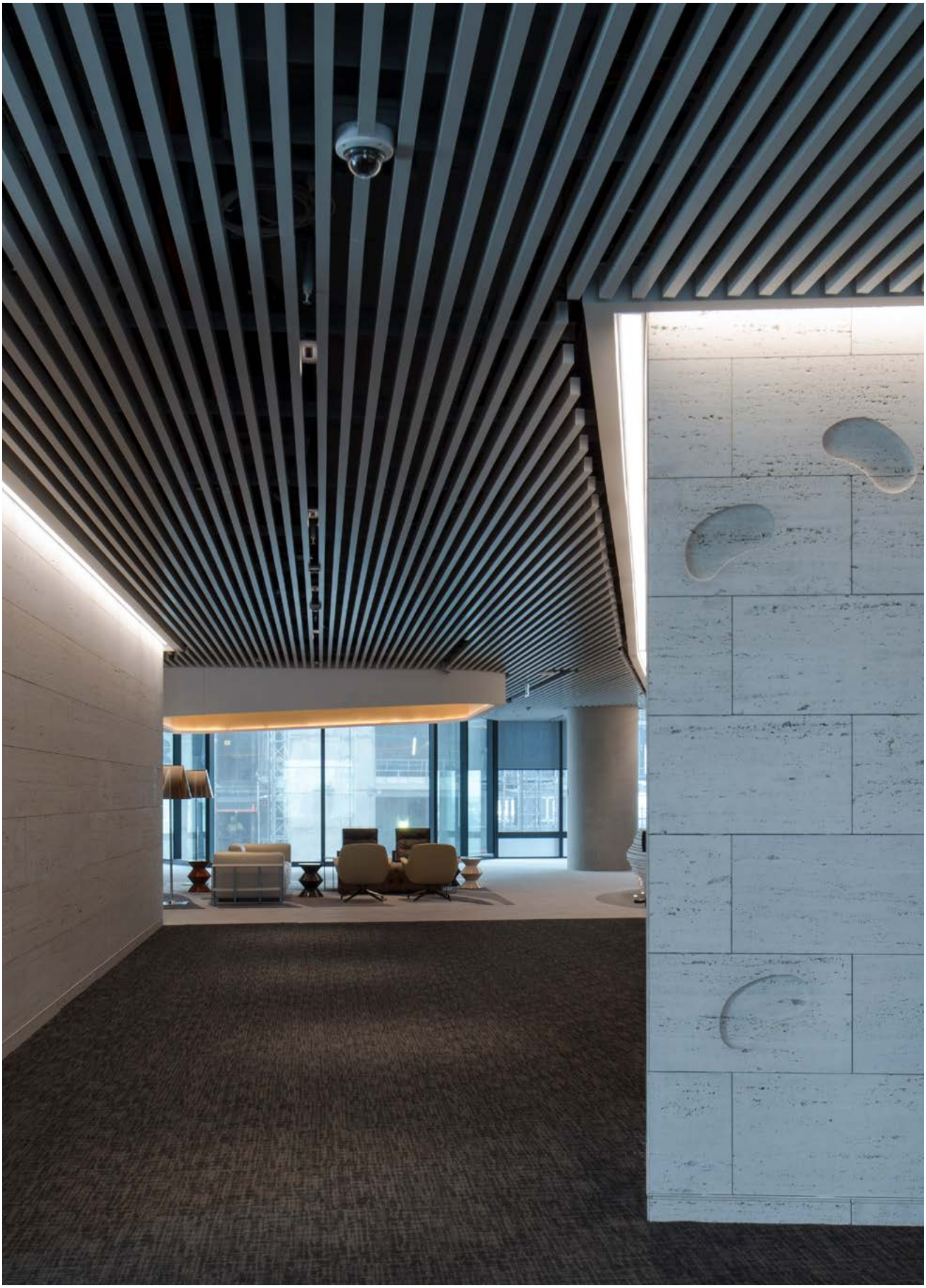


SAS**730**

Westfield, Stratford City

Location
London, UK
Architect
Westfield Shopping Towns Ltd

Contractor
Westfield Shopping Towns Ltd
Purpose
Retail

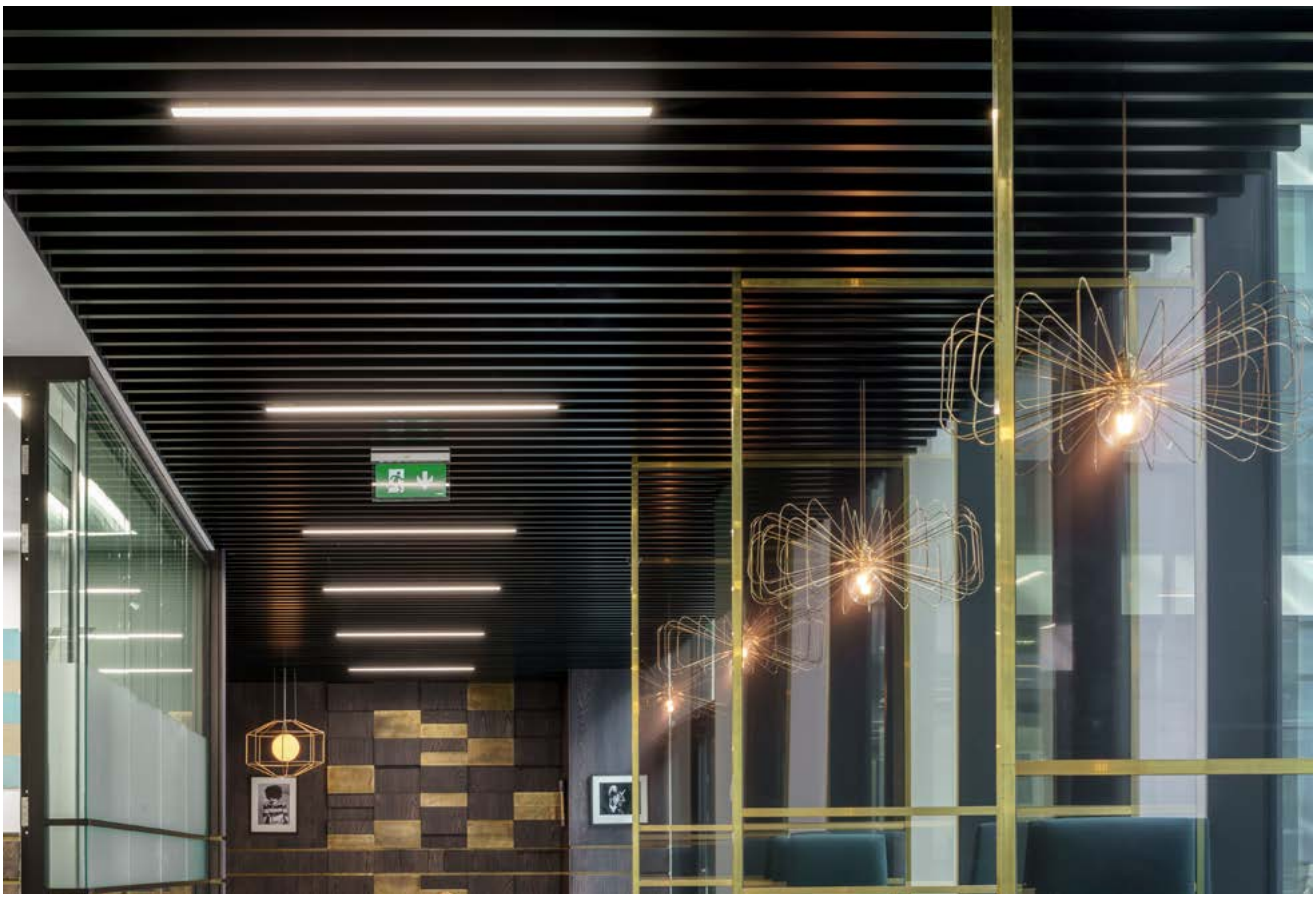


SAS**740**

Westpac, Barangaroo

Location
Sydney
Architect
RSHP & Geyer

Contractor
Lendlease
Purpose
Commercial



SAS**740**

Top
Royal College of Surgeons

Location
Dublin, Ireland
Architect
Henry J Lyons

Contractor
Bennett Construction
Purpose
Education

Bottom
Pinsent Masons

Location
Dublin, Ireland
Architect
RKD Architects

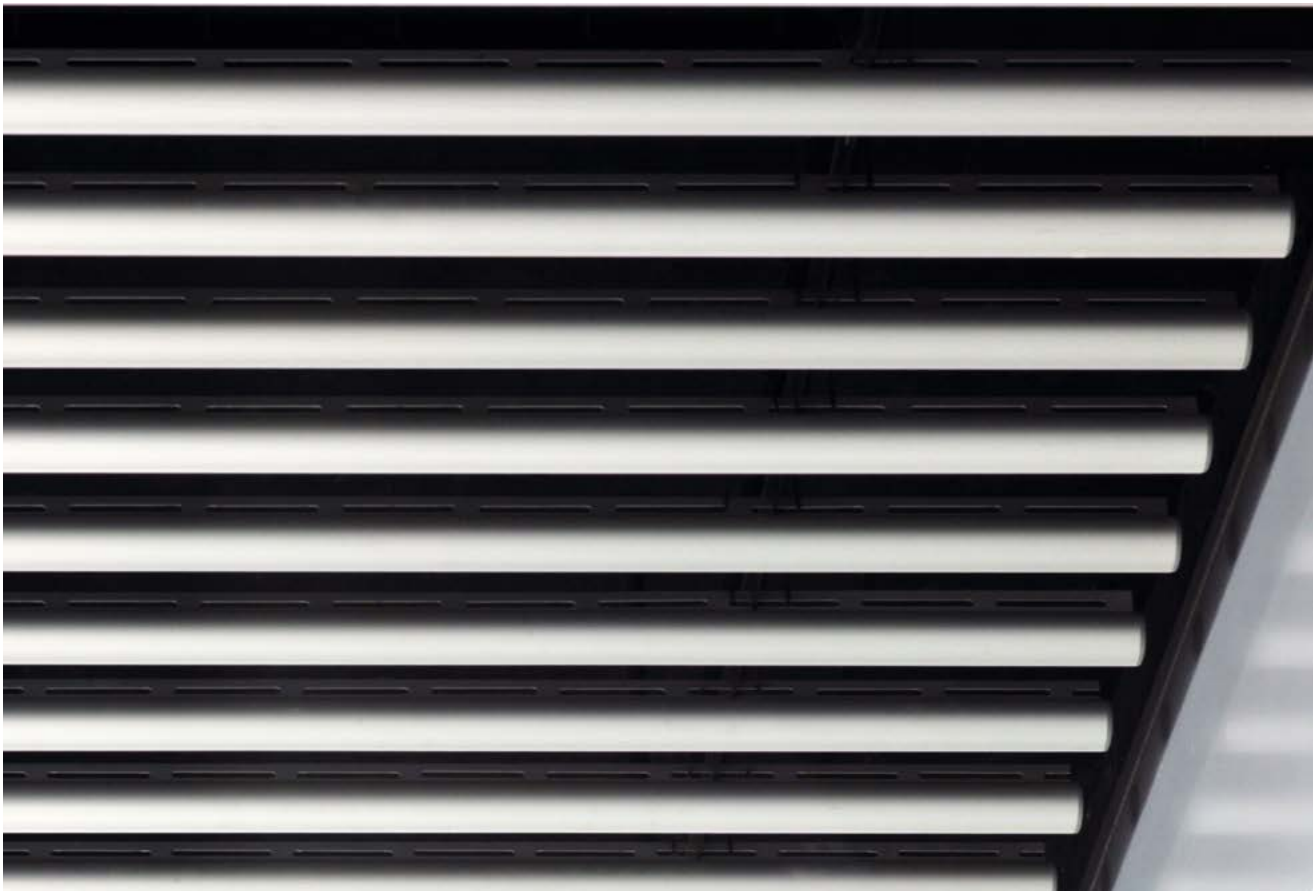
Contractor
T&I Fitouts Ltd
Purpose
Commercial

SAS**750** Tubeline

Minter Ellison

Location
Sydney, Australia
Architect
BVN Architecture

Contractor
Buildcorp
Purpose
Commercial



SAS**750** Tubeline

Cannon Street Station

Location
London, UK
Architect
Foggo Associates

Contractor
Laing O'Rourke
Purpose
Transport

SAS**750** Tubeline

50 Martin Place

Location
Sydney, Australia
Architect
Johnson Pilton Walker PTY Ltd

Contractor
Multiplex
Purpose
Commercial

SAS**750** Tubeline

John Lewis, Birmingham

Location
Birmingham, UK
Architect
Haskoll Architects

Contractor
Mace Ltd
Purpose
Retail

SAS**800** Trucell

1 Aldermanbury Square

Location
London, UK
Architect
TateHindle Architects

Contractor
Skanska
Purpose
Commercial

SAS**810** Tricell

OMERS, 122 Leadenhall Street

Location
London, UK
Architect
HLW International

Contractor
StructureTone Ltd
Purpose
Commercial

SAS200 PLUS

Stansted Airport

Location
Essex, UK
Architect
Foster + Partners

Contractor
Laing Management Consulting
Purpose
Transport

SAS**200**PLUS

Ropemaker Place, London

Location
London, UK
Architect
Arup Associates

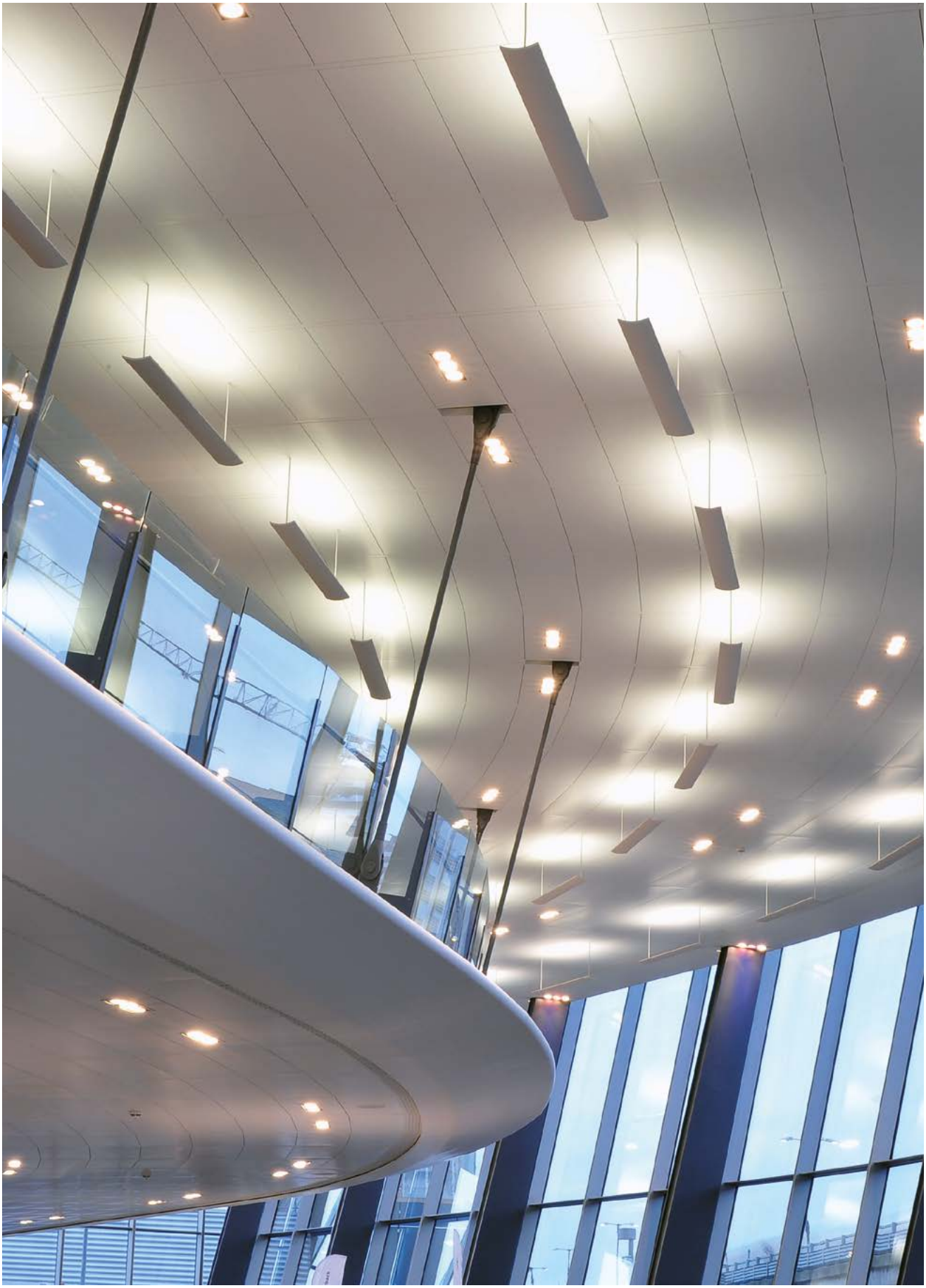
Contractor
Mace Ltd
Purpose
Commercial

SAS330PLUS

Royal Opera House, Essex

Location
Essex, UK
Architect
Nicholas Hare Architects LLP

Contractor
McLaren Construction
Purpose
Leisure

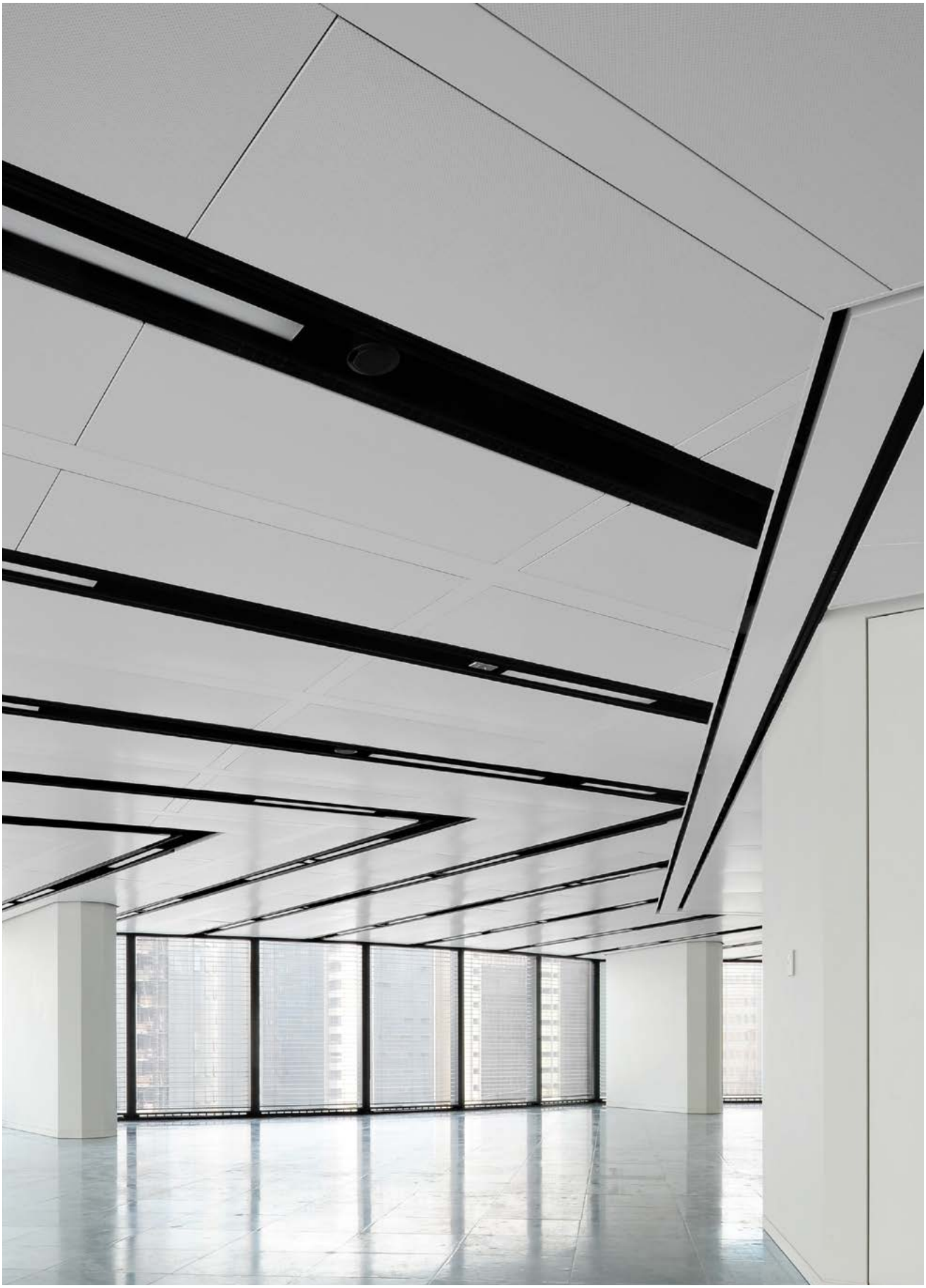


SAS330 PLUS

West London Audi

Location
London, UK
Architect
Wilkinson Eyre Architects

Contractor
Wallrite Ltd
Purpose
Retail



SAS330 PLUS

Trust Tower, Central Market

Location
Abu Dhabi, UAE
Architect
Foster & Partners

Contractor
Arabian Construction Company WLL
Purpose
Commercial

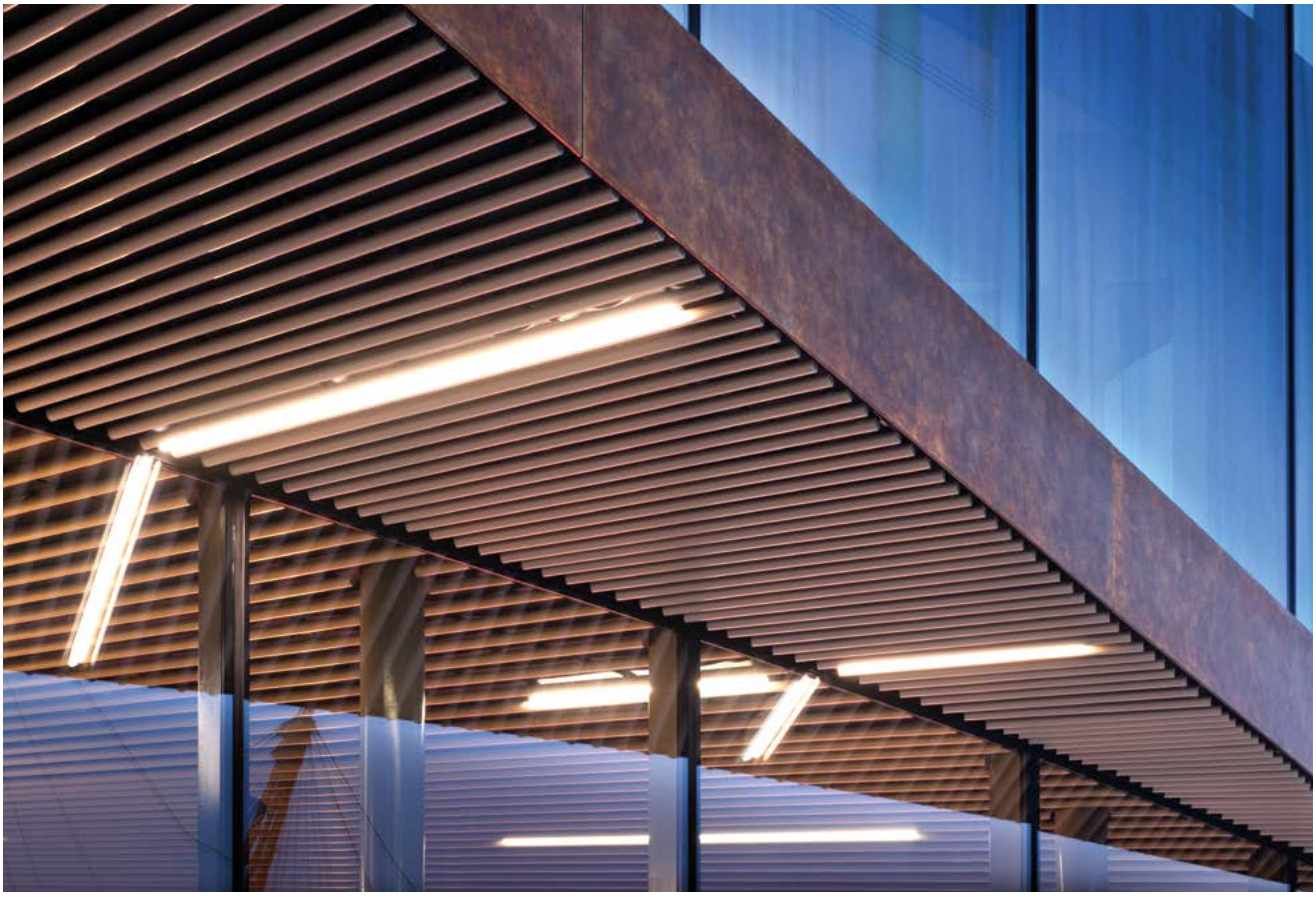
SAS750 PLUS

Westfield, Stratford City

Location
London, UK
Architect
Westfield Shopping Towns Ltd

Contractor
Westfield Shopping Towns Ltd
Purpose
Retail

SAS750 PLUS

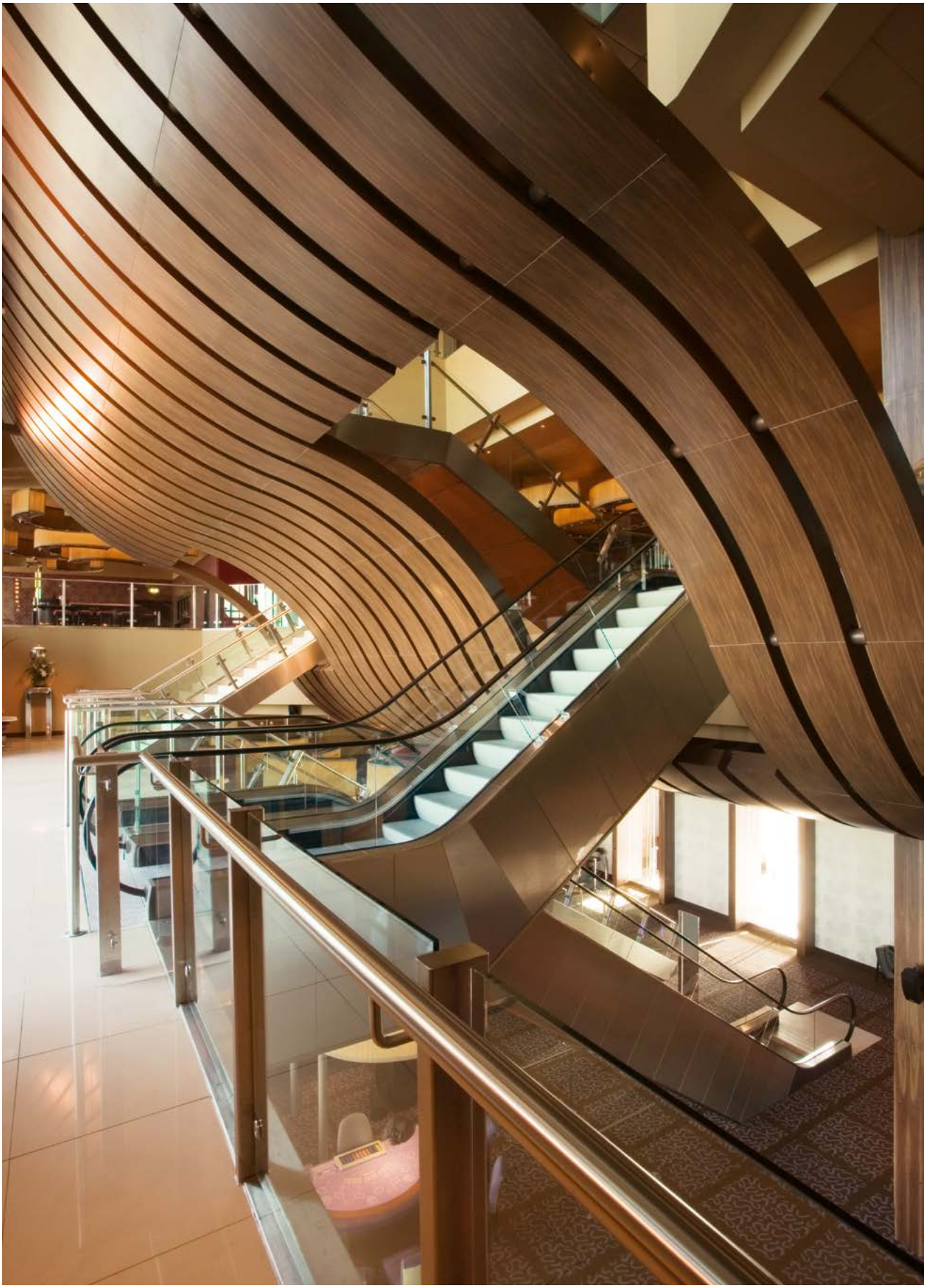


The Gateway Pavilion

Greenwich, London

Location
London, UK
Architect
Marks Barfield Architects

Contractor
Wates
Purpose
Retail



SAS PLUS

Alea Casino LCI

Location
Glasgow, UK
Architect
Burrows Cave International & Real Studios

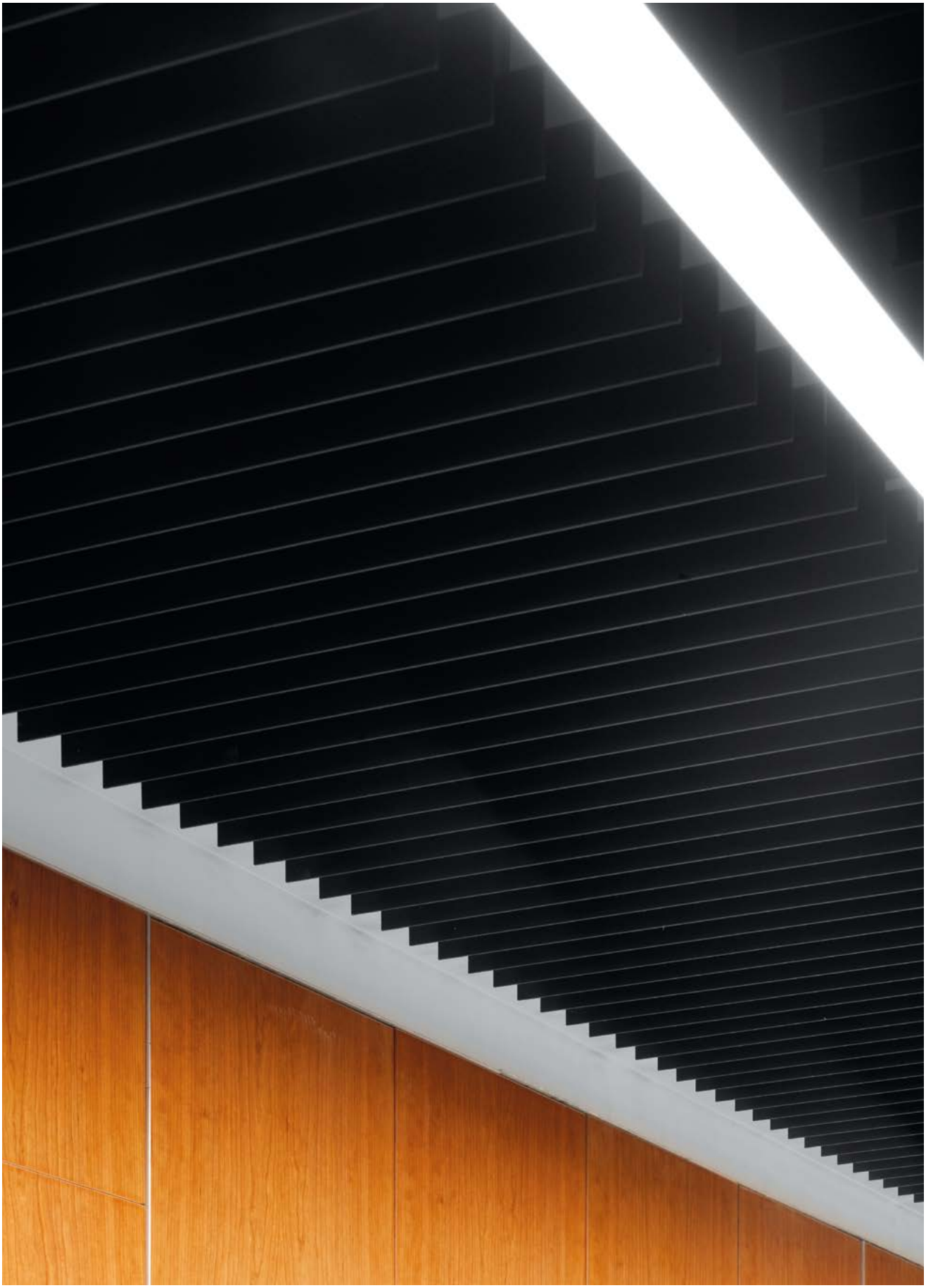
Contractor
Thomas Johnstone Ltd
Purpose
Leisure

SAS PLUS

Maggie's Centre, London

Location
London, UK
Architect
Rogers Stirk Harbour & Partners

Contractor
ROK London (East)
Purpose
Healthcare



SAS PLUS

Grand Central, Birmingham

Location
Birmingham, UK
Architect
Haskoll Architects

Contractor
Mace Ltd
Purpose
Retail

Perforations

Perforations | Overview

SAS Perforation Codes
To aid the specification and understanding of perforation patterns, SAS perforation codes break down into three simple sections.

For example:

S1820

So, S1820 has a square pitch with 1.8mm punched perforation and 20% open area.

D
Diagonal
S
Square

The first letter (D or S) indicates whether the pitch is diagonal or square to the edge of the tile.

18
Diameter

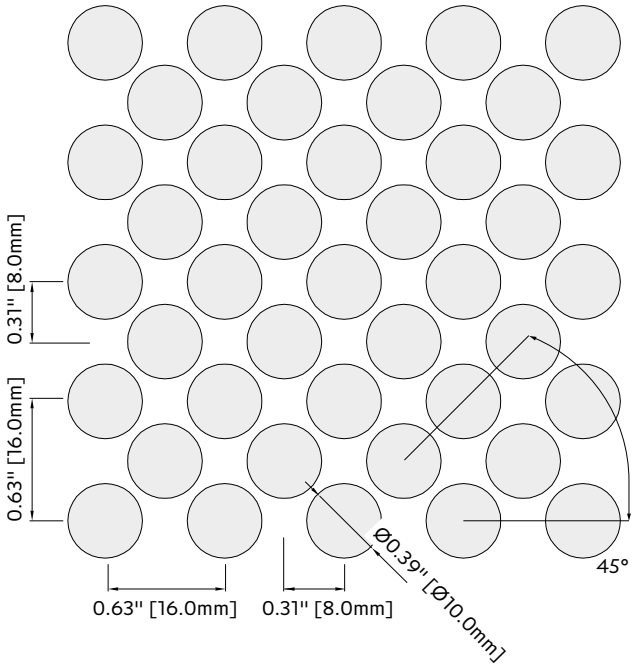
The first two numbers indicate the size of the punched hole. 18 indicates 1.8mm diameter.

20
Open area

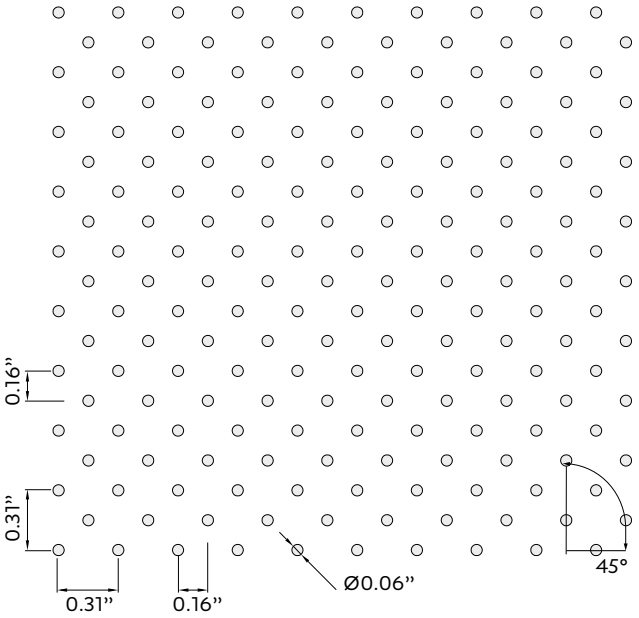
The final two numbers indicate the percentage of open area. 20 indicates a 20% open area (before paint).

Complete flexibility on perforation subject to acoustic requirements, please contact technical team.

D1061 (Ø10.0mm)
Ø0.39", 61% Open Area



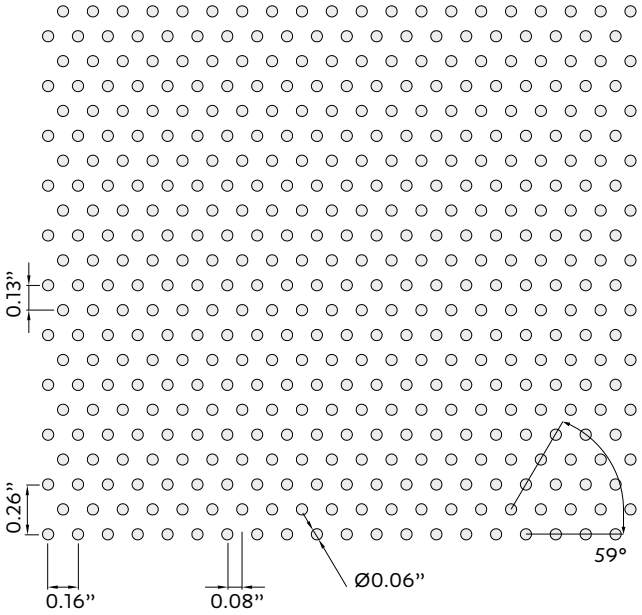
D1505 (Ø1.5mm)
Ø0.06", 5% Open Area



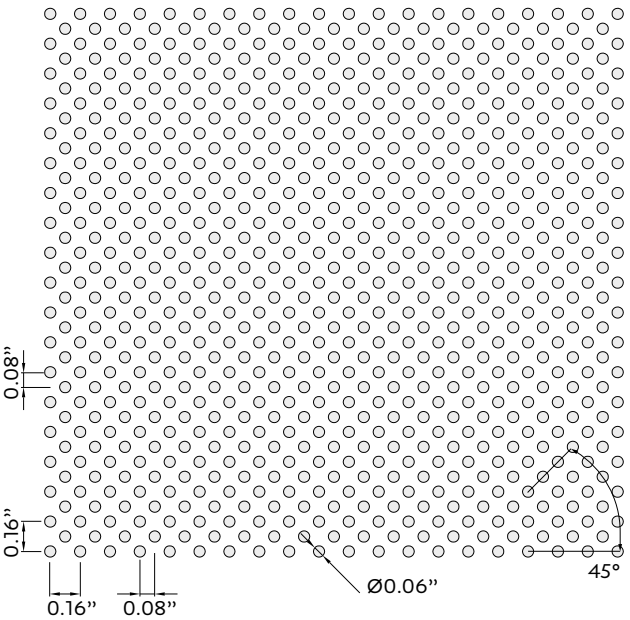
All dimensions are in inches.

Perforations | Overview

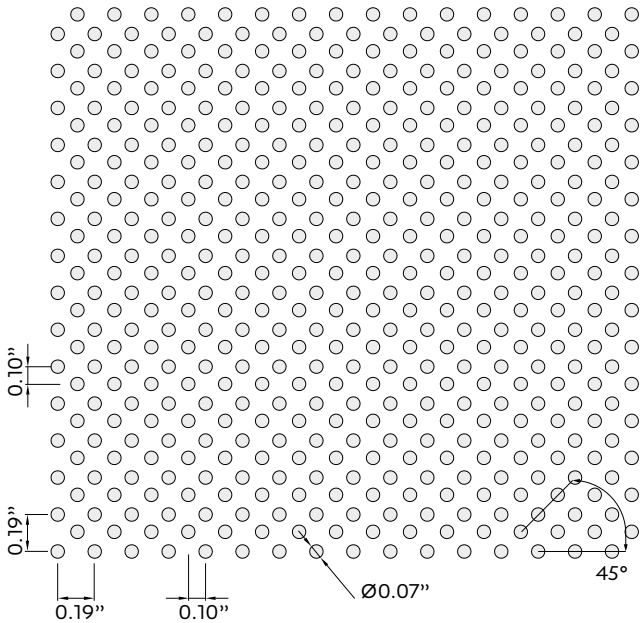
D1513 (Ø1.5mm) *
Ø0.06", 13% Open Area



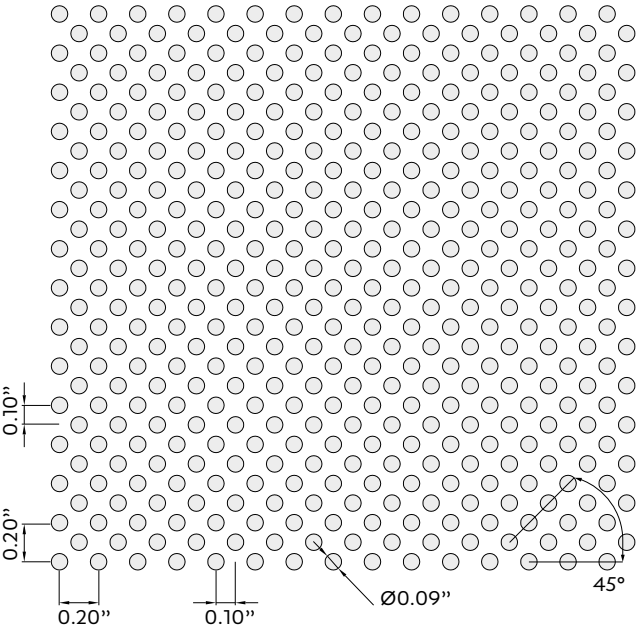
D1522 (Ø1.5mm)
Ø0.06", 22% Open Area



D1821 (Ø1.8mm)
Ø0.07", 21% Open Area



D2227 (Ø2.2mm)
Ø0.09", 27% Open Area

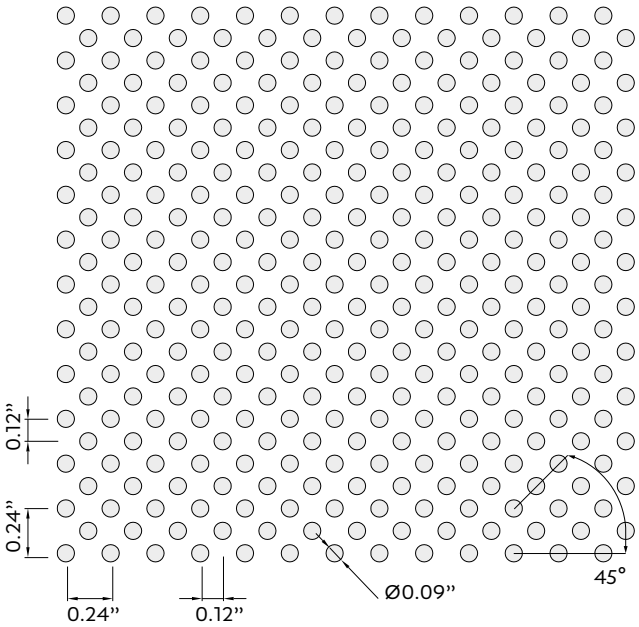


* Perforation appears differently when turned 90°

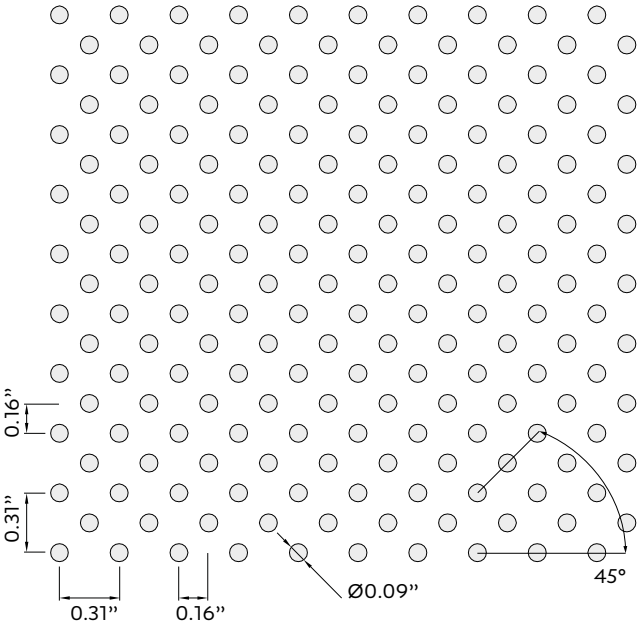
All dimensions are in inches.

Perforations | Overview

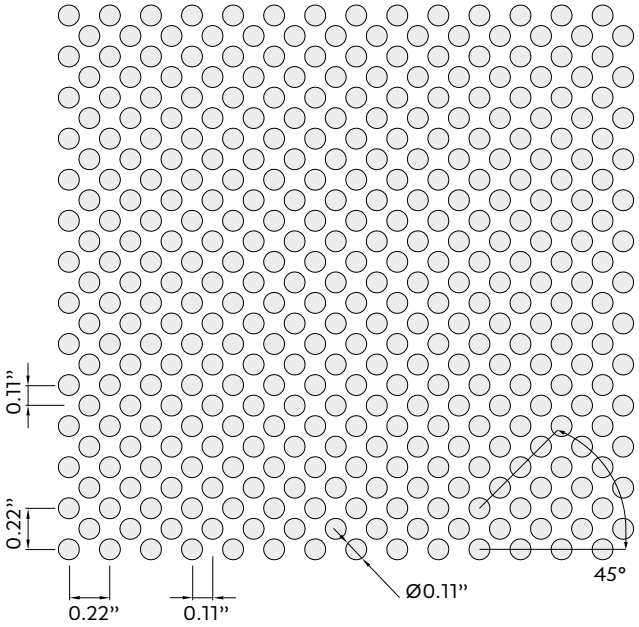
D2324 (Ø2.1/8")
Ø0.09", 24% Open Area



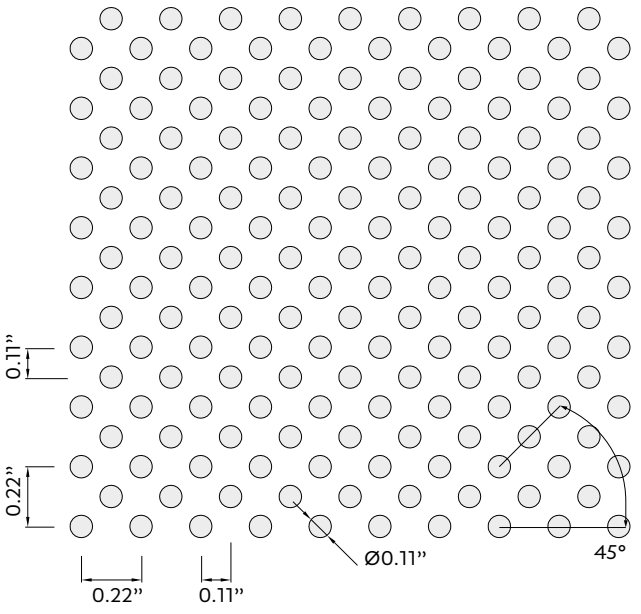
D2414 (Ø2.4mm)
Ø0.09", 14% Open Area



D2841 (Ø2.8mm)
Ø0.11", 41% Open Area



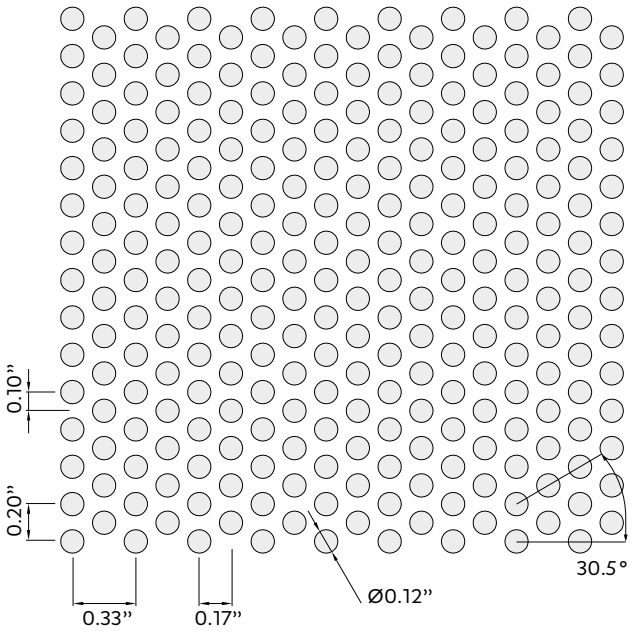
D3022 (Ø3.0mm)
Ø0.12", 22% Open Area



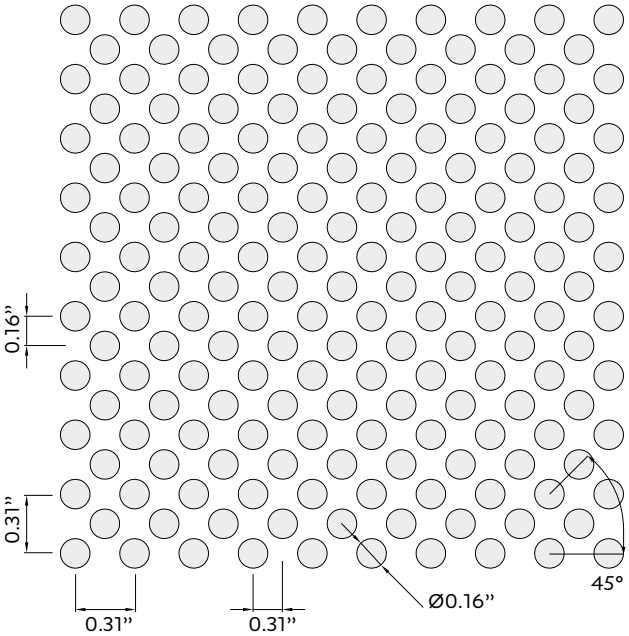
All dimensions are in inches.

Perforations | Overview

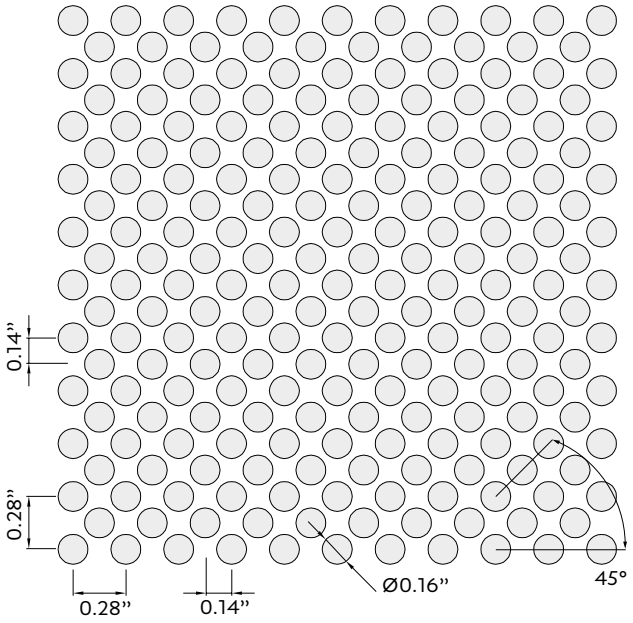
D3136 (Ø3.1mm) *
Ø0.12", 36% Open Area



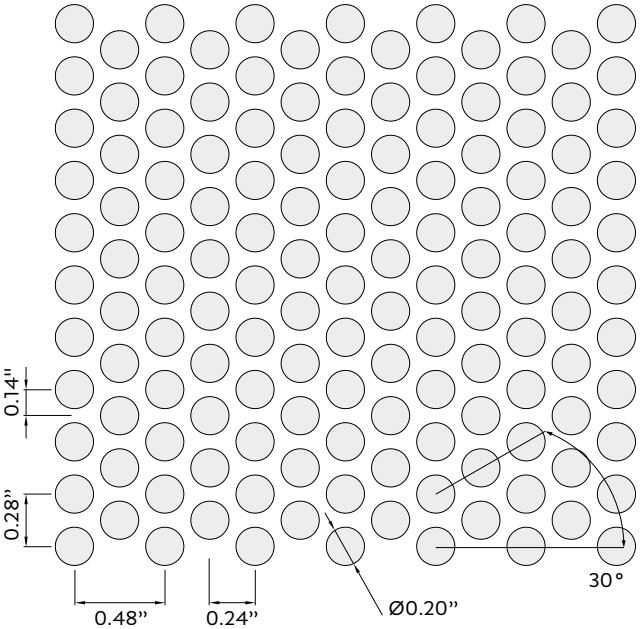
D3939 (Ø3.9mm)
Ø0.16", 39% Open Area



D4050 (Ø0.4mm)
Ø0.16", 50% Open Area



D5149 (Ø5.1mm) *
Ø0.20",, 49% Open Area

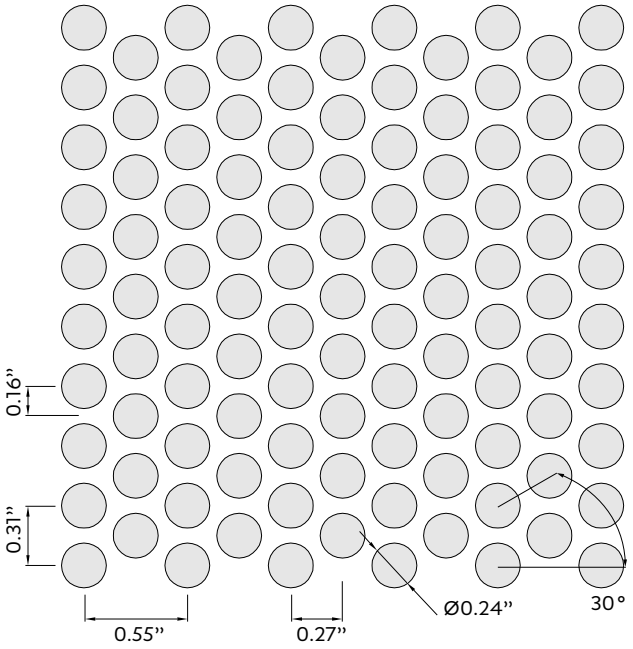


* Perforation appears differently when turned 90°

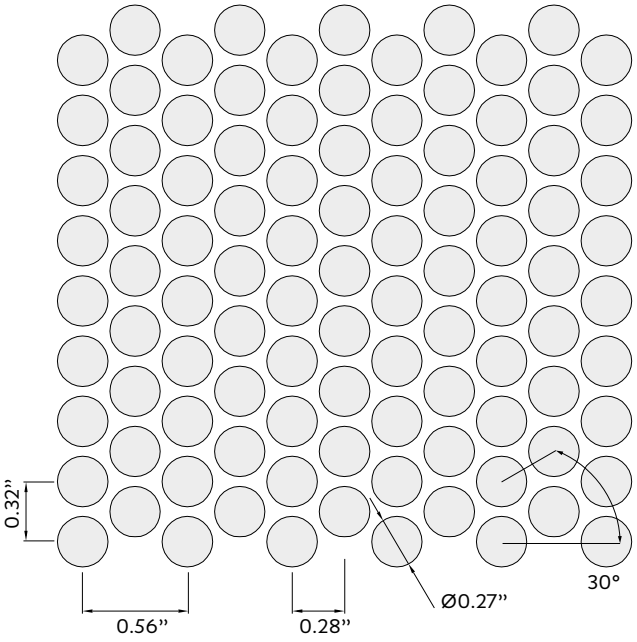
All dimensions are in inches.

Perforations | Overview

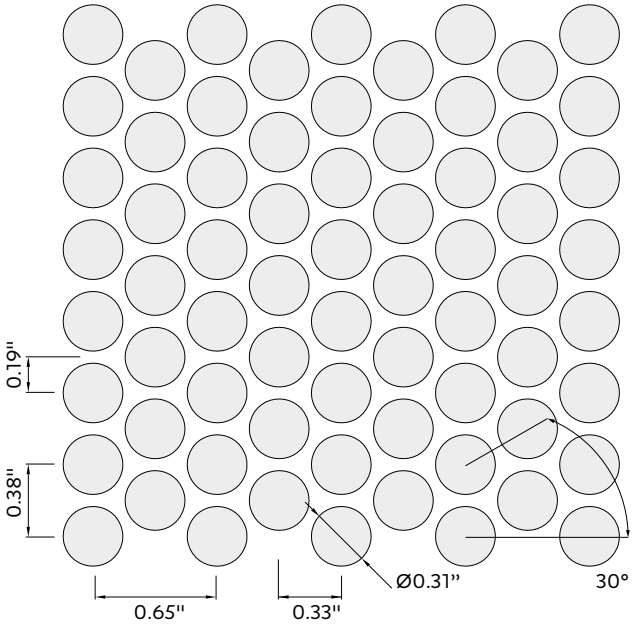
D6051 (Ø6.0mm) *
Ø0.24", 51% Open Area



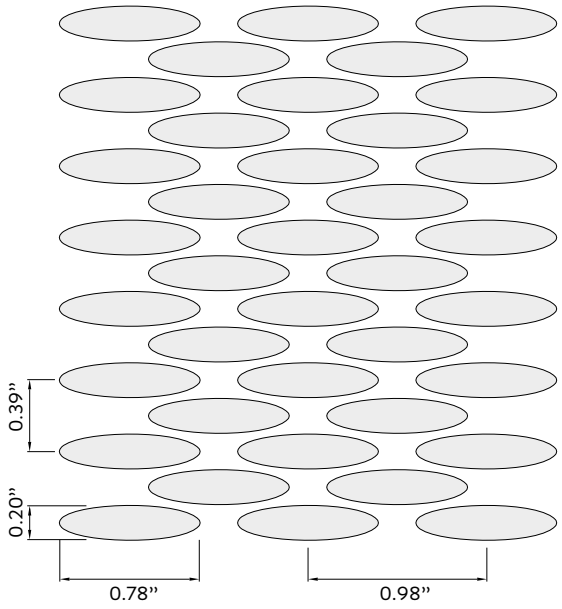
D6863 (Ø6.8mm) *
Ø0.27", 63% Open Area



D8063 (Ø6.1/8") *
Ø0.31", 63% Open Area



EL60 (19.75 x 4.9mm) *
Ø0.78" x Ø0.19", 60% Open Area

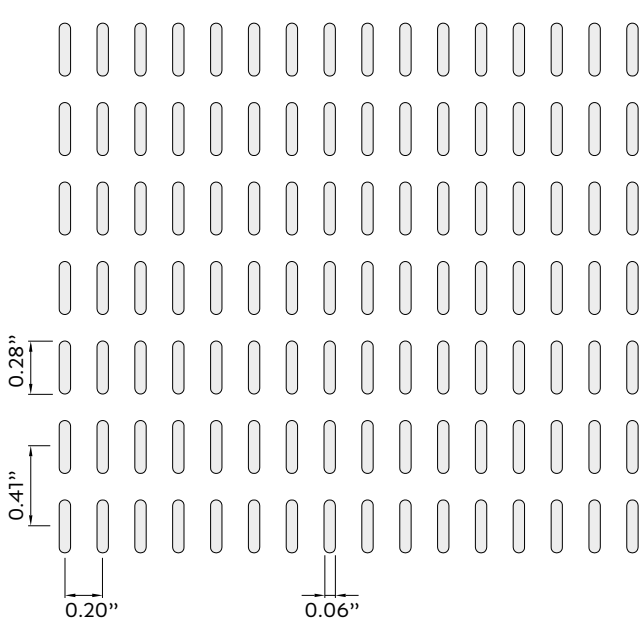


* Perforation appears differently when turned 90°

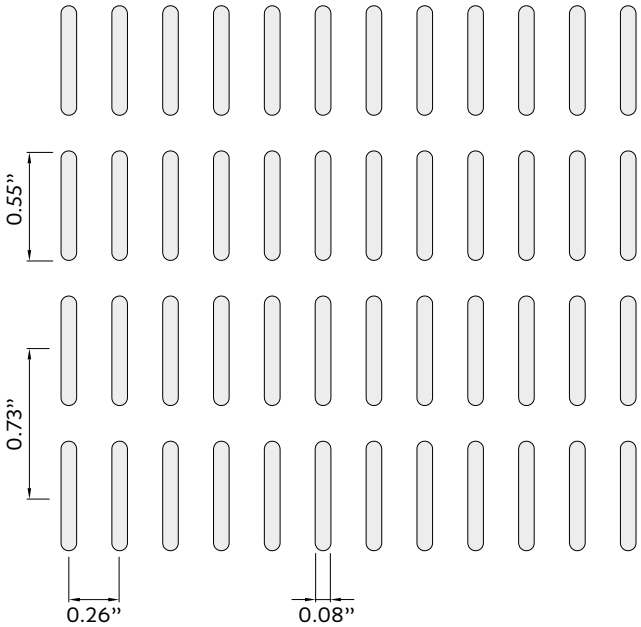
All dimensions are in inches.

Perforations | Overview

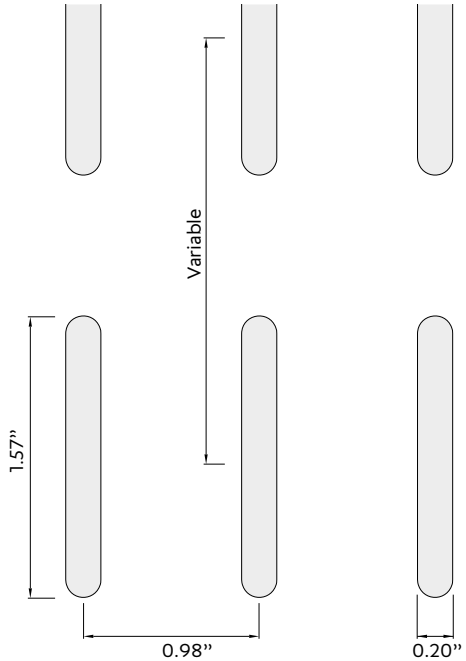
OB19 (1.5 x 7.0mm) *
Ø0.06'' x Ø0.28'' 19% Open Area



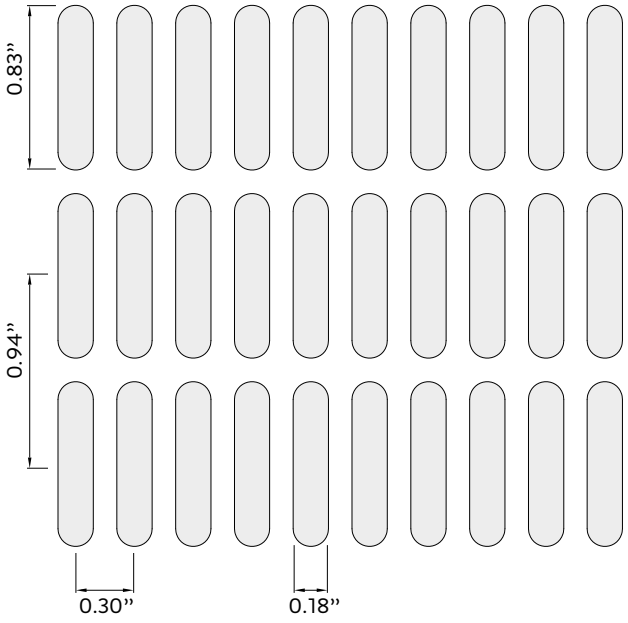
OB23 (2.0 x 14.0mm) *
Ø0.08'' x Ø0.55'', 23% Open Area



OB40 (5 x 40.0mm) *
Ø0.20'' x Ø1.57'', Dependent on pitch



OB50 (4.5 x 21.0mm) *
Ø0.18'' x Ø0.83'', 50% Open Area

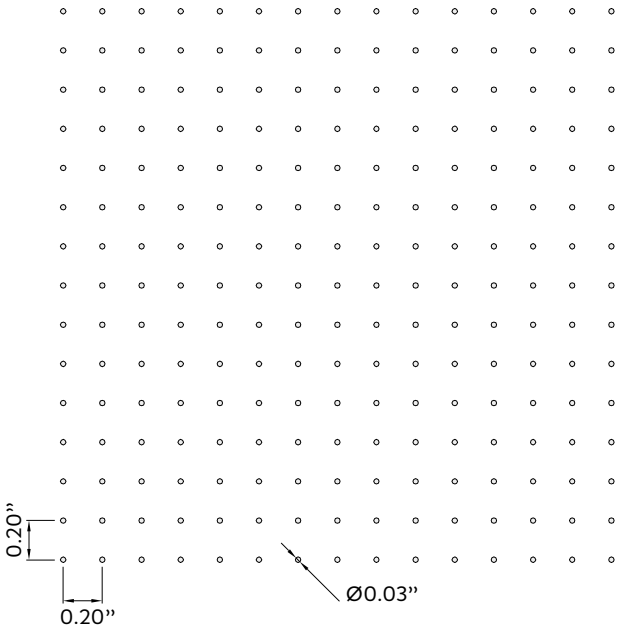


* Perforation appears differently when turned 90°

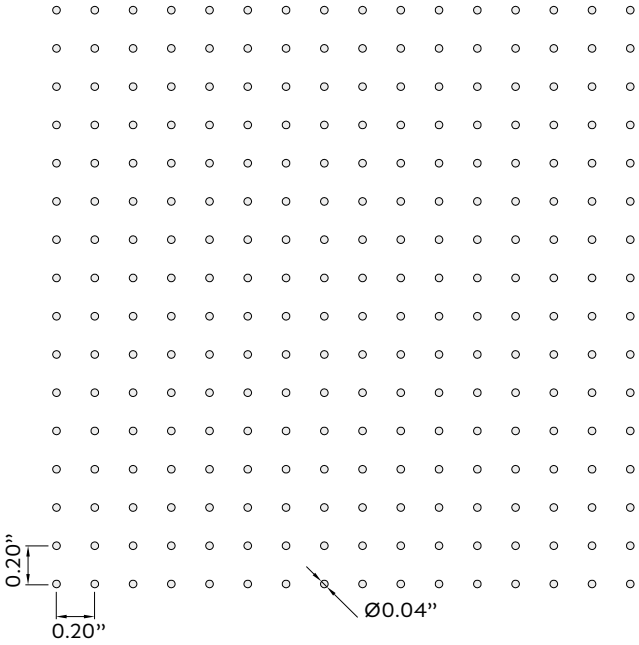
All dimensions are in inches.

Perforations | Overview

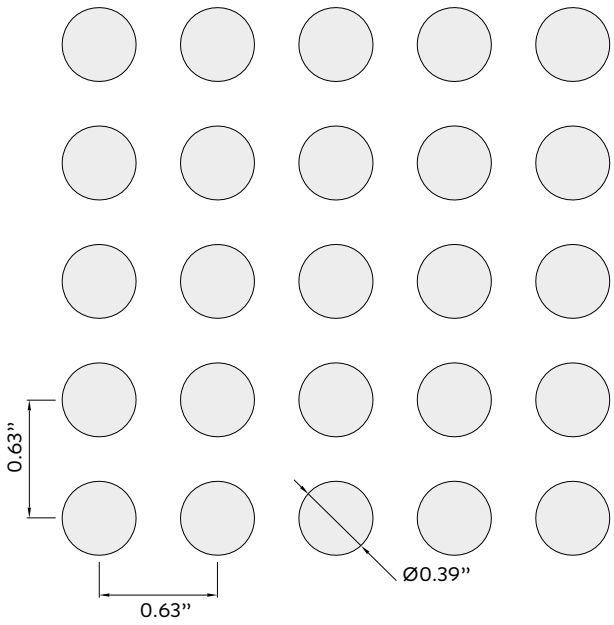
S0702 (Ø1.7mm) Ultramicro
Ø0.03'' 2% Open Area



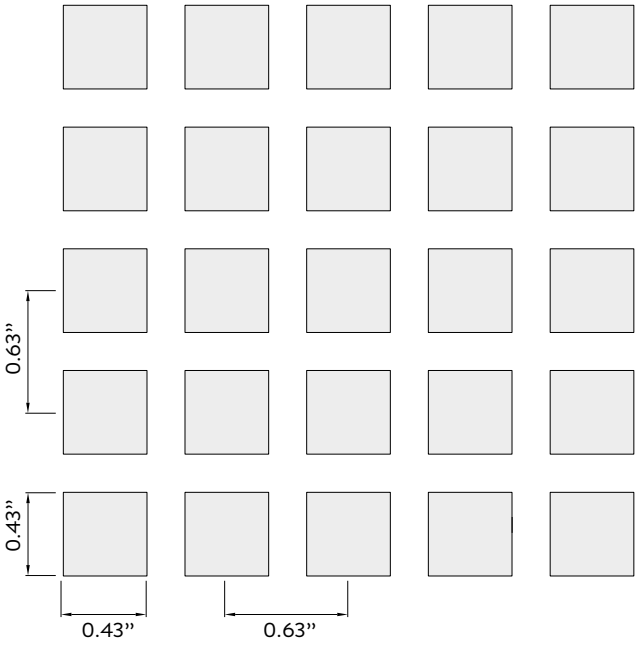
S1003 (Ø1.0mm) Ultramicro
Ø0.04'', 3% Open Area



S1030 (Ø1.5mm)
Ø0.39'', 30% Open Area



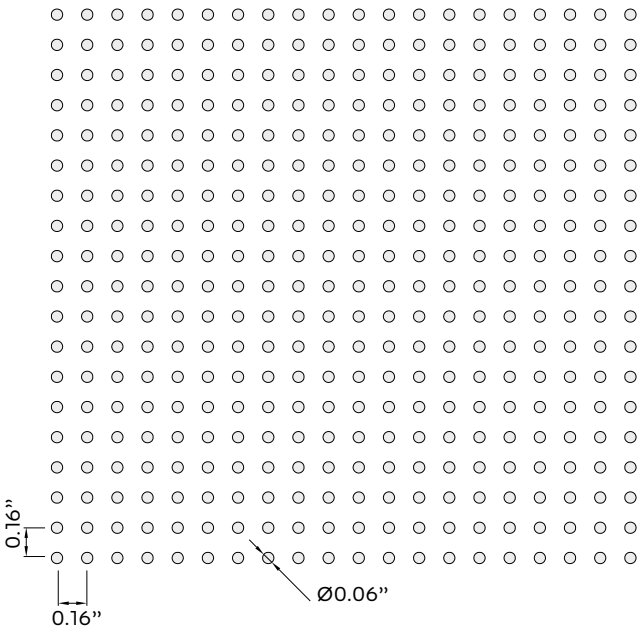
S1147 (Ø1.1mm)
Ø0.43'' x Ø0.43'', 47% Open Area



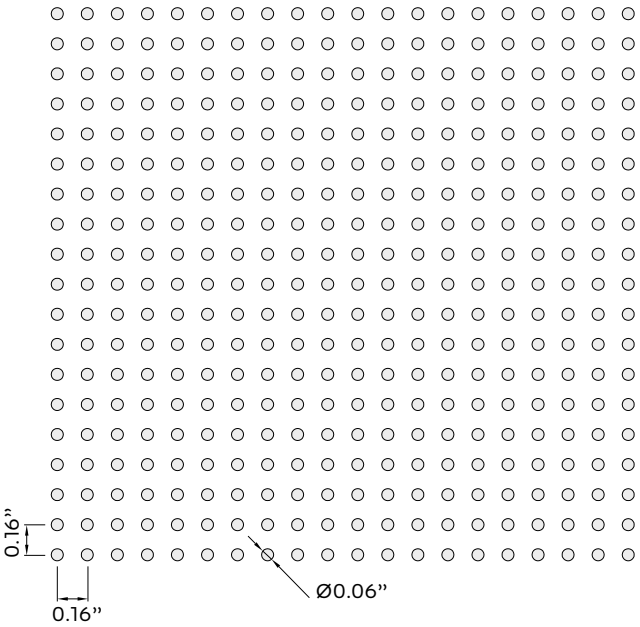
All dimensions are in inches.

Perforations | Overview

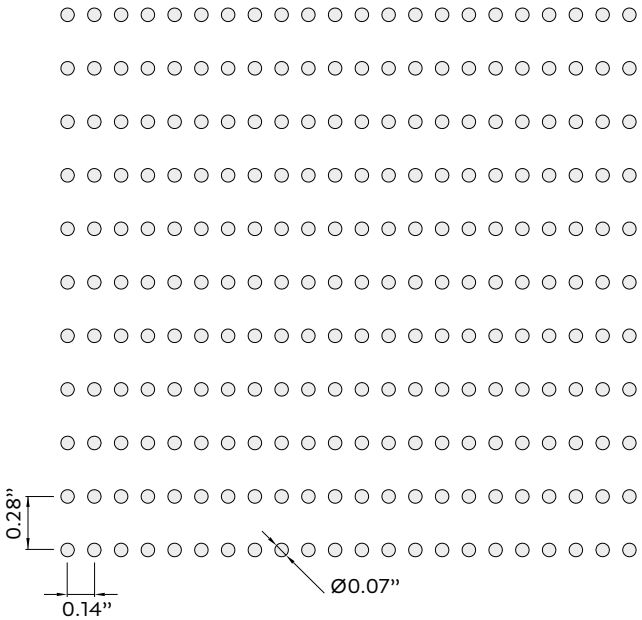
S1511 (Ø1.5mm)
Ø0.06", 11% Open Area



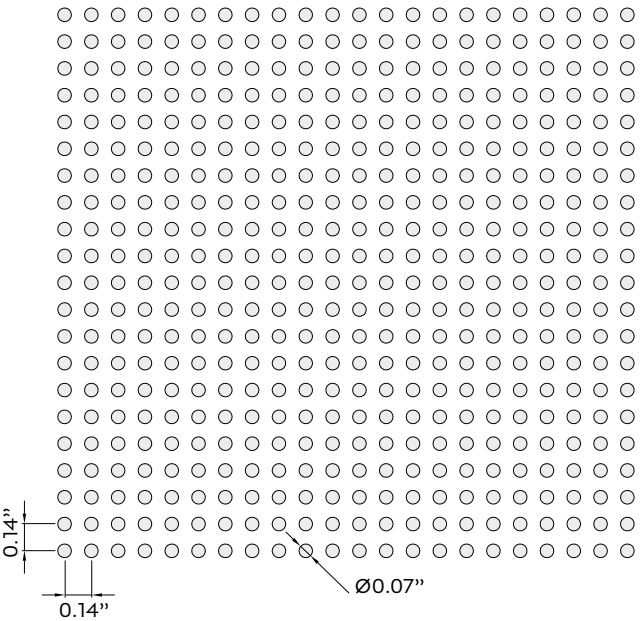
S1612 (Ø1.6mm)
Ø0.06", 12% Open Area



S1810 (Ø1.8mm) *
Ø0.07", 10% Open Area



S1820 (Ø1.8mm)
Ø0.07", 20% Open Area

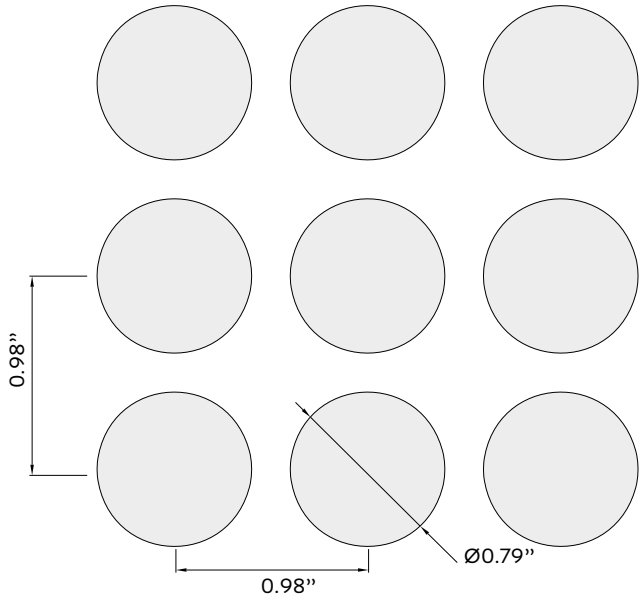


* Perforation appears differently when turned 90°

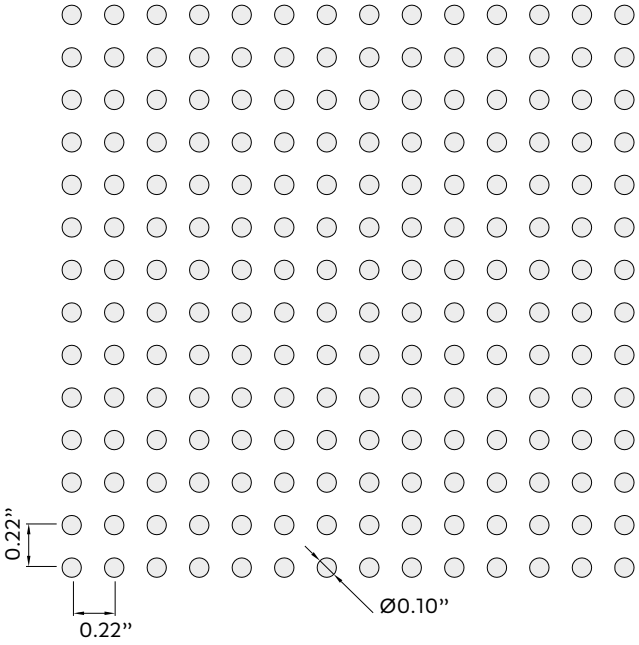
All dimensions are in inches.

Perforations | Overview

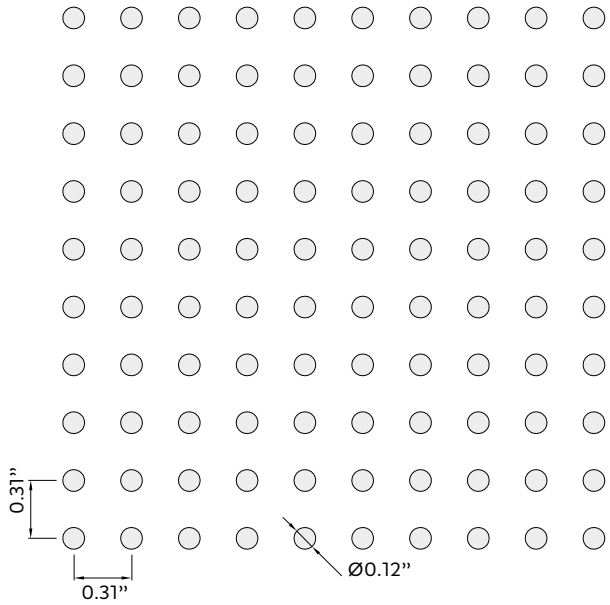
S2051 (Ø13/16")
Ø0.79", 51% Open Area



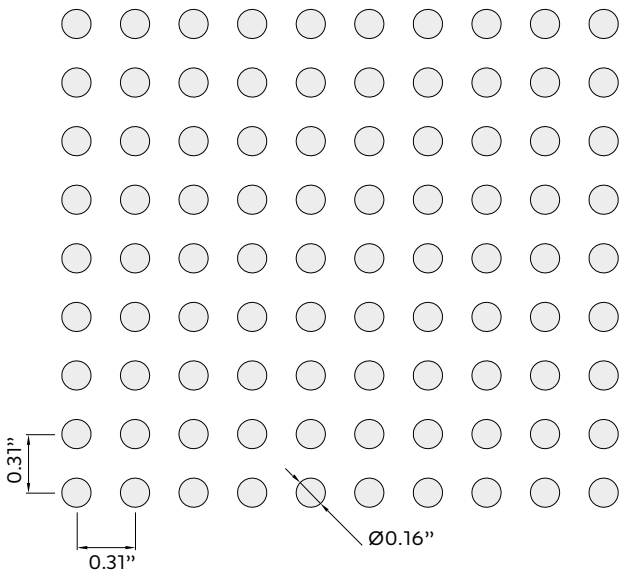
S2516 (Ø2.5mm)
Ø0.10", 16% Open Area



S3011 (Ø3.0mm)
Ø0.12", 11% Open Area



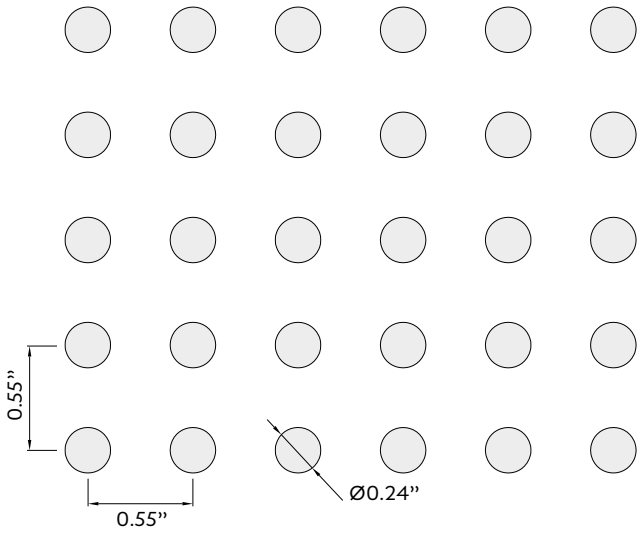
S3920 (Ø3.9mm)
Ø0.16", 20% Open Area



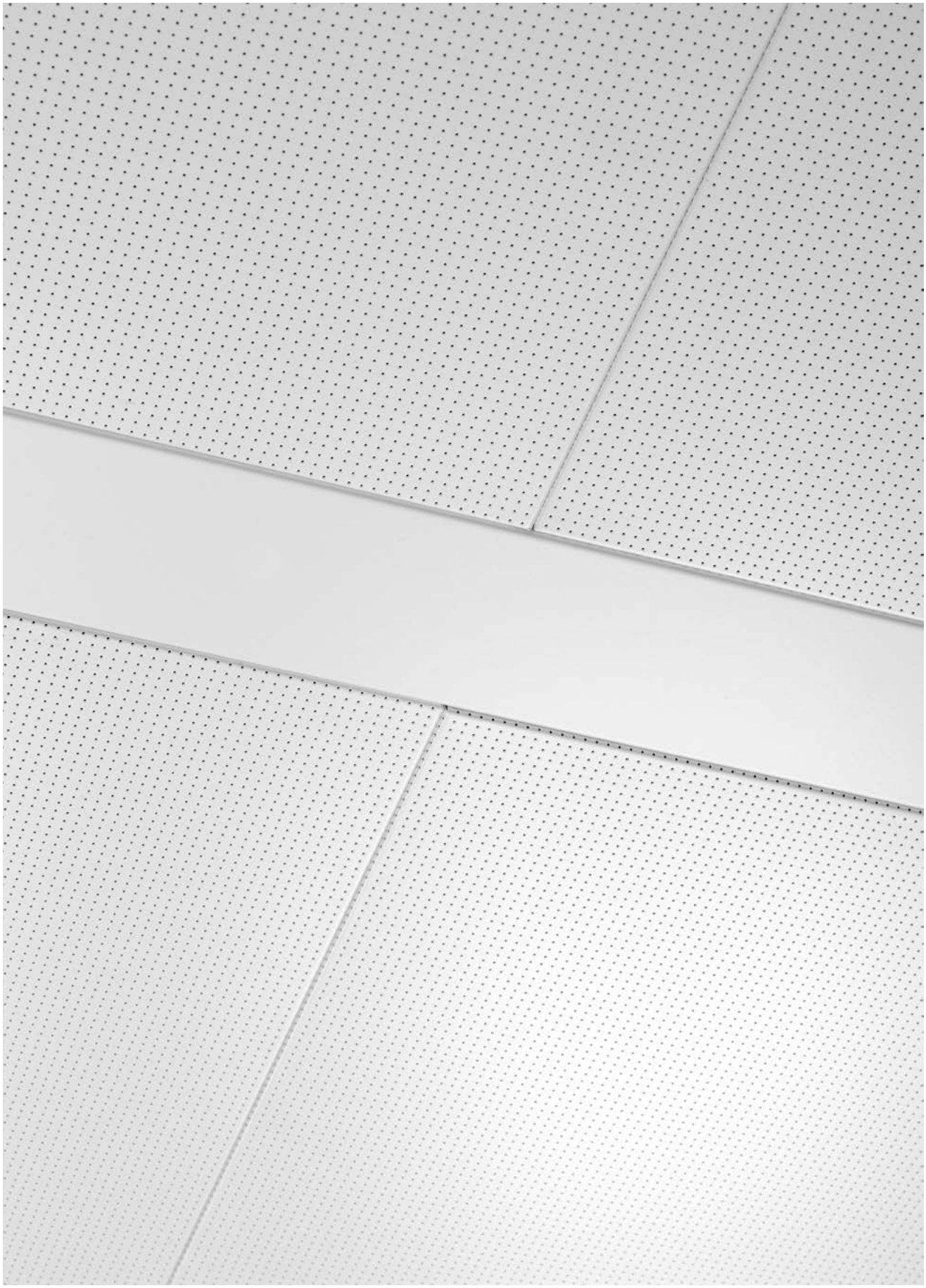
All dimensions are in inches.

Perforations | Overview

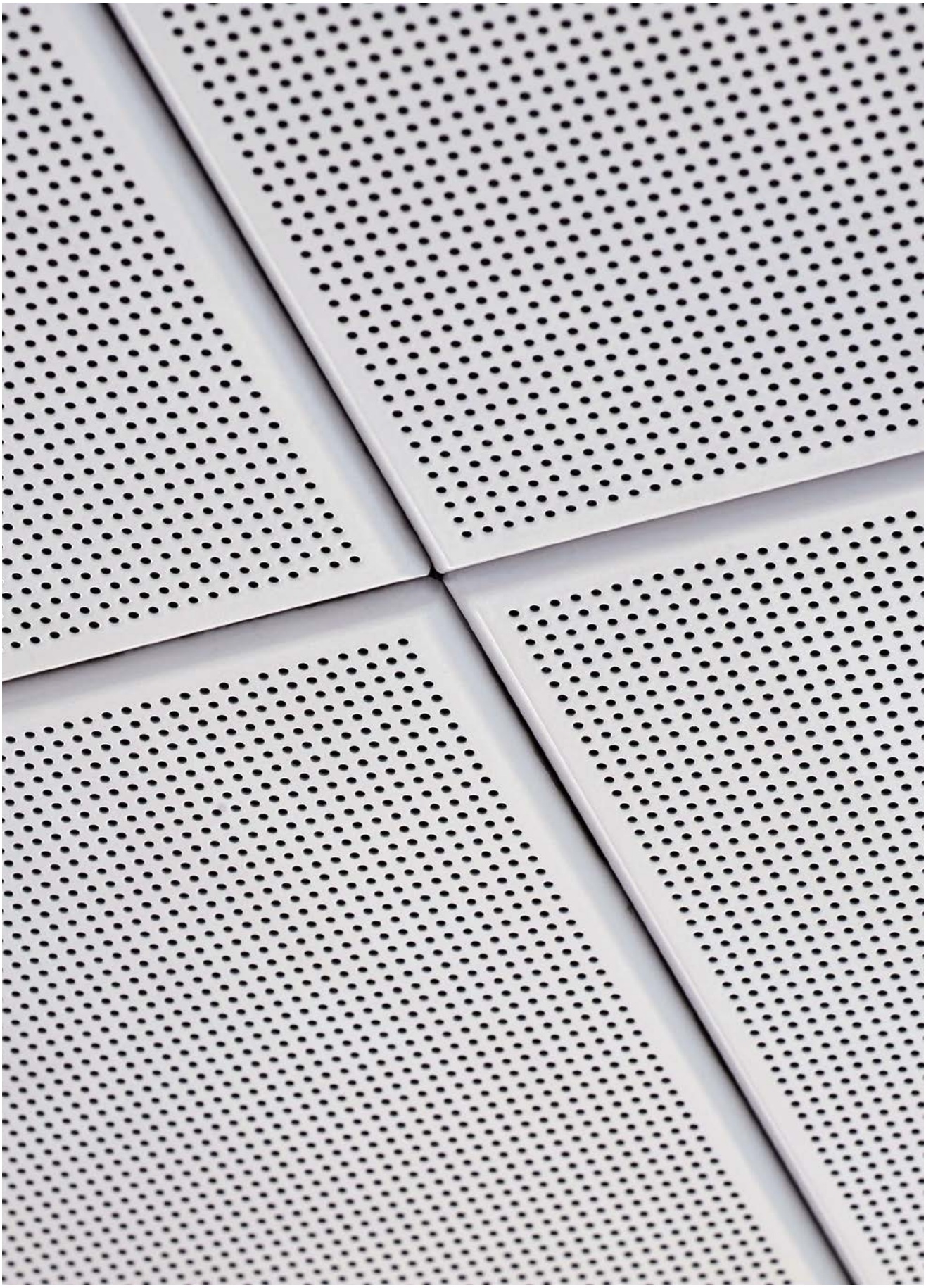
S6015 (Ø6.0mm)
Ø0.24", 15% Open Area



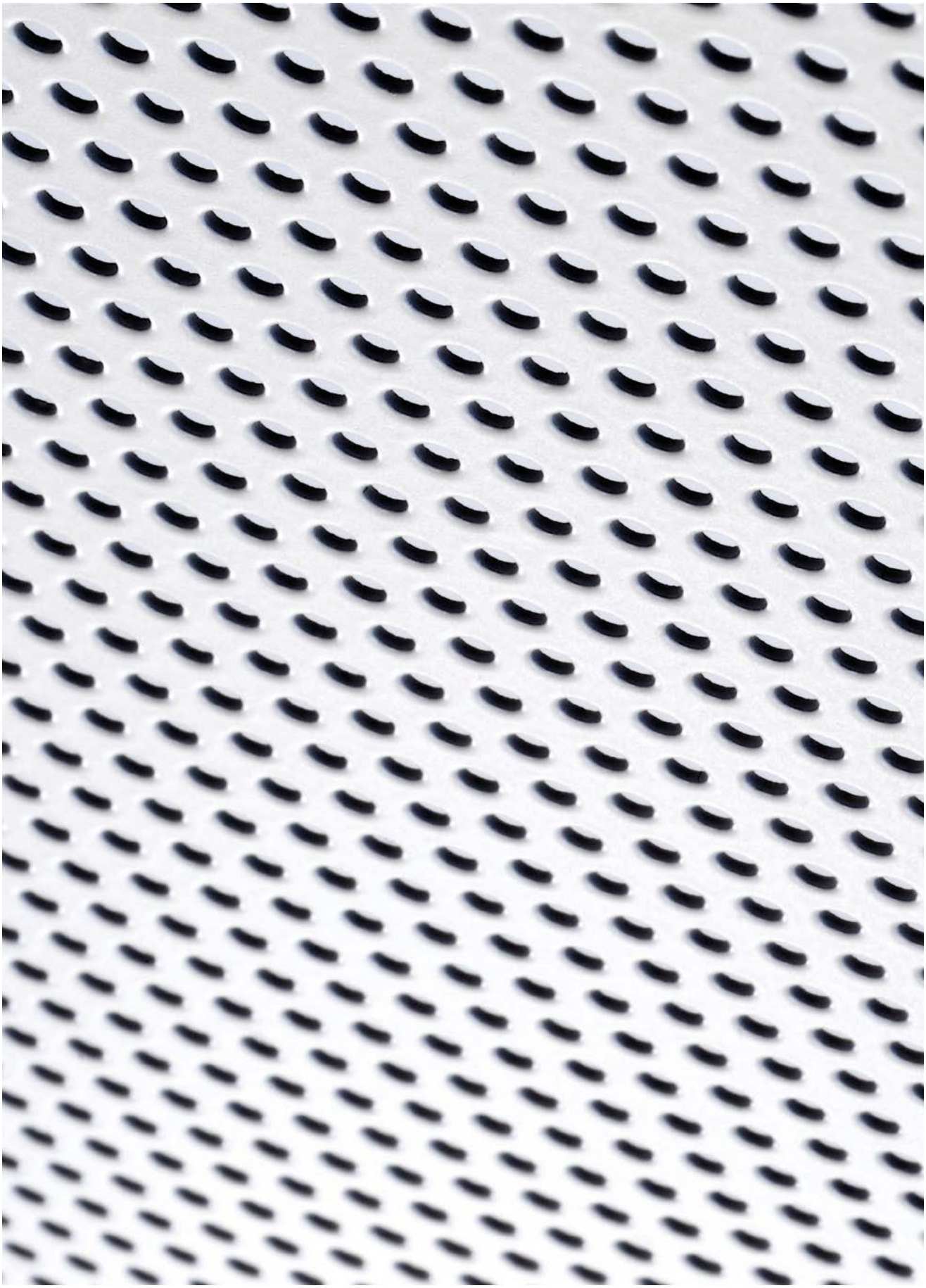
All dimensions are in inches.



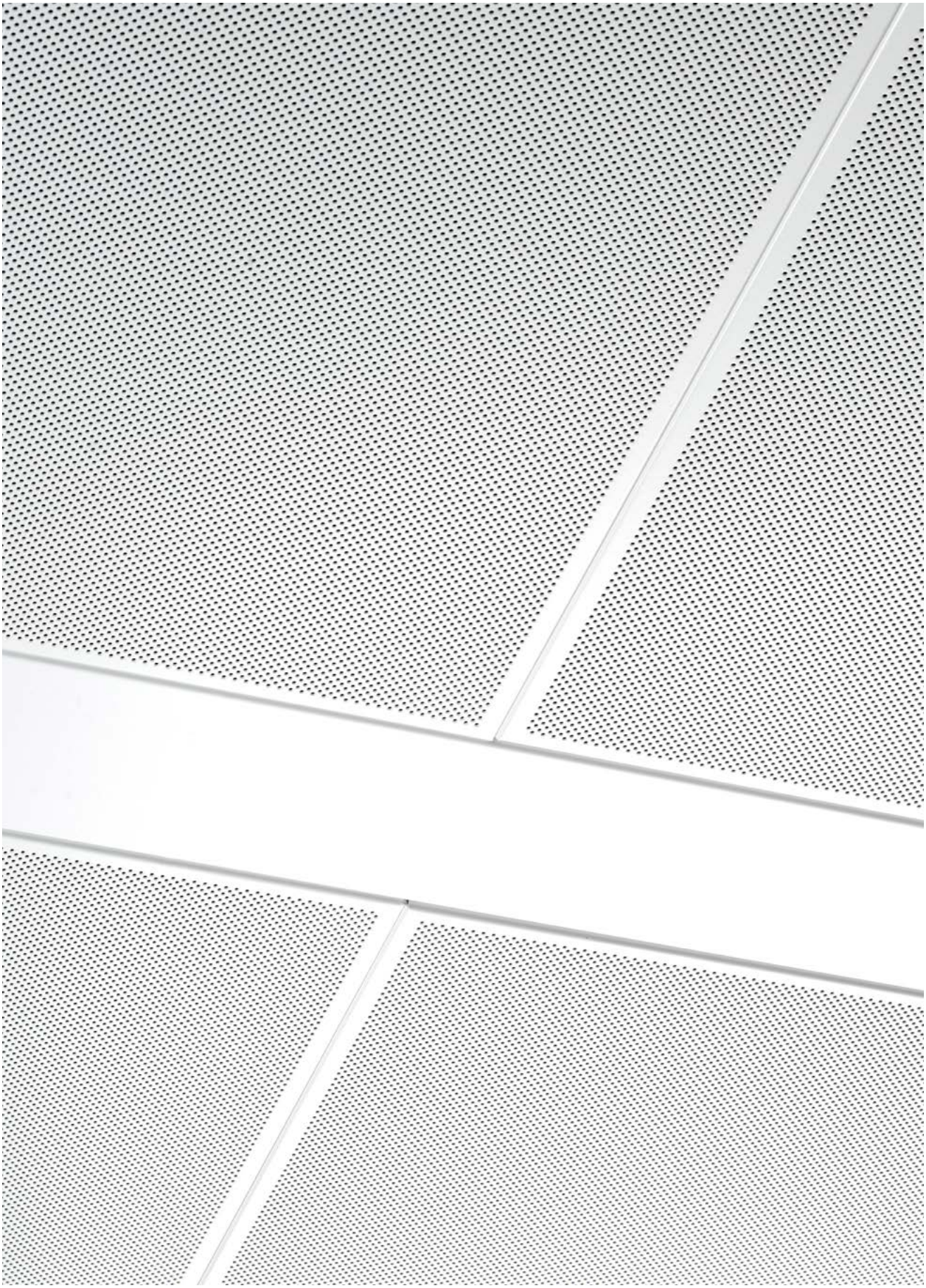
S1003



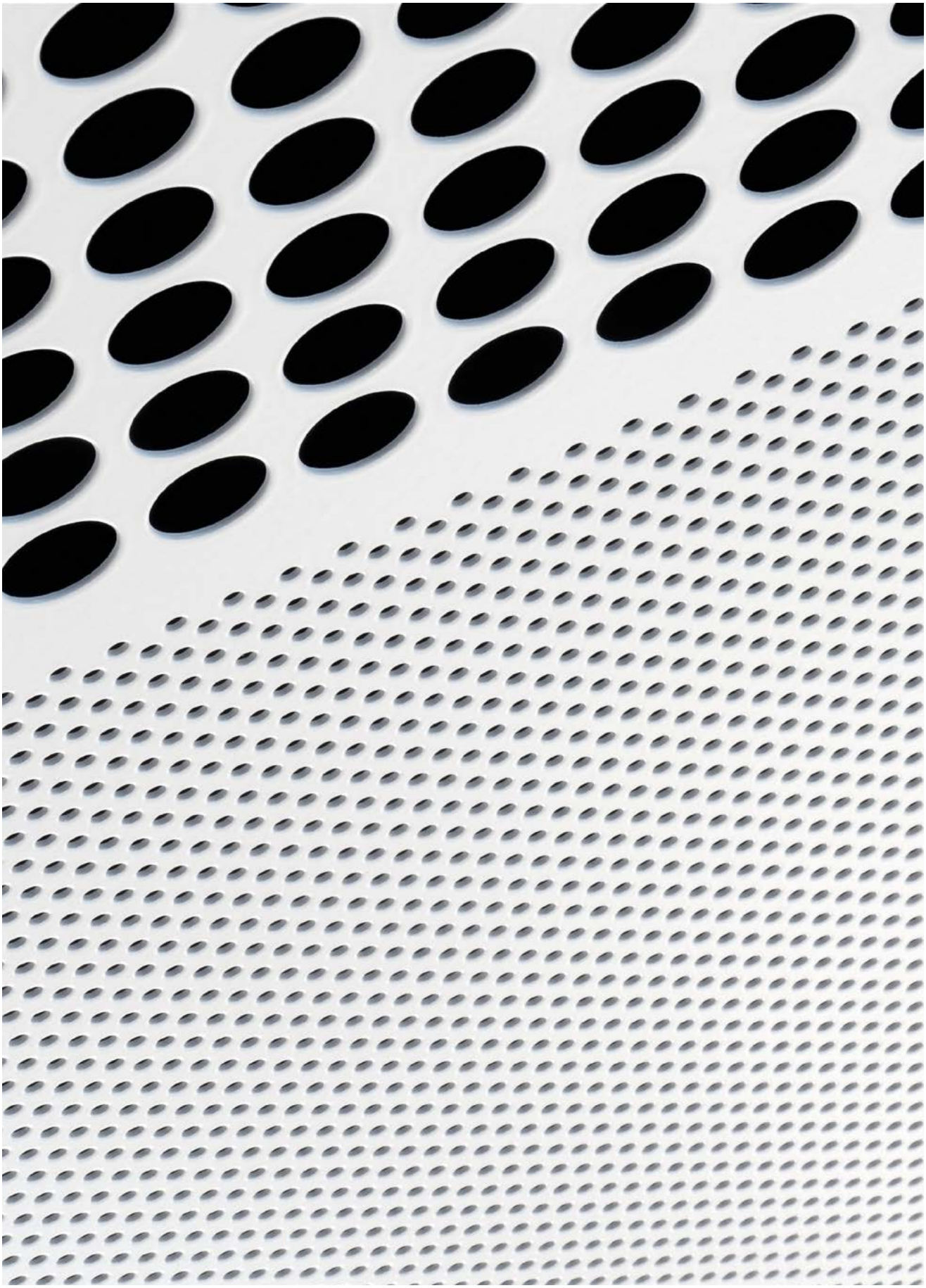
S1511



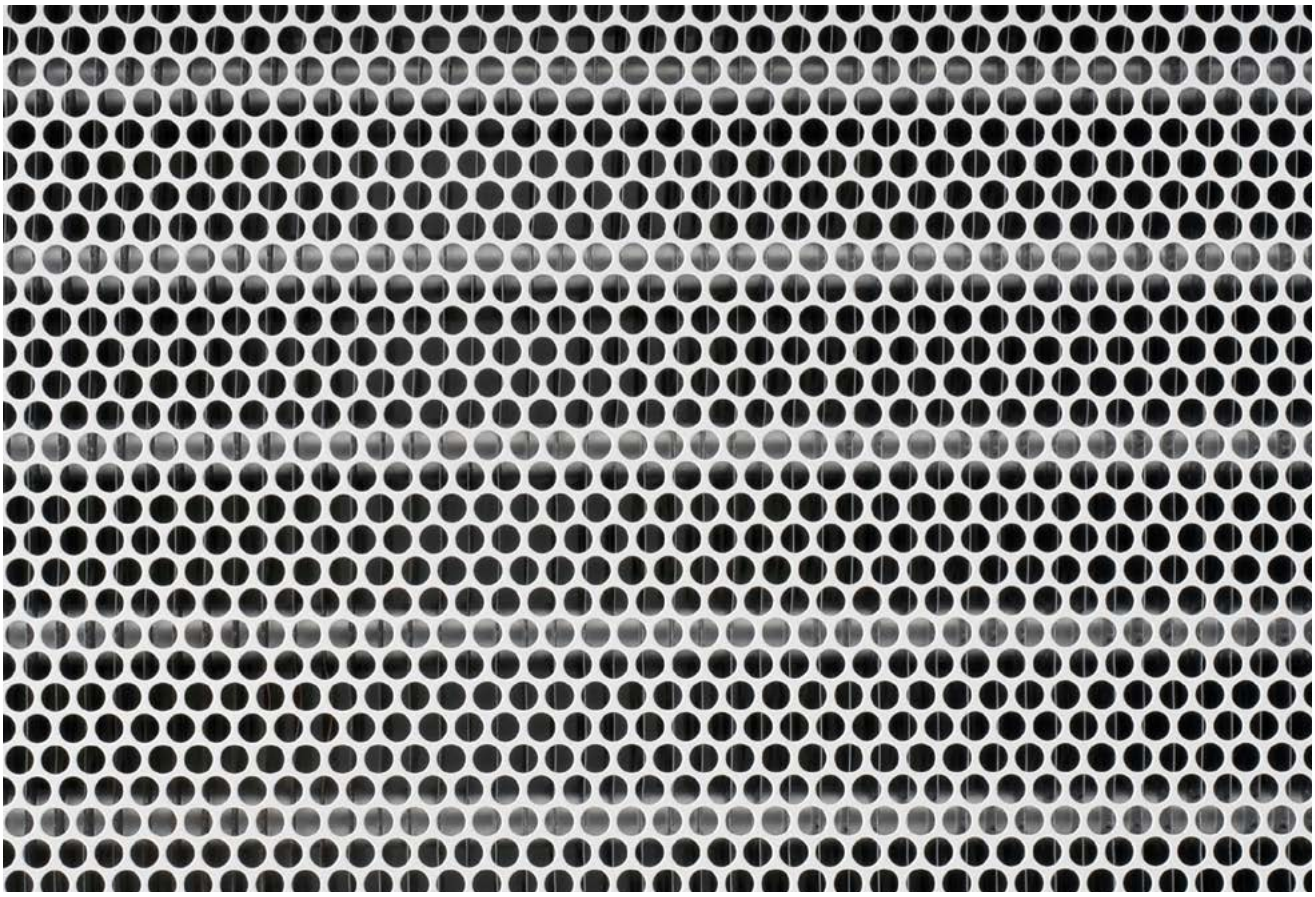
D1513

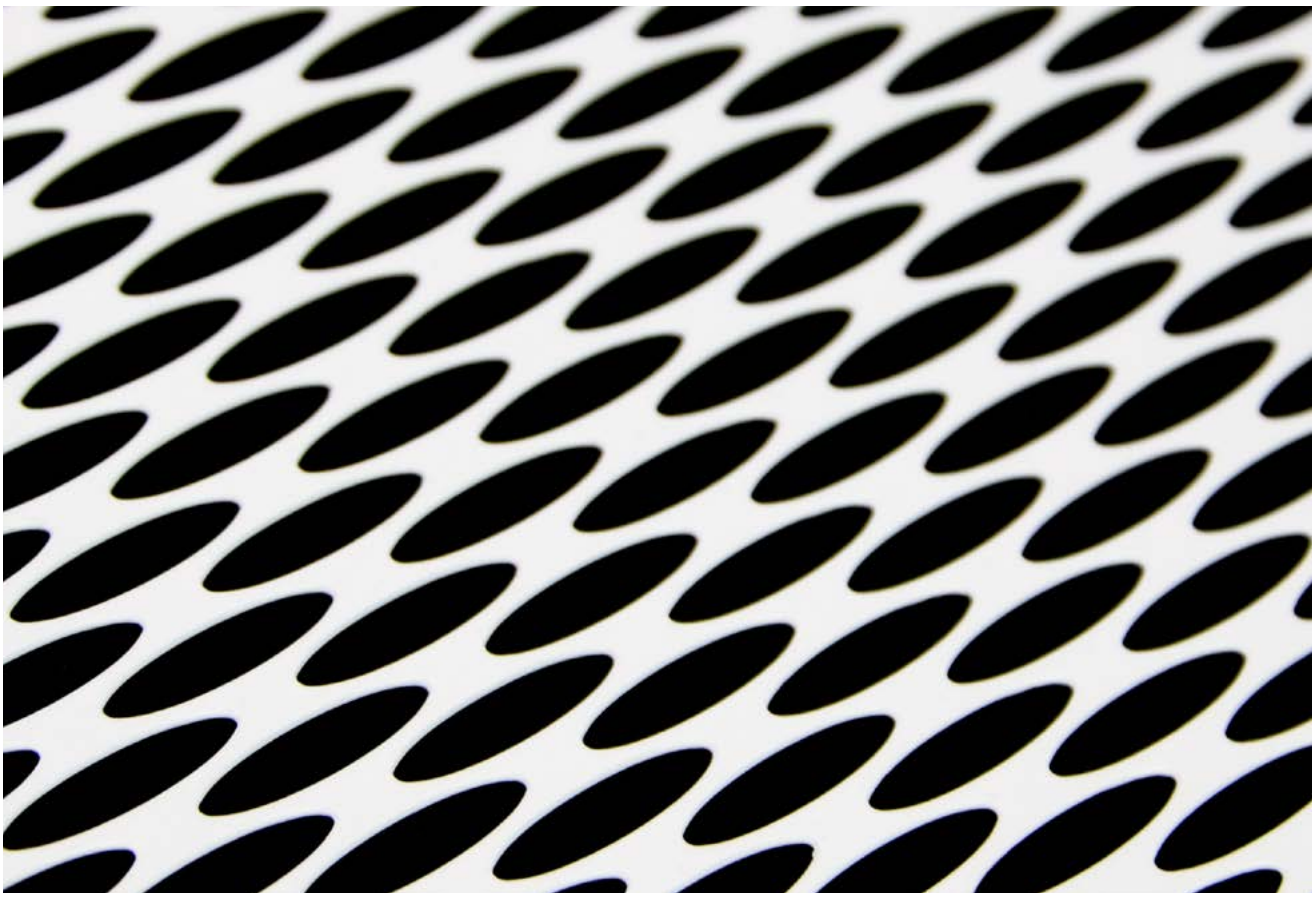


D1522



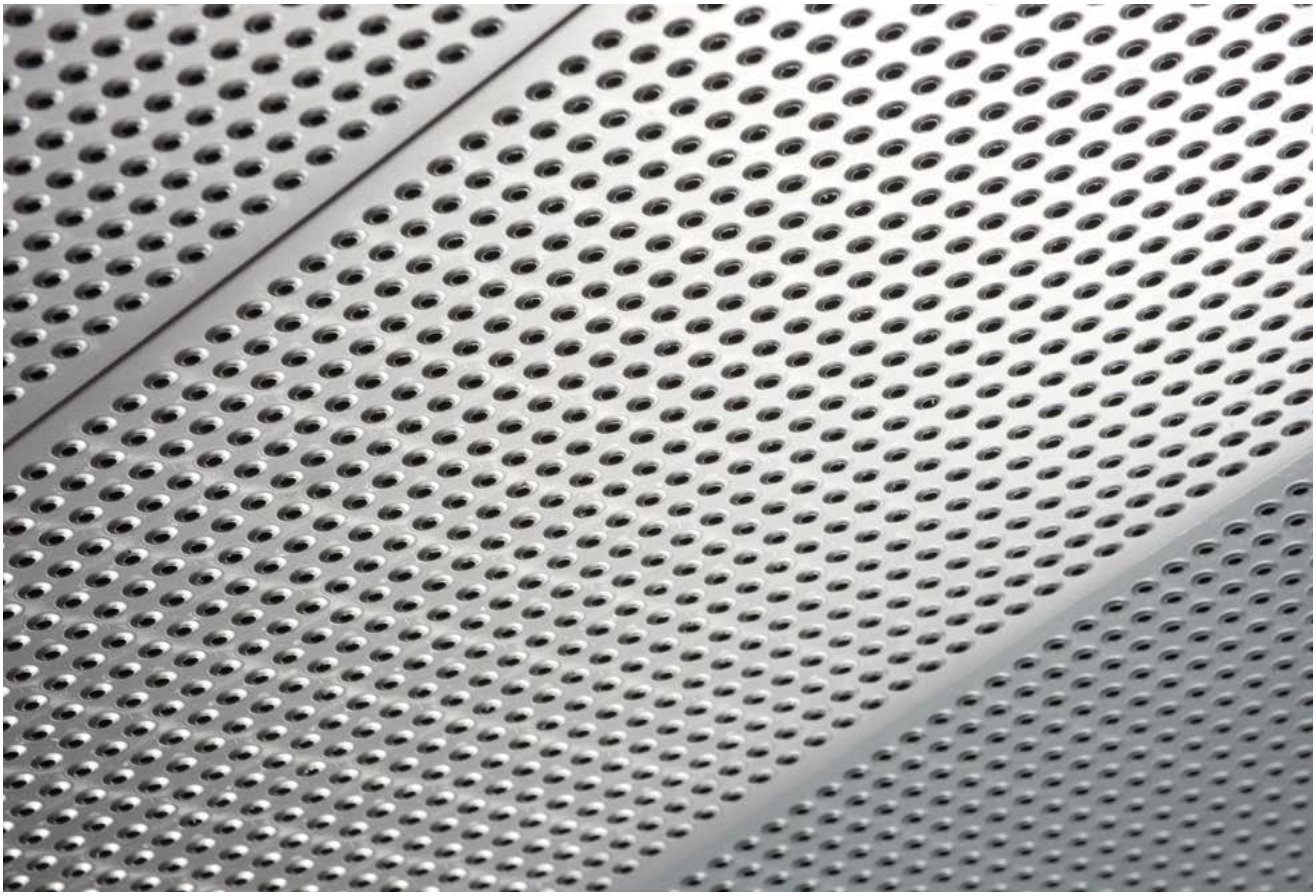
D2324 / S1030

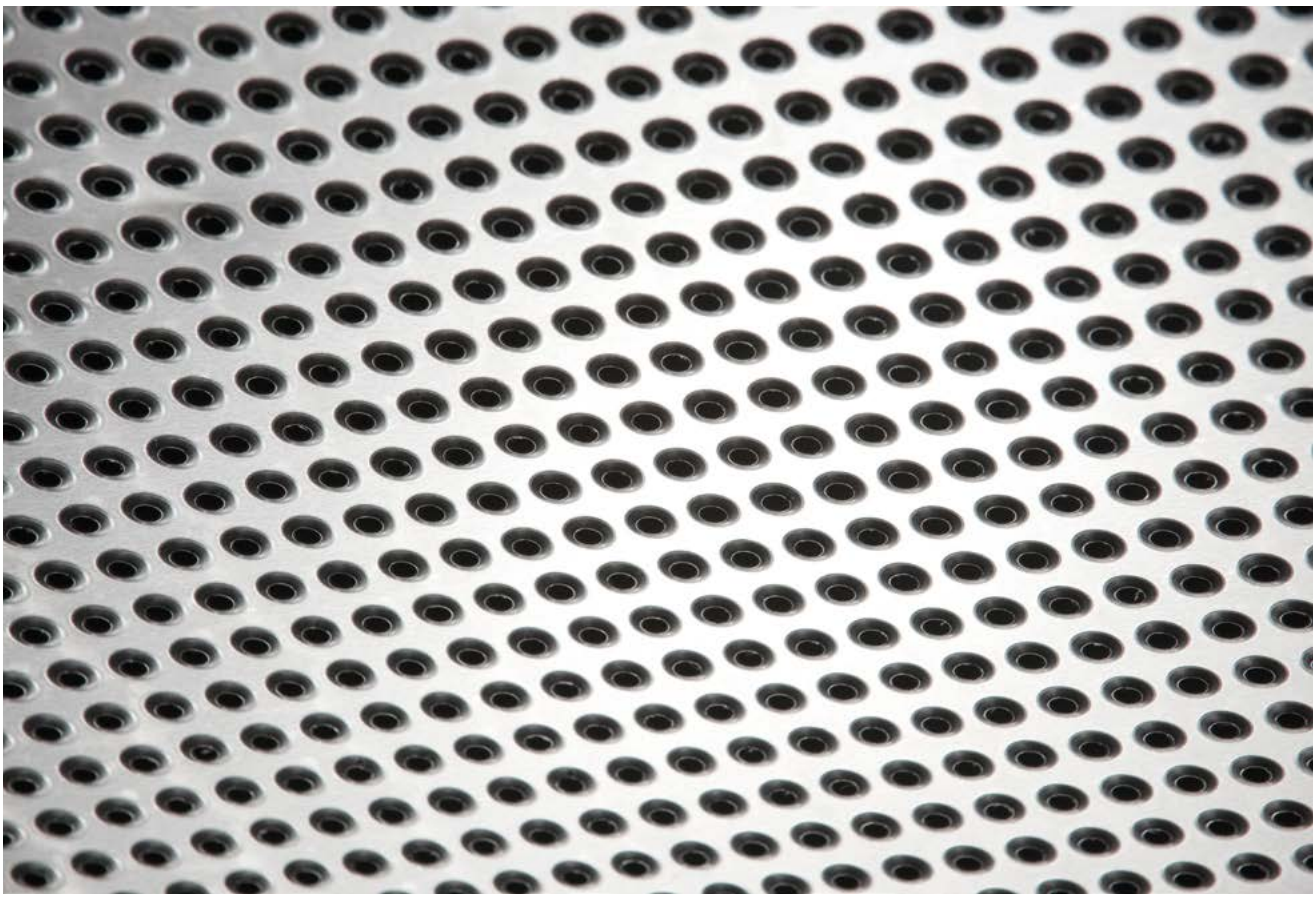




Top
D4050

Bottom
EL60



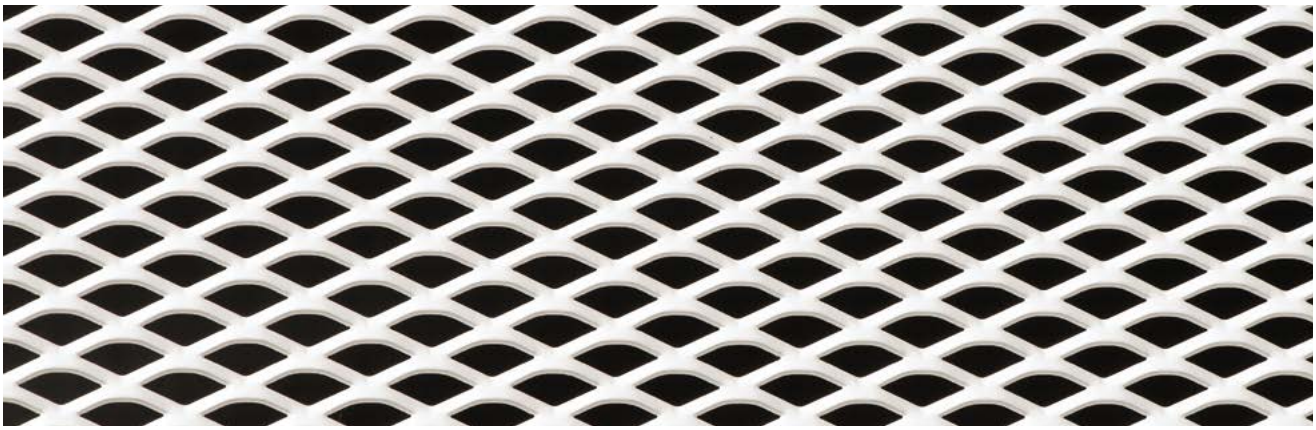


Fluted perforation (bespoke)

Mesh

Mesh

Mesh | Overview



An increasingly popular material option, mesh is an ideal choice to achieve contemporary design aesthetics and is an alternative option to exposed soffit. Across commercial, transportation, retail, leisure and educational sectors, we work directly with architects, designers and contractors to meet the desired aesthetic and functional needs of the project.

SAS Mesh has a wide range of pattern and finish options and can be manufactured to the specifiers shape and design.

System Features
Specified for its textured appearance, the additional main features of SAS International mesh panels include:

- Compatible with multiple SAS systems
- Available in six patterns and the full range of RAL colors
- Incorporates M&E services and complex building layouts
- Adjustable to bespoke designs

Tile Shape & Design
Mesh can be designed and manufactured in a wide range of patterns including profiles that are round, square, diamond and hexagonal.

For best results and to maximise the strength of the material, mesh should be specified with the long-way pattern direction across the tile width.

Specification considerations for mesh include:

- Visible face ('A' face as standard)
- Open view orientation
- Longway direction (across width as standard)
- Pattern selection
- Finishes and integration requirements

Bespoke Designs
Non-standard, bespoke options can also be manufactured to specification. Please contact our technical design team for more information on bespoke mesh patterns and applications, access, security, service integration and load support.

Finishes Availability

- Coating – Polyester powder coat
- Color – Available in a full range of RAL PPC

Lighting and Integration
Various effects can be achieved using light location. From discreet illumination to bold up-lighting, the expanded metal provides multiple possibilities.

Like other suspended metal ceilings, the system can also be designed with cut outs for lights and sensors. For precise and secure integration, flanged lights and vents are recommended and should be independently supported.

Texture (A and B side)
The mesh manufacture process results in the material having a different appearance depending on which face is visible. Tiles are manufactured with the 'A Face' visible as standard but if desired the 'B face' could be specified as the finished face.

The 'A' side of the tile is smoother with more gentle curves while the "B" side has a more pronounced texture. Depending on aesthetic preference, specifiers will need to choose their preferred visible face.

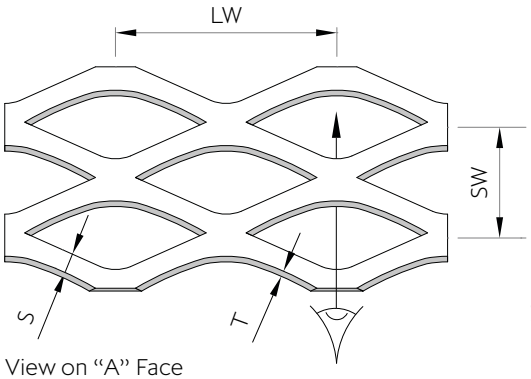
Acoustic Performance
Acoustic mineral wool pad tissue wrapped.

Other acoustic treatments are available, depending on project requirement. Please contact our technical department for more information.

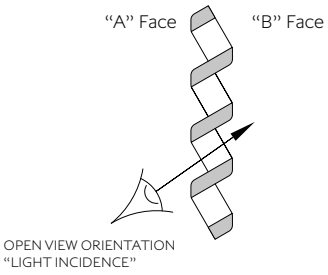
Storage and Handling
Full PPE must be worn due to the nature of mesh.

Mesh | Overview

Orientation
Mesh is an excellent architectural material because of its textured surface providing depth and visual interest. The appearance of mesh changes when viewed from different angles defined as 'open view' and 'closed view'. The 'open view' allows light to pass through the gaps while the 'closed view' reflects light on the surface depending on the viewer's perspective.

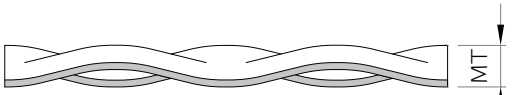


View on "A" Face



Section Through
"Shortway" Direction

LW Long Way
SW Short Way
S Strand Width
T Strand Thickness
MT Mesh Thickness



Section Through
"Longway" Direction

Compatible Systems
SAS systems compatible with mesh are:

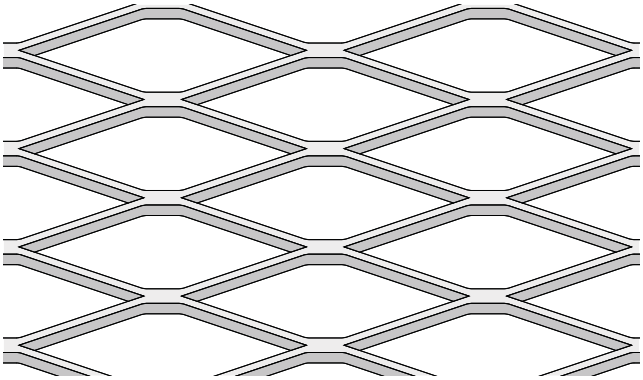
- SAS130
- SAS170
- SAS200 and SAS205
- SAS320 and SAS330
- SAS600 rafts

Reference	System Compatibility						Pattern Sw (inches)	Open Area % (approximate)
	130	170	200/205	320	330	600	LW x SW – S x T	
SAS-DL							1 11/16 x 1/2 - 1/8 x 1/16	60%
SAS-DML							1 1/8 x 3/8 - 1/16 x 1/16	55%
SAS-DM							5/8 x 5/16 - 1/16 x 1/16	50%
SAS-DS							3/8 x 1/4 - 1/16 x 1/16	47%
SAS-HM							9/16 x 1/4 - 1/16 x 1/16	63%
SAS-HS							3/8 x 3/16 - 1/16 - 1/16	58%

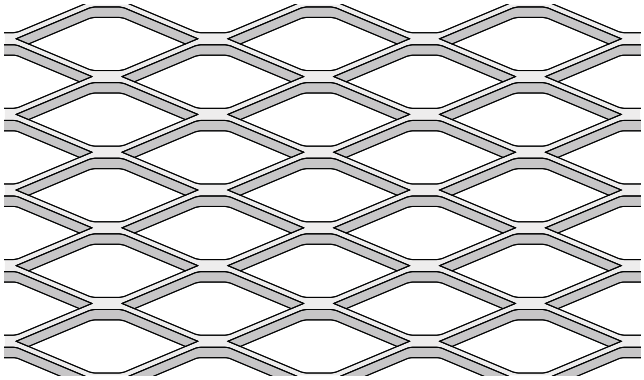
Non-standard, bespoke options can also be manufactured to specification. For more information on bespoke mesh patterns and applications, please contact our technical design team.

Mesh | Overview

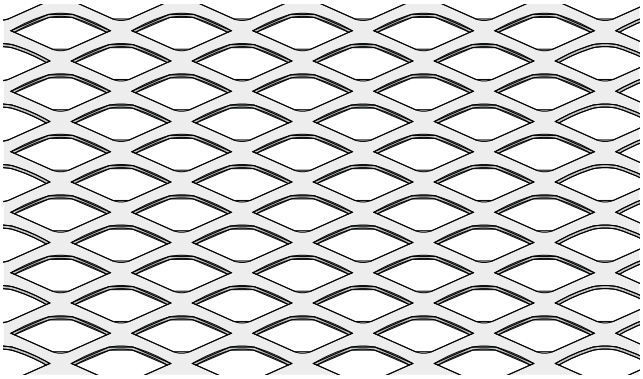
SAS-DL
Size : 1 11/16 (LW) x 1/2 (SW) – 1/8 (S) x 1/16 (T)



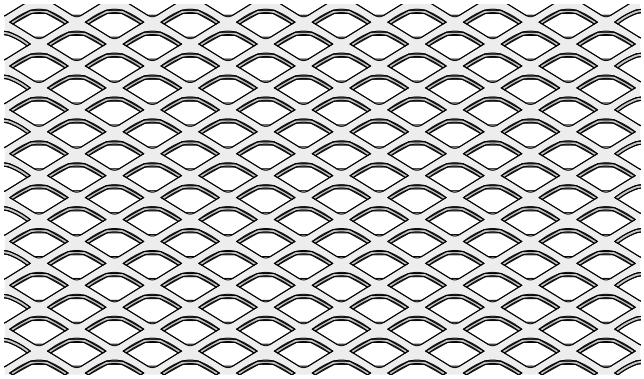
SAS-DML
Size: 1 1/8 (LW) x 3/8 (SW) – 1/16 (S) x 1/16 (T)



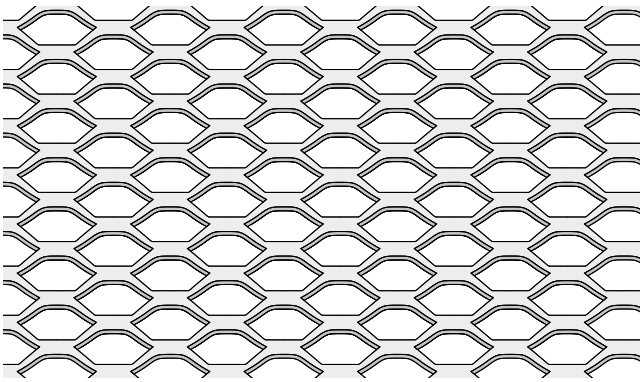
SAS-DM
Size: 5/8 (LW) x 5/16 (SW) – 1/16 (S) x 1/16 (T)



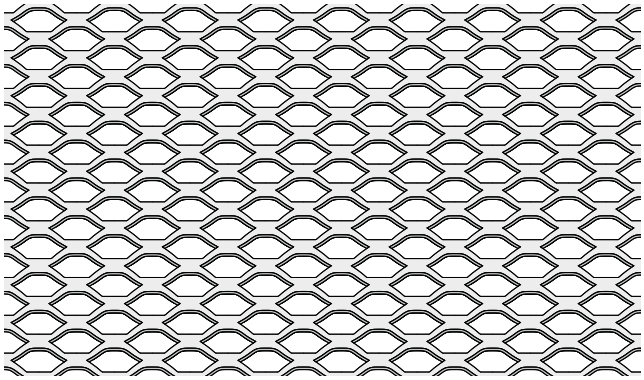
SAS-DS
Size: 3/8 (LW) x 1/4 (SW) – 1/16 (S) x 1/16 (T)



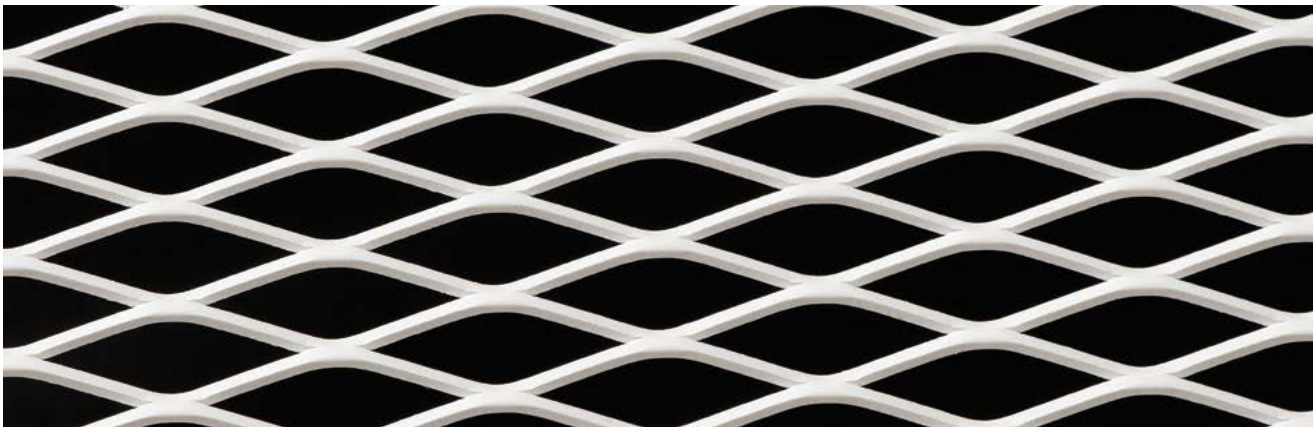
SAS-HM
Size: 9/16 (LW) x 1/4 (SW) – 1/16 (S) x 1/16 (T)



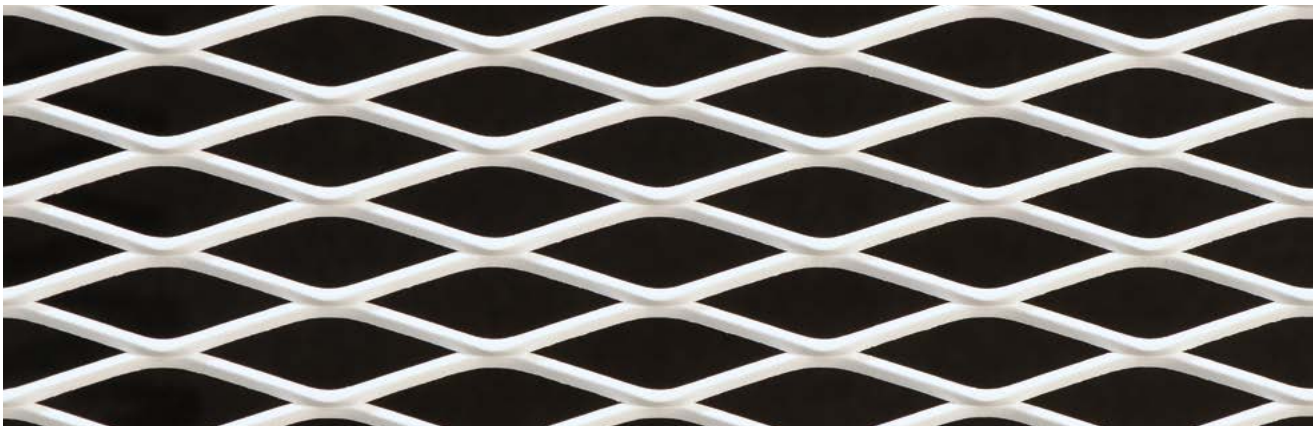
SAS-HS
Size: 3/8 (LW) x 3/16 (SW) – 1/16 (S) x 1/16 (T)



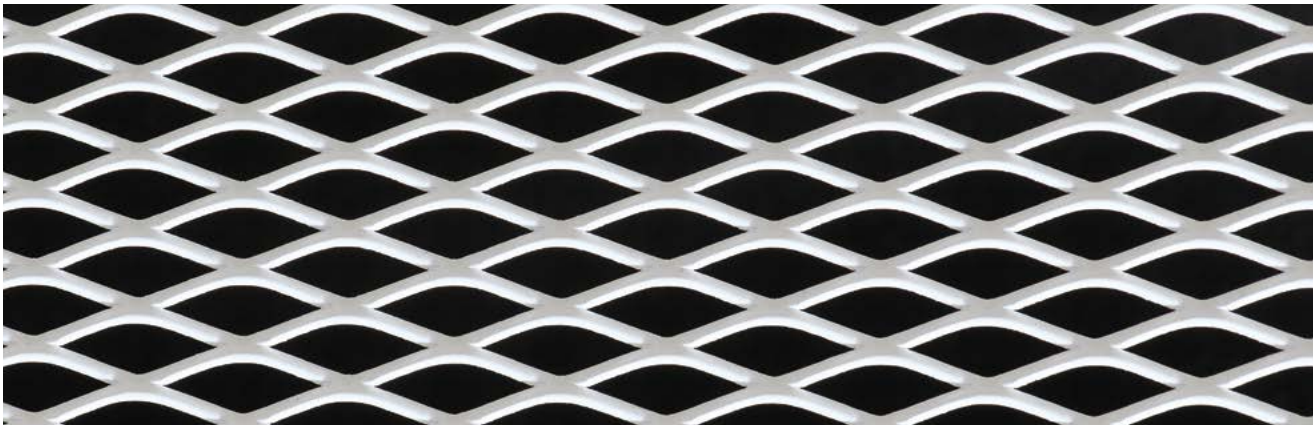
SAS-DL
A Face



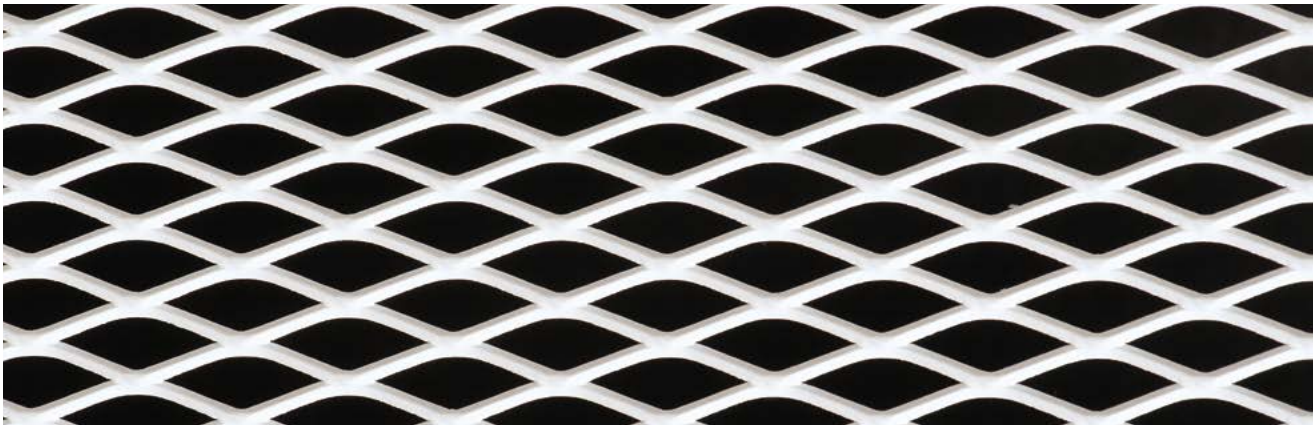
B Face



SAS-DML
A Face

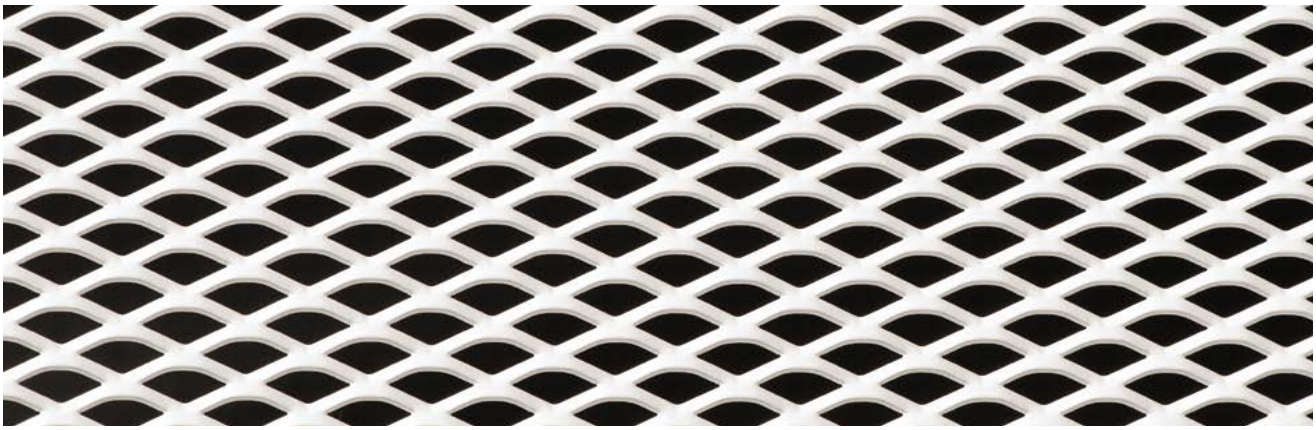


B Face

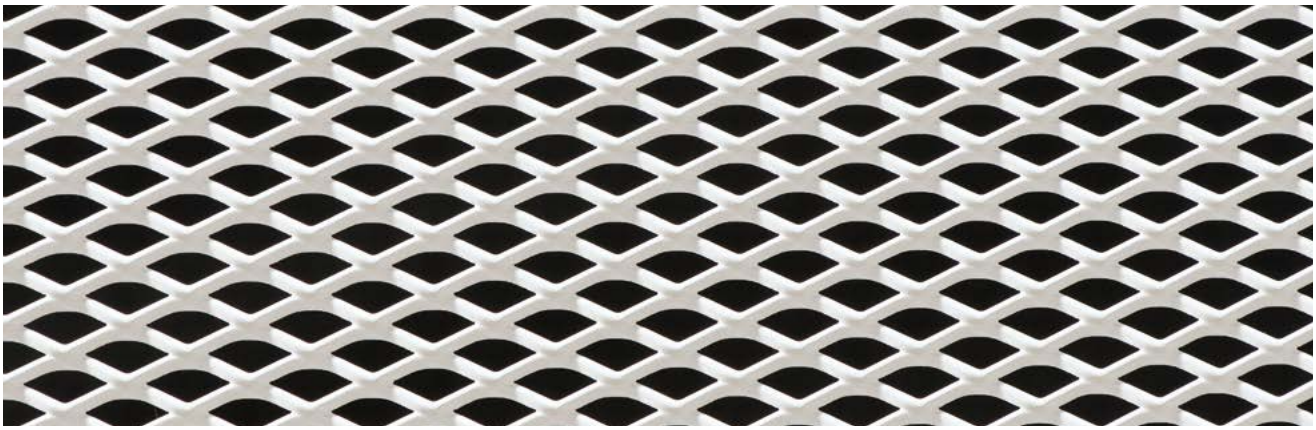


SAS-DM

A Face

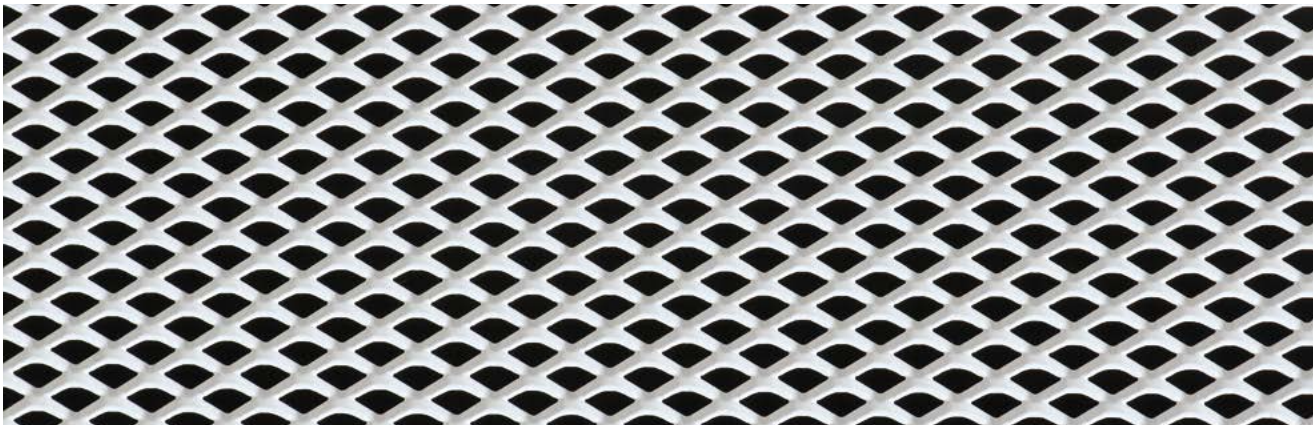


B Face

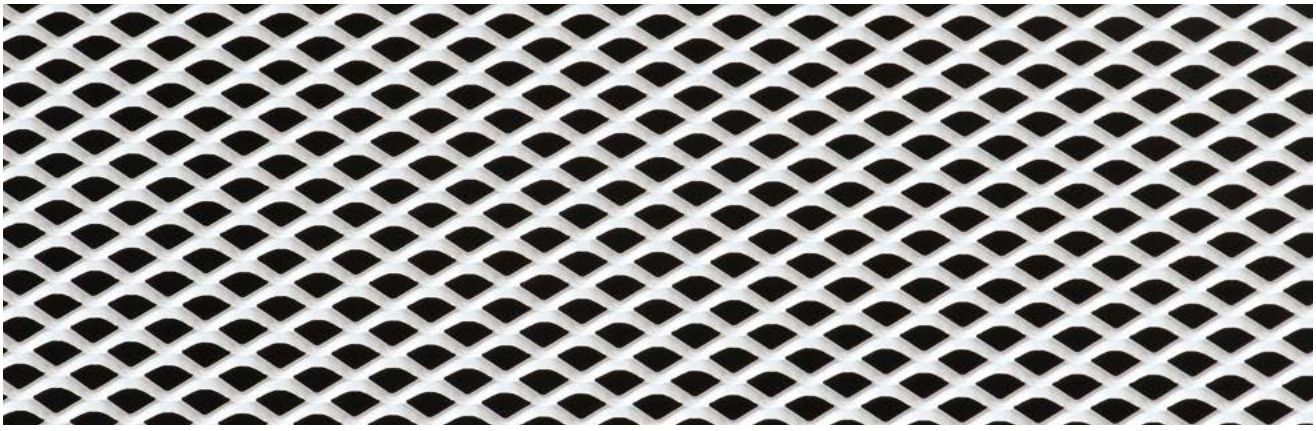


SAS-DS

A Face

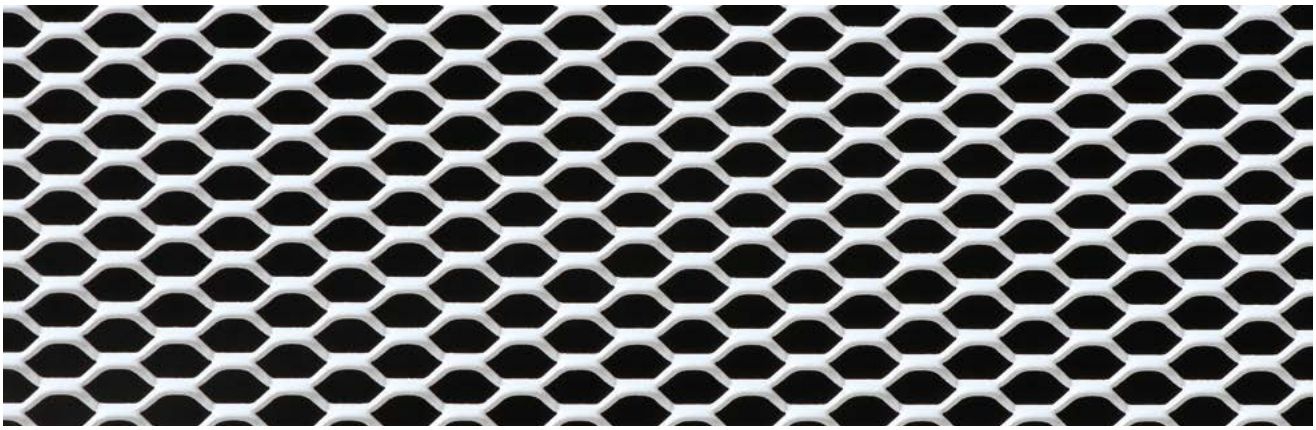


B Face

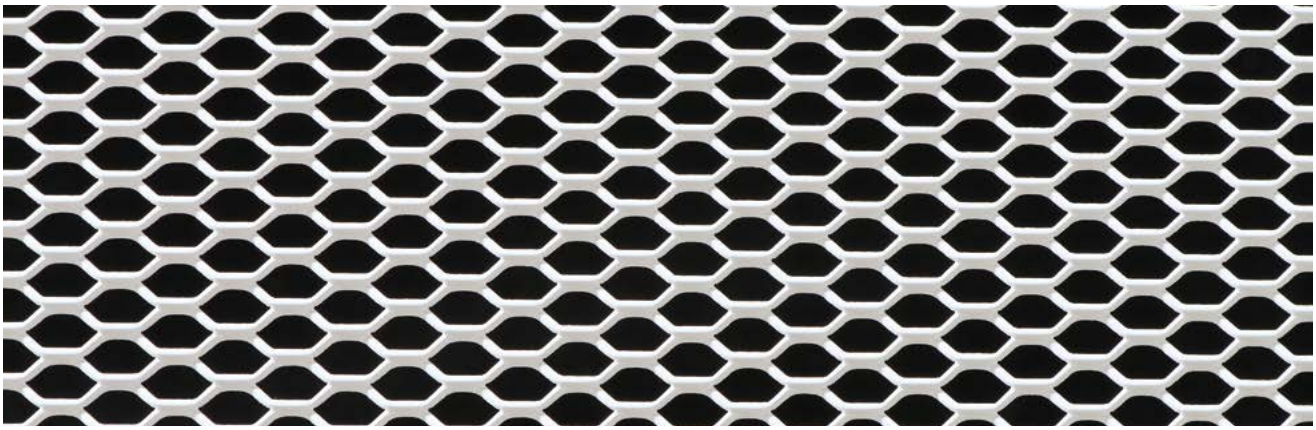


SAS-HM

A Face

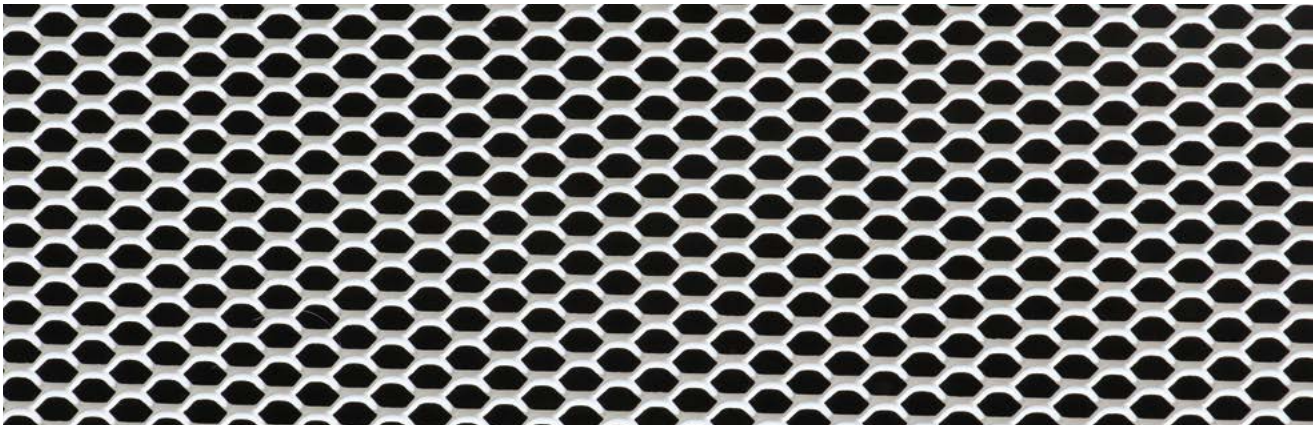


B Face

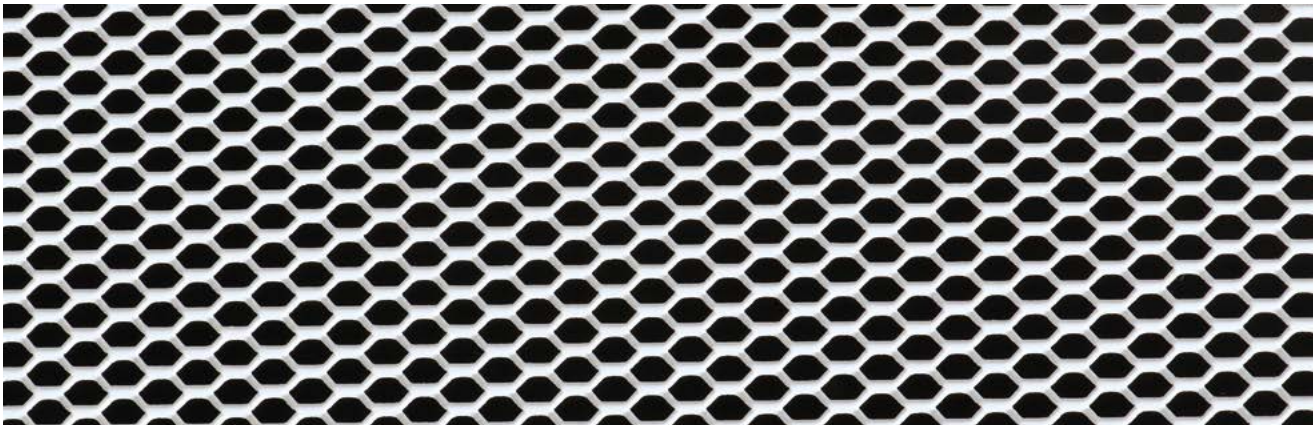


SAS-HS

A Face



B Face



Mesh

Atrium

Location
Dublin, Ireland
Architect
Plus Architecture

Contractor
Mac Interiors
Purpose
Commercial

Finishes

Finishes

Strategic investment in quality aesthetics offers a significant return. On average, 80% of operational spend within an organisation can be attributed to staff-related costs. Beautiful interiors attract staff, increase their retention, positively improve employee wellbeing and communicate the right values to potential clients. A desirable building in the right location minimises these staff-related costs, improving profitability for both occupiers and owners.

PPC
Polyester powder coating is the process of electrostatically applying dry powder to a substrate and heating to melt the powder forming a 'skin' around the material.

The main benefits of this process over traditional wet paint is the durability of the finish, additionally no solvents are required during the application process.

PPC is typically a smooth finish available in a range of gloss levels however textured finishes are available and give the illusion of a lower gloss level.

Antibacterial and Anti-graffiti variants are also available.

Enhanced Performance PPC
Enhanced performance PPC is designed to be used in corrosive environments. Specialised powder and additional processes during the application ensure paint can withstand harsh environments.

Anodised Aluminum
Anodising is the process of finishing on aluminum using electrical currents, this gives an altered aesthetic and improved corrosion resistance. A wide variety of colors and surface treatments are available, please enquire for further details.

Please note Aluminum will normally be used as the base material. Fixings and cut details will need to be carefully reviewed to ensure the integrity of the finish is not compromised.

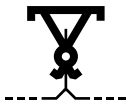
Special PPC's
Special PPC's are bespoke powders designed to simulate certain materials. There is a vast array of finishes available such a mirror finishes, high gloss and anodic effects. Please enquire for further details.

Timber Effect
Timber effect paint finishes give the effect of real wood, however offer the benefits of metal. They can be perforated to give a high level of acoustic absorption, larger panels are possible due to lighter weight, stability of product and higher reaction to fire performance. Almost any timber can be replicated through a number of processes.

Natural Finishes
Exposing the natural finish of the material is also possible. A range of techniques, from clear powder coat to hand applied patination are possible. Unfinished metal is never recommended and processing marks will be visible whenever exposing the natural finish of the base material.

For further information on finishes please contact the technical design team.

SAS120

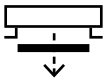


A simple suspended ceiling system with concealed grid, clip-in tiles and secure void option.

SYSTEM GROUP	GRID
	
Suspended ceiling	Concealed grid SAS Spring Tee suspension

TILE	
	
Clip-in	Bevelled edges | Closed butt-joints

ACOUSTICS	
0.4 - 1.0	**15-41dB**
NRC	Dnfw*

ACCESS	SYSTEM WEIGHT	LIFE EXPECTANCY
	**1.8lbs/ft²** Approx.	**25yr**
Full – pull down access	Based on 2' x 2' tiles	In excess of

***Note** SAS products are tested in accordance with UK standard Dnfw this means CAC will be 2-2.5dB greater. For more information, please see page 19.

SAS PLUS

HAVE A QUESTION?

Configurable with other products. Call us.
Contact us on enquiries@sasint.us

SAS**120**

SAS120 is ideally suited to interiors requiring frequent cleaning regimes or an economical solution to secure void access. Clip-in systems allow for upward cleaning pressure without dislodging or displacing tiles. If required, voids can be secured through the use of a simple clip mechanism.

Hospitals and food preparation areas are ideal examples of appropriate environments, however the system is suitable for numerous applications.

Module Sizes (ft) with nominal ⅛" bevel

2' x 2'
2' x 4'

Bespoke module sizes and shapes are available on request.

Access
Downward Demountable – The void is completely accessible with the use of a simple tool.

Alternatively, in areas where security is paramount optional security clips are available. This restricts access to the void to minimise security concerns.

Finishes
SAS120 is available in all standard SAS finishes, please refer to page 110. Bespoke finishes are available on request.

Perforations
Typically supplied with 1522, 1820 or 2516. For our full range of perforations, please refer to page 84. Bespoke perforations are also an option.

Acoustic Materials
Acoustic mineral wool pad with black tissue face, foil back and sides. Other acoustic materials are available please refer to page 17.

Please note SAS120 is not suited to all SAS acoustic materials due to maximum loads on clip-in systems.

Service Integration
Tiles can be formed with apertures during manufacturing and post painted for integration with lights and other services.

Please note SAS tiles will support loads up to 5.5lbs. SAS pattresses can be used to support loads up to 13lbs. Anything in excess of 13lbs requires independent suspension.

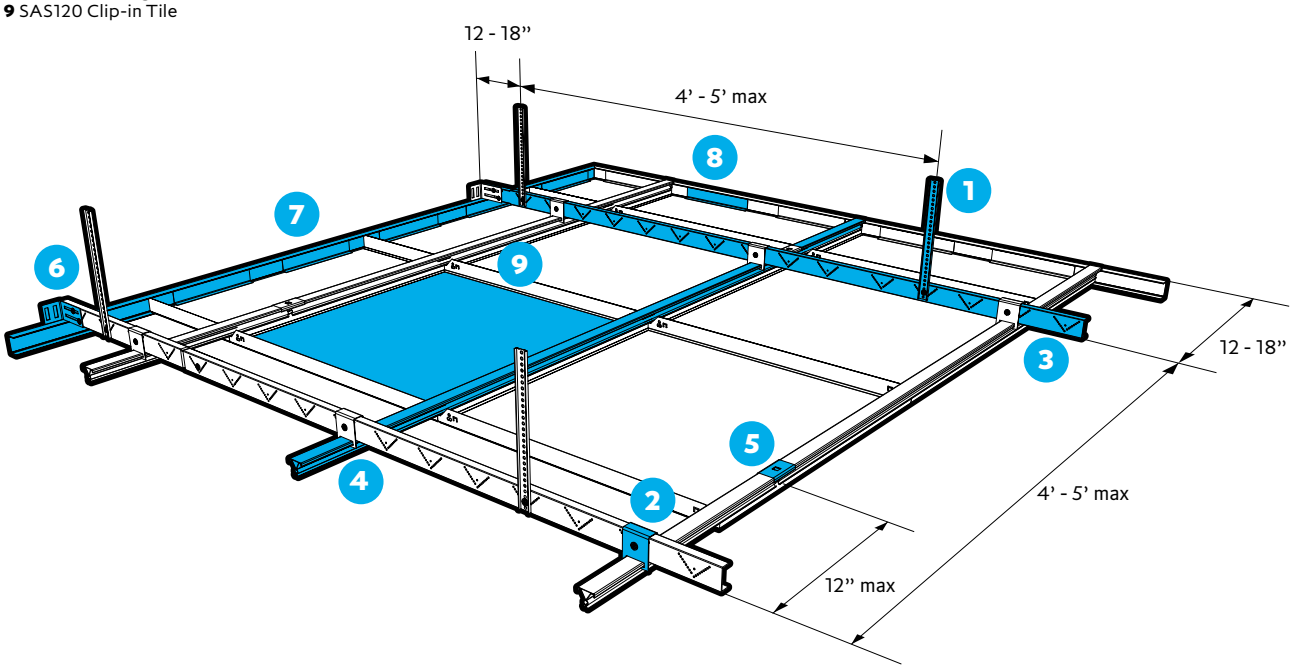
Technical Support
Please contact our technical team for all questions relating to access, security, bespoke features, acoustics, service integration or load support.

SAS120

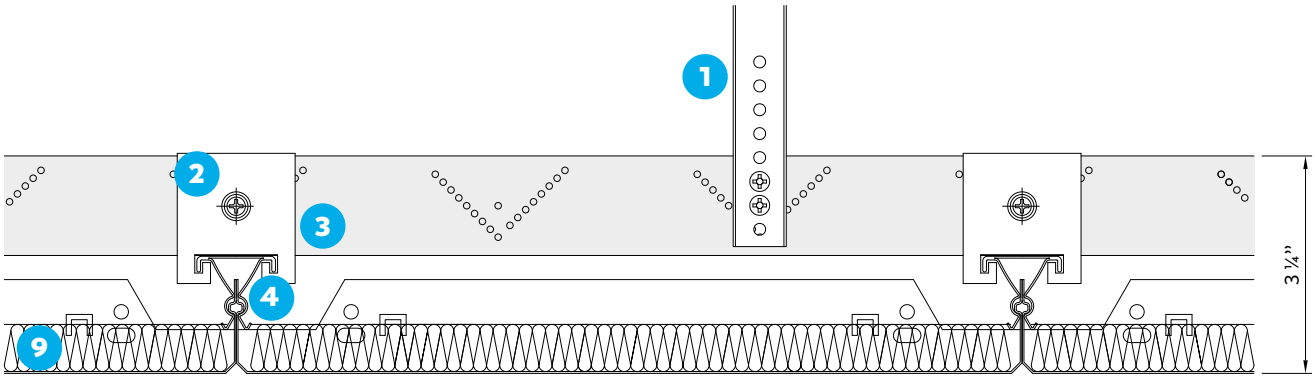
Perspective Drawing

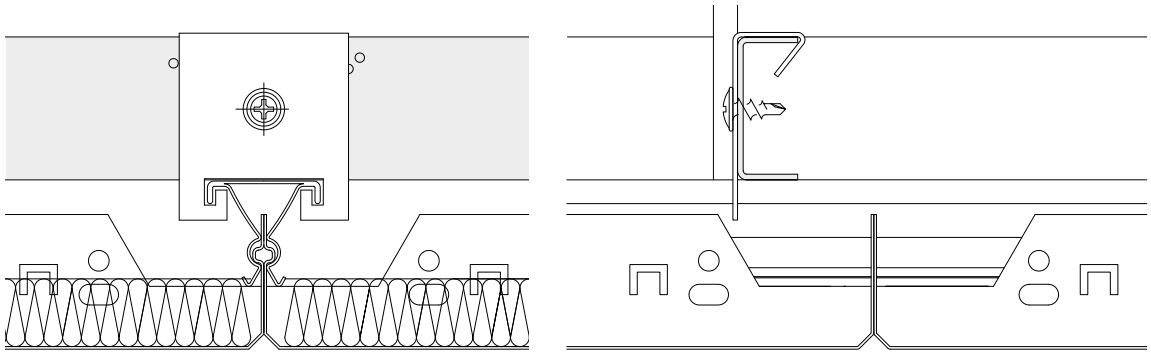
1 Emac Hanger
2 Suspension Bracket
3 Emac Primary Channel
4 Emac Spring Tee
5 Emac Spring Tee Splice
6 Emac Wall Anchor
7 Perimeter Trim
8 Perimeter Wedge
9 SAS120 Clip-in Tile

*Lightweight installations only, see page 246 for full details.



Section and detail drawings





SAS**120**

@waterloo

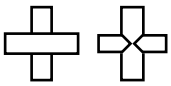
Location
London, UK
Architect
Magyar Marsoni Architects

Contractor
BW Interiors Ltd
D&B Contractor
Peldon Rose Ltd
Purpose
Commercial

SAS130

Lay-in, exposed grid modular suspended ceiling system, offering flush or tegular finishes and partitioning integration.

SYSTEM GROUP	GRID
	
Suspended ceiling	Exposed grid – SAS Tee Grid or SAS Alugrid variants

TILE	GRID
	
Lay-in	Butt-cut junctions or precise mitred joints

ACOUSTICS	
0.4 - 1.0	**15-45dB**
NRC	Dnfw*

ACCESS	SYSTEM WEIGHT	LIFE EXPECTANCY
	1 5⁄16 tiles approx. **1lbs/ft²** ⅝ tiles approx. **1.5lbs/ft²** ¾ tiles approx. **2.2lbs/ft²**	**25yr**
Lift and tilt	Based on 2' x 2' tiles*	In excess of

***Note** SAS products are tested in accordance with UK standard Dnfw this means CAC will be 2-2.5dB greater. For more information, please see page 19.

SAS PLUS

HAVE A QUESTION?

Configurable with other products. Call us.
Contact us on enquiries@sasint.us

SAS**130**

SAS130 offers either a flush (Alugrid) or tegular (Tee Grid) finish metal ceiling, depending on aesthetic preference. Lay-in tiles are quick to mount and dismount offering simple access to the ceiling void.

The suspended ceiling integrates seamlessly with both partitioning and signage for hassle free installations (Alugrid Q). The system can also form an airtight seal (with Alugrid Cleanseal) for air management and moisture control applications. Typical applications of SAS130 include commercial offices, Data Centres and labs.

Module Sizes (inches)

2' x 2'
2' x 4'
2'6" x 2'6"

Bespoke module sizes and shapes are available on request.

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

Finishes
SAS130 is available in all standard SAS finishes, please refer to page 110. Bespoke finishes are available on request.

Perforations
Typically supplied with 1522, 1820 or 2516. For our full range of perforations, please refer to page 84. Bespoke perforations are also an option.

Acoustic Materials
Acoustic mineral wool pad with black tissue face, foil back and sides. Other acoustic materials are available, please refer to page 17.

Service Integration
Tiles can be formed with apertures during manufacturing and post painted for integration with lights and other services.

Please note SAS130 can support additional loads up to 6lbs. This is based on a point or uniformly distributed load over 4', with hanger centres positioned 4' apart, maximum. For loads greater than 6lbs, SAS recommends using independent suspension.

Airtightness and Acoustics
The Alugrid-P Cleanseal grid option creates an airtight barrier between the grid and tile. This stops unwanted dirt getting in behind or falling through the tile. This can be a highly desirable trait in labs and Data Centre applications.

Partitioning and Signage
The continuous linear thread form allows the easy location and relocation of partition heads by means of an suitable bolt. The design of Alugrid-Q means this can happen repeatedly without causing damage. This same feature also allows for hanging signs and other lightweight features.

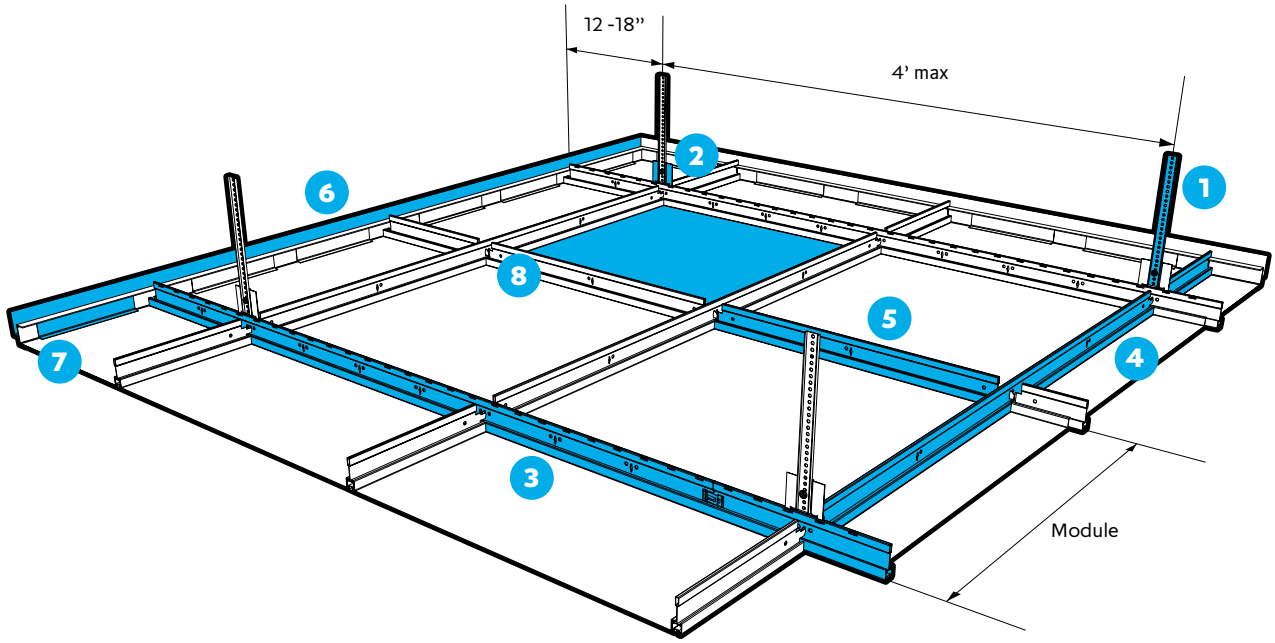
Technical Support
Please contact our technical team for all questions relating to access, security, bespoke features, service integration or load support.

SAS130

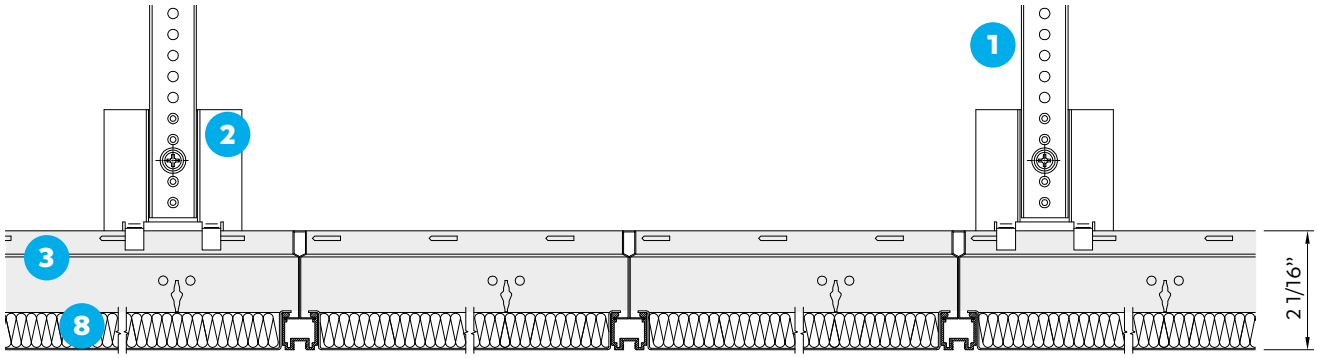
Perspective Drawing

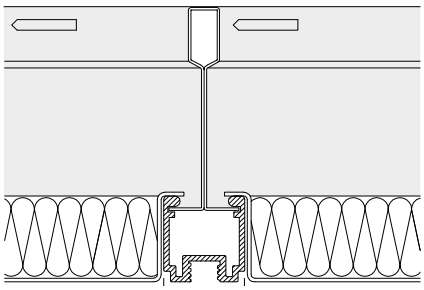
1 Emac Hanger
2 Emac Suspension Bracket
3 Main Tee
4 Cross Tee
5 Noggin
6 Perimeter Trim
7 Perimeter Wedge
8 SAS130 Lay-in Tile

*Lightweight installations only, see page 246 for full details.



Section and detail drawings

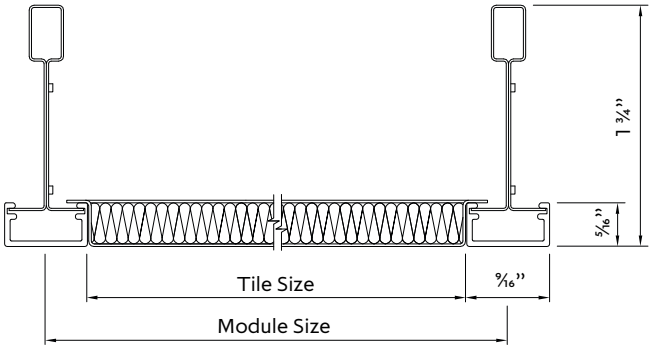




SAS**130** | Grid options

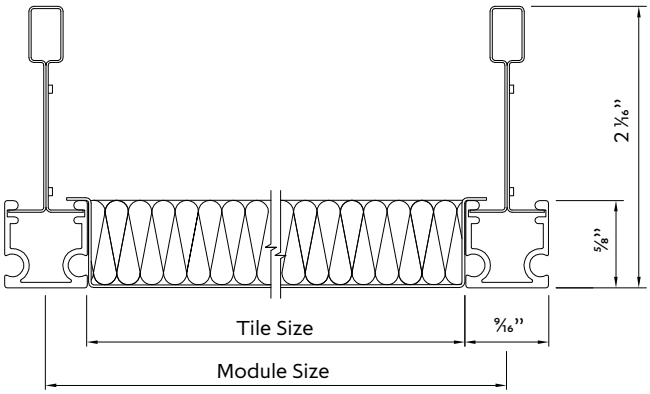
SAS Alugrid-P 15/08

Module size	Tile size
2' x 2'	1' 11 ⅜" x 1' 11 ⅜"
2' x 4'	1' 11 ⅜" x 3' 11 ⅜"
2'6" x 2'6"	2' 5 ⅝" x 2' 5 ⅜"



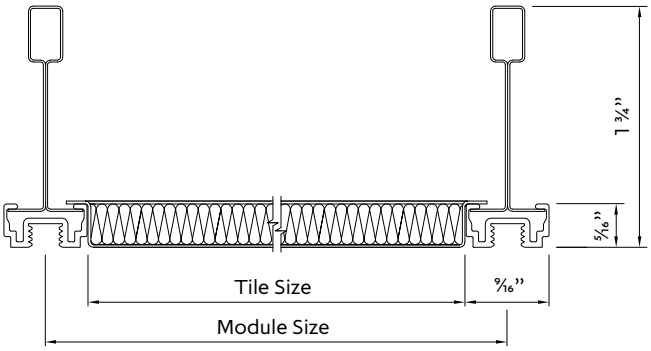
SAS Alugrid-P 15/16

Module size	Tile size
2' x 2'	1' 11 ⅜" x 1' 11 ⅜"
2' x 4'	1' 11 ⅜" x 3' 11 ⅜"
2'6" x 2'6"	2' 5 ⅝" x 2' 5 ⅜"



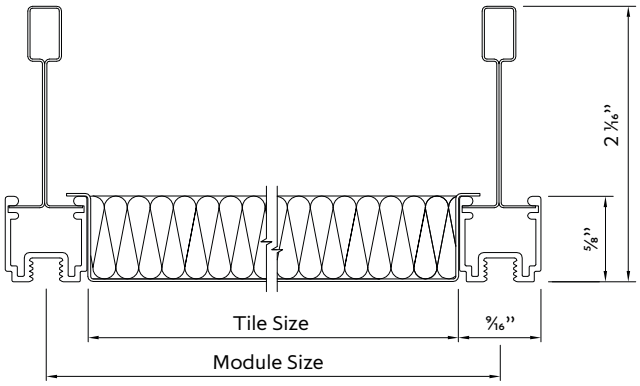
SAS Alugrid-Q 15/08

Module size	Tile size
2' x 2'	1' 11 ⅜" x 1' 11 ⅜"
2' x 4'	1' 11 ⅜" x 3' 11 ⅜"
2'6" x 2'6"	2' 5 ⅝" x 2' 5 ⅜"



SAS Alugrid-Q 15/16

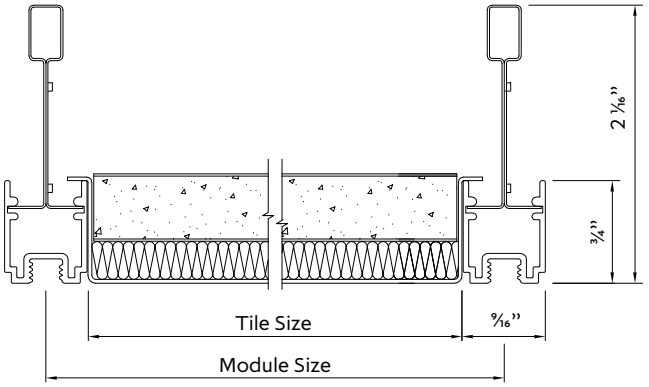
Module size	Tile size
2' x 2'	1' 11 ⅜" x 1' 11 ⅜"
2' x 4'	1' 11 ⅜" x 3' 11 ⅜"
2'6" x 2'6"	2' 5 ⅝" x 2' 5 ⅜"



SAS**130** | Grid options

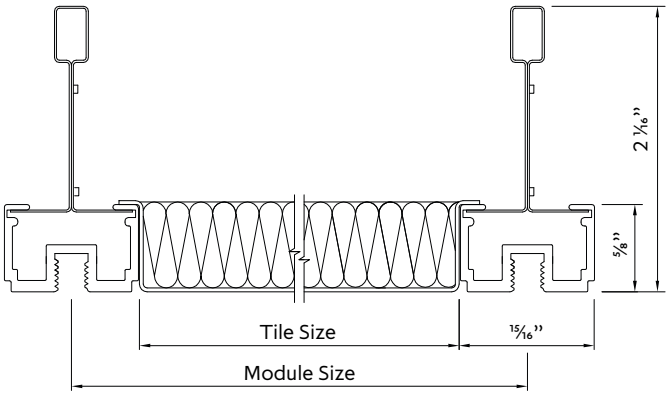
SAS Alugrid-Q 15/19

Module size	Tile size
2' x 2'	1' 11 ⅜" x 1' 11 ⅜"
2' x 4'	1' 11 ⅜" x 3' 11 ⅜"
2'6" x 2'6"	2' 5 ⅝" x 2' 5 ⅜"



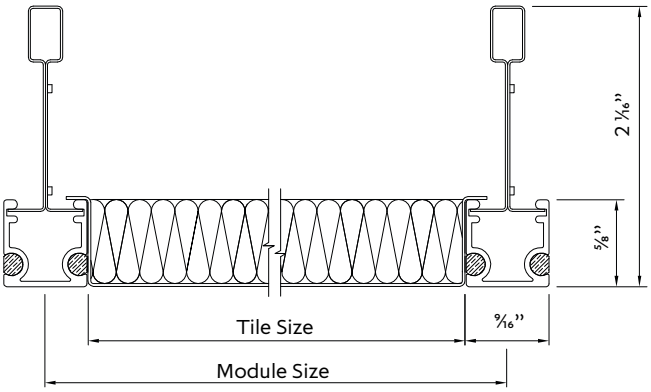
SAS Alugrid-Q 25/16

Module size	Tile size
2' x 2'	1' 11" x 1' 11"
2' x 4'	1' 11" x 3' 11"
2'6" x 2'6"	2' 5" x 2' 5"



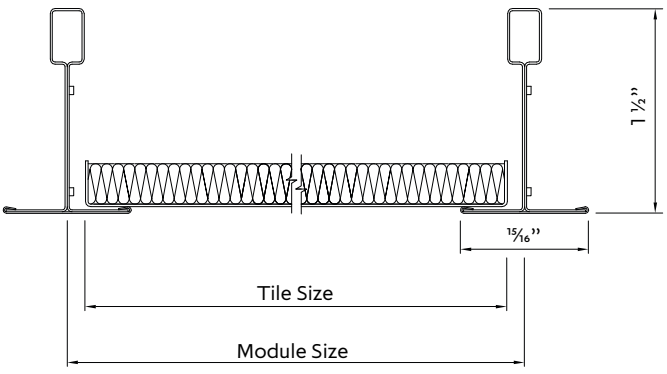
SAS Alugrid-P Cleanseal

Module size	Tile size
2' x 2'	1' 11 ⅜" x 1' 11 ⅜"
2' x 4'	1' 11 ⅜" x 3' 11 ⅜"
2'6" x 2'6"	2' 5 ⅝" x 2' 5 ⅜"



SAS T24 Square Edge

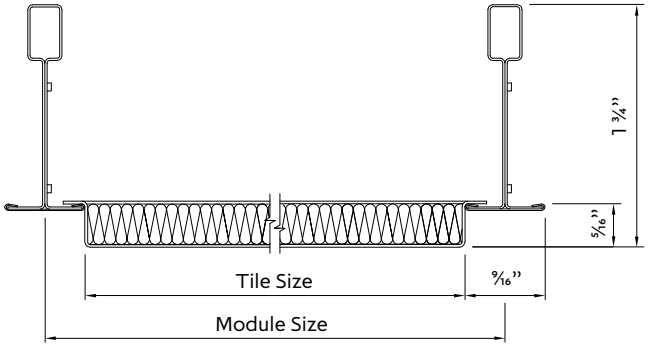
Module size	Tile size
2' x 2'	1' ¾" x 1' ¾"
2' x 4'	1' ¾" x 3' ¾"
2'6" x 2'6"	2' 5 ¾" x 2' 5 ¾"



SAS**130** | Grid options

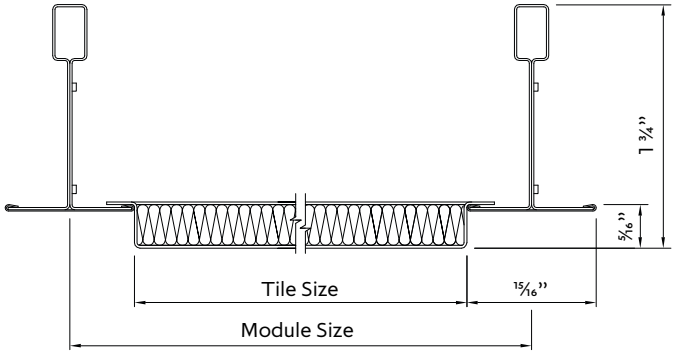
SAS T15 Tegular

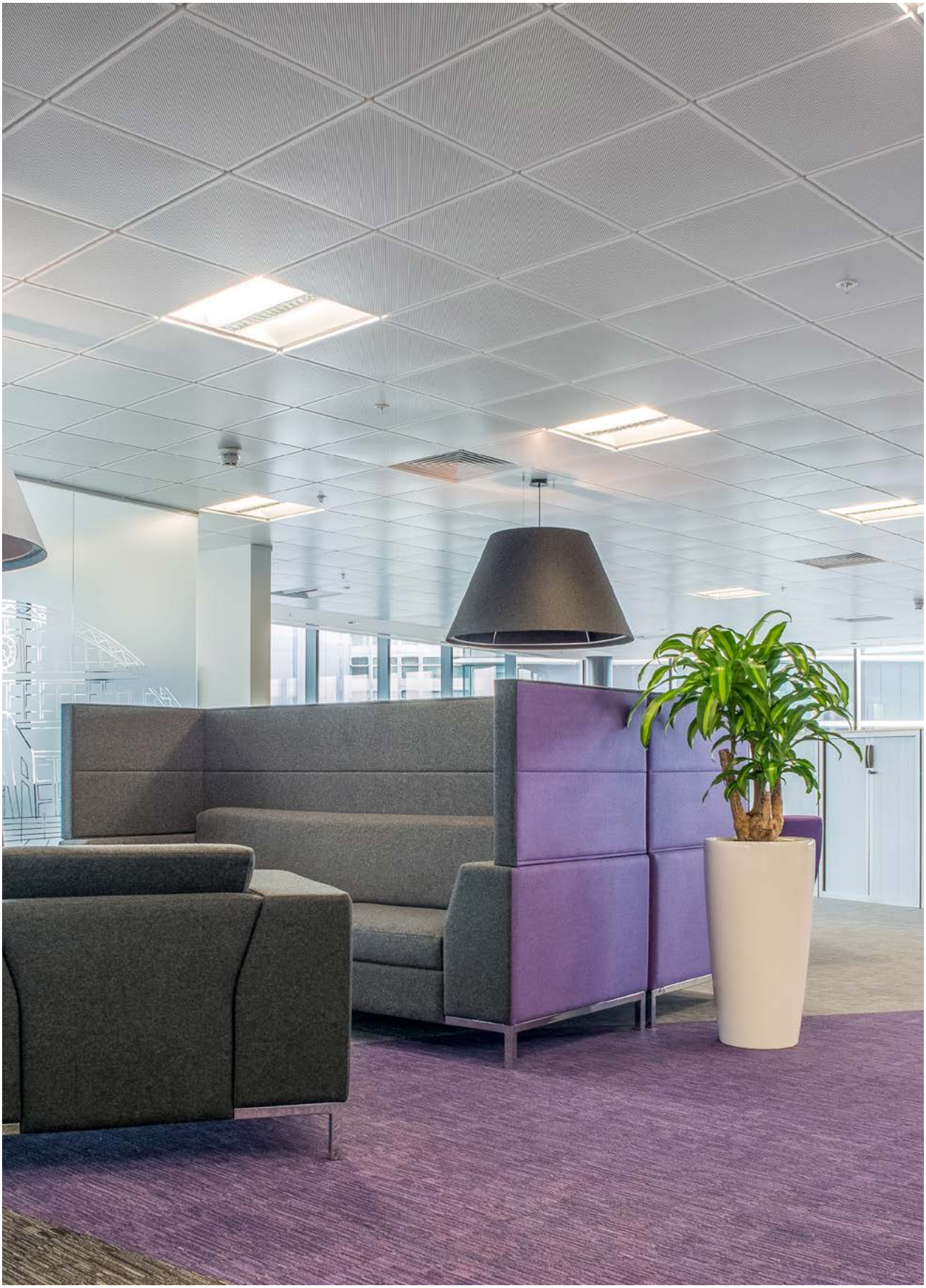
Module size	Tile size
2' x 2'	1' 11 ⅜" x 1' 11 ⅜"
2' x 4'	1' 11 ⅜" x 3' 11 ⅜"
2'6" x 2'6"	2' 5 ⅝" x 2' 5 ⅜"



SAS T24 Tegular

Module size	Tile size
2' x 2'	1' 11" x 1' 11"
2' x 4'	1' 11" x 3' 11"
2'6" x 2'6"	2' 5" x 2' 5"





SAS**130**

101 The Embankment

Location
Manchester, UK
Architect
Flanagan Lawrence

Contractor
TSK Group
Purpose
Commercial

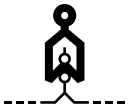
SAS**130**

4 Matthew Parker Street

Location
London, UK
Architect
CBRE Ltd

Contractor
BW Interiors Ltd
Purpose
Commercial

SAS**150**



A highly versatile and easily maintained clip-in suspended ceiling system with convenient hinge-down access and secure void option.

SYSTEM GROUP	GRID
	
Suspended ceiling	Concealed Grid – SAS shallow or deep Omega Bar

TILE	
	
Clip-in	Bevelled edges | Closed butt-joints

ACOUSTICS	
0.4 - 1.0	**15-41dB**
NRC	Dnfw*

ACCESS	SYSTEM WEIGHT	LIFE EXPECTANCY
	**1.8lbs/ft²** Approx.	**25yr**
Full – hinge and slide tiles	Based on 2' x 2' tiles	In excess of

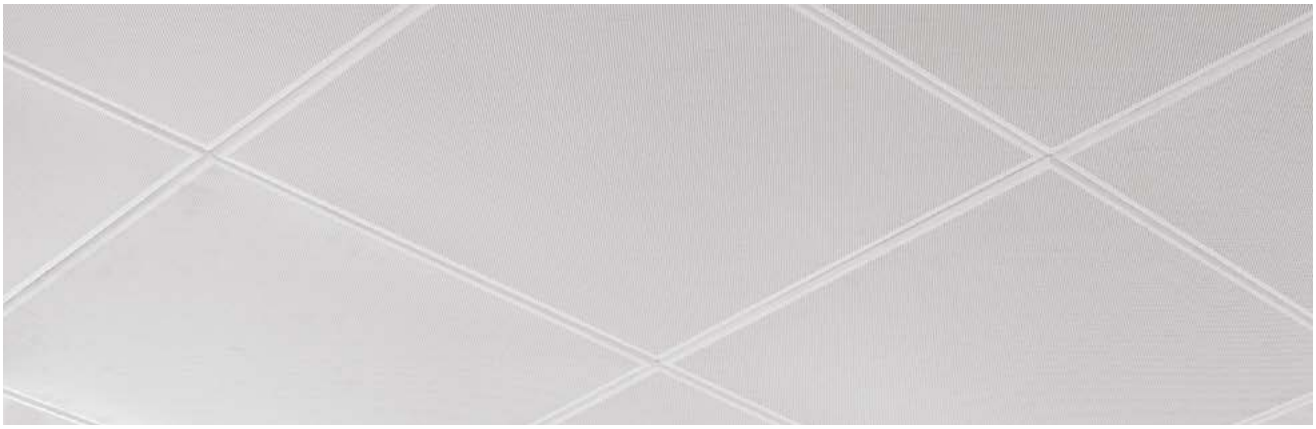
***Note** SAS products are tested in accordance with UK standard Dnfw this means CAC will be 2-2.5dB greater. For more information, please see page 19

SAS PLUS

HAVE A QUESTION?

Configurable with other products. Call us.
Contact us on enquiries@sasint.us

SAS**150**



SAS150 offers all the benefits of SAS120, with the additional convenience of hinge-down access minimising risk of damage. Clip-in systems allow for upward cleaning pressure without dislodging or displacing tiles. If required, voids can be secured through the use of a simple clip mechanism.

Hospitals and food preparation areas are ideal examples of appropriate environments, however the system is suitable for numerous applications.

Module Sizes (inches) with nominal ⅛" bevel

2' x 2'
2' x 4'

Bespoke module sizes and shapes are available on request.

Access
Hinge down and slide – The void is completely accessible with the use of a simple tool.

Alternatively, in areas where security is paramount optional security clips are available. This restricts access to the void to minimise security concerns.

Finishes
SAS150 is available in all standard SAS finishes, please refer to page 110. Bespoke finishes are available on request.

Perforations
Typically supplied with 1522 (available as stock item), 1820 or 2516. For our full range of perforations, please refer to page 84. Bespoke perforations are also an option.

Acoustic Materials
Acoustic mineral wool pad with black tissue face, foil back and sides. Other acoustic materials are available, please refer to page 17.

Please note SAS150 is not suited to all SAS acoustic materials due to maximum loads on clip-in systems.

Service Integration
Tiles can be formed with apertures during manufacturing and post painted for integration with lights and other services.

Please note SAS tiles will support loads up to 5.5lbs. SAS pattresses can be used to support loads up to 13lbs. Anything in excess of 13lbs requires independent suspension.

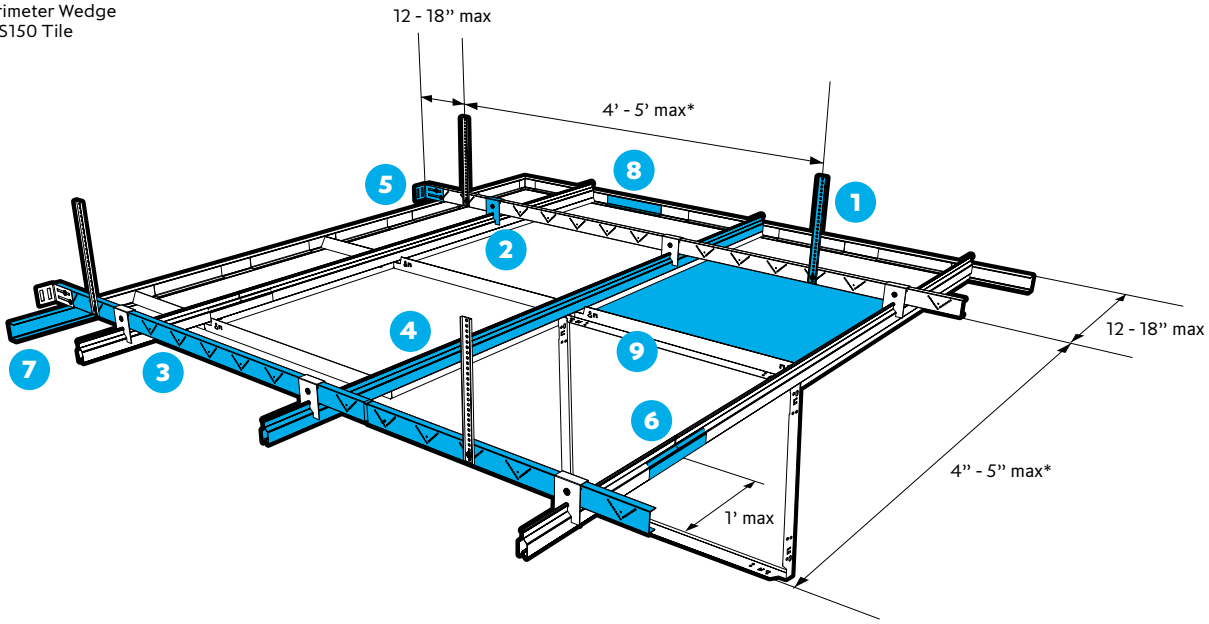
Technical Support
Please contact our technical team for all questions relating to access, security, bespoke features, acoustics, service integration or load support.

SAS150

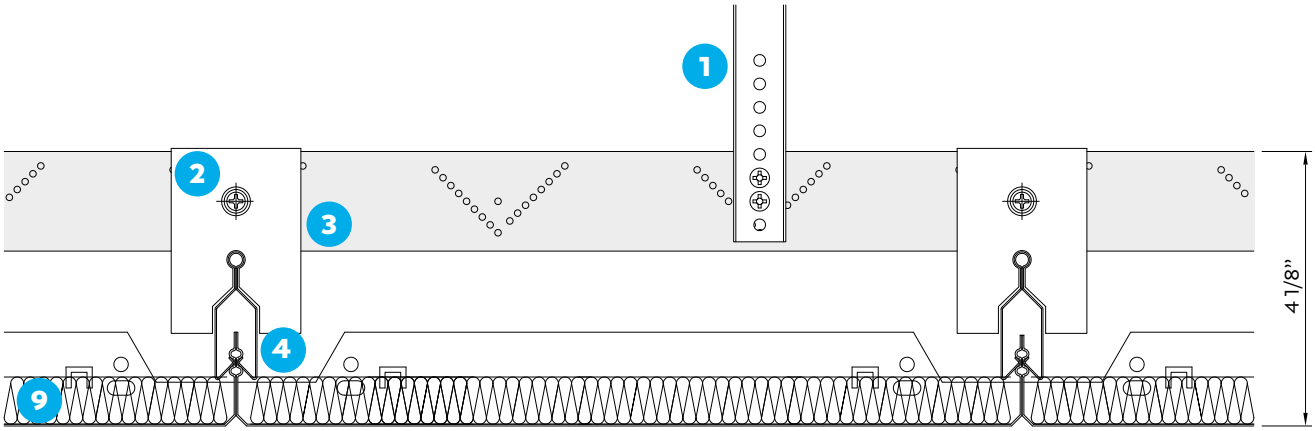
Perspective Drawing

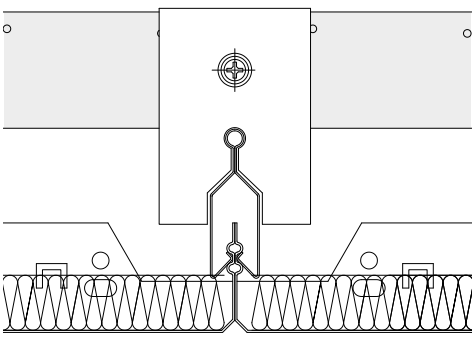
1 Emac Hanger
2 Omega Bar to Channel Bracket
3 Emac Channel
4 SAS Omega Bar
5 Emac Wall Anchor
6 Omega Bar Splice
7 Perimeter Trim
8 Perimeter Wedge
9 SAS150 Tile

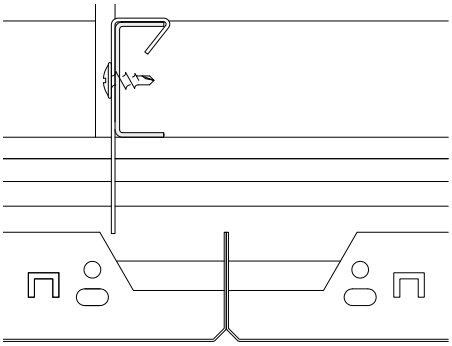
*Lightweight installations only, see page 247 for full details.



Section and detail drawings

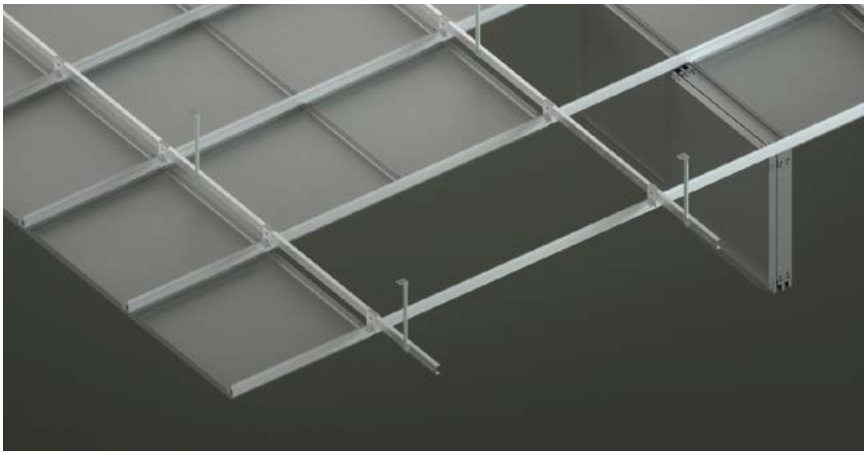






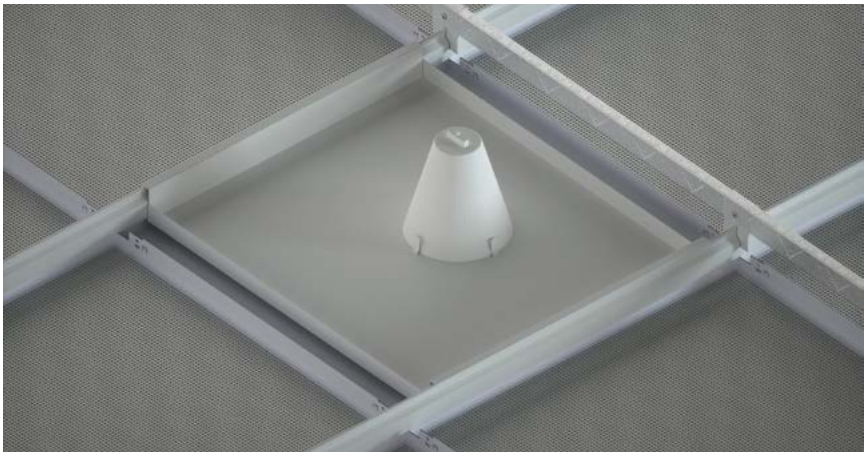
SAS**150** | Features

Hinge and Slide Facility



SAS150 allows every full tile to pivot and slide along the grid system. This feature facilitates easy access to large areas of the ceiling void for maintenance. Tiles are retained within the ceiling grid avoiding damage and eliminating the need for storage.

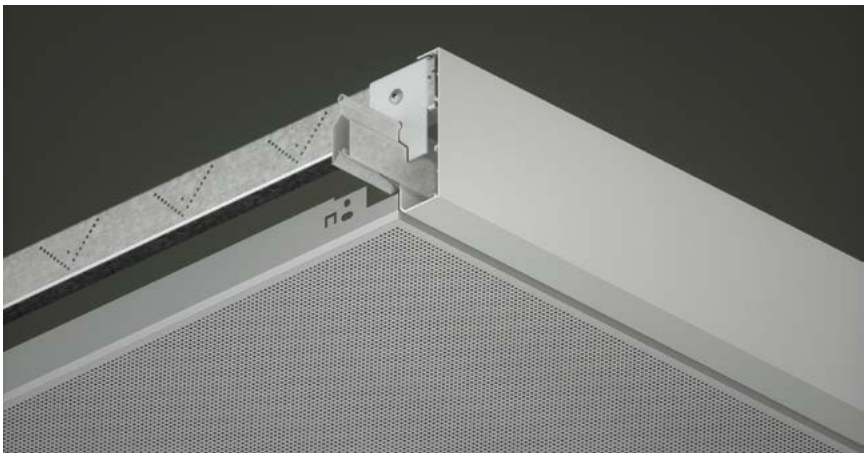
Service Integration



Other services can be integrated with SAS150. Modular lighting can be supported directly from the soffit. Where maximum point loads are exceeded (5lbs) the service must be supported independently or from the grid.

Loads in excess of 5lbs and up to 13lbs can be supported by an SAS Pattress. This distributes the load across the SAS Omega Bar and eliminates the need for complicated support arms. Loads in excess of 13lbs must be supported independently. For more information on load support, please contact our technical design department.

Bulkhead Closure Panels



Bulkhead closure panels enable floating rafts and ceilings to be created using a standard clip in ceiling tile. The height of the closure panels can be manufactured to suit project requirements. For more information on closure panels, please contact our technical design department.

SAS**150**

DNO Office

Location
Dubai, UAE
Architect
Cambridge Consultants

Contractor
n/a
Purpose
Commercial

SAS**150**

Boston Scientific Cork

Location
Cork, Ireland
Architect
Butler Cammoranesi Architects

Contractor
John Sisk & Son
Purpose
Commercial

SAS170

A highly versatile and easily maintained torsion spring ceiling system with convenient hinge-down access.

SYSTEM GROUP	GRID
	
Suspended ceiling	Concealed Grid – Slotted Tee Grid

TILE	
	
Torsion Spring	Square edges | Closed butt-joints

ACOUSTICS	
0.7 - 1.0	**15-41dB**
NRC	Dnfw*

ACCESS	SYSTEM WEIGHT	LIFE EXPECTANCY
	**2.1lbs/ft²** Approx.	**25yr**
Hinge down access	Based on 2' x 2' tiles	In excess of

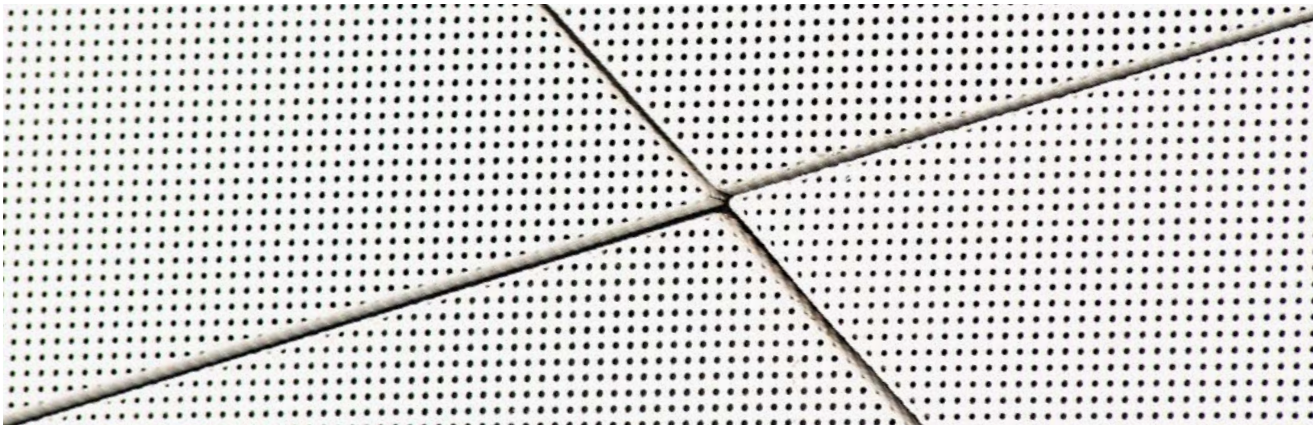
***Note** SAS products are tested in accordance with UK standard Dnfw this means CAC will be 2-2.5dB greater. For more information, please see page 19

SAS PLUS

HAVE A QUESTION?

Configurable with other products. Call us.
Contact us on enquiries@sasint.us

SAS**170**



SAS170 is a concealed grid suspended ceiling system offering convenient hinge down access. The highly adaptable system is often used as a basis for fully bespoke designs. Due to its inherent versatility, the torsion spring system can be used in a wide variety of applications.

Module Sizes (ft)

2' x 2'
2' x 4'

Bespoke module sizes and shapes are available on request.

Access
SAS170 offers full access by way of hinge down tiles, suspended vertically from the grid.

Finishes
SAS170 is available in all standard SAS finishes, please refer to page 110. Bespoke finishes are available on request.

Perforations
SAS170 can be manufactured with any standard SAS perforation. For our full range of perforations, please refer to page 84. Bespoke perforations are also an option.

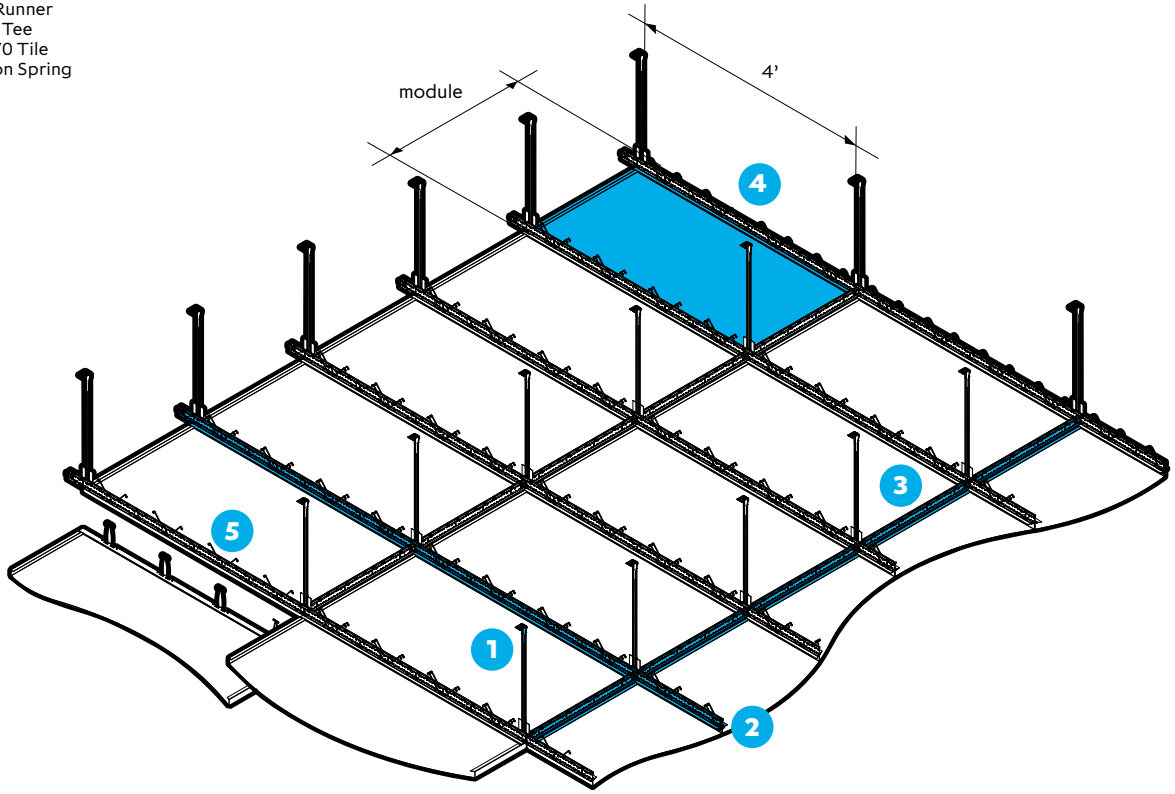
Acoustic Materials
Acoustic mineral wool pad with black tissue face, foil back and sides. Other acoustic materials are available, please refer to page 17.

Service Integration
Tiles can be formed with apertures during manufacturing and post painted for integration with lights and other services.

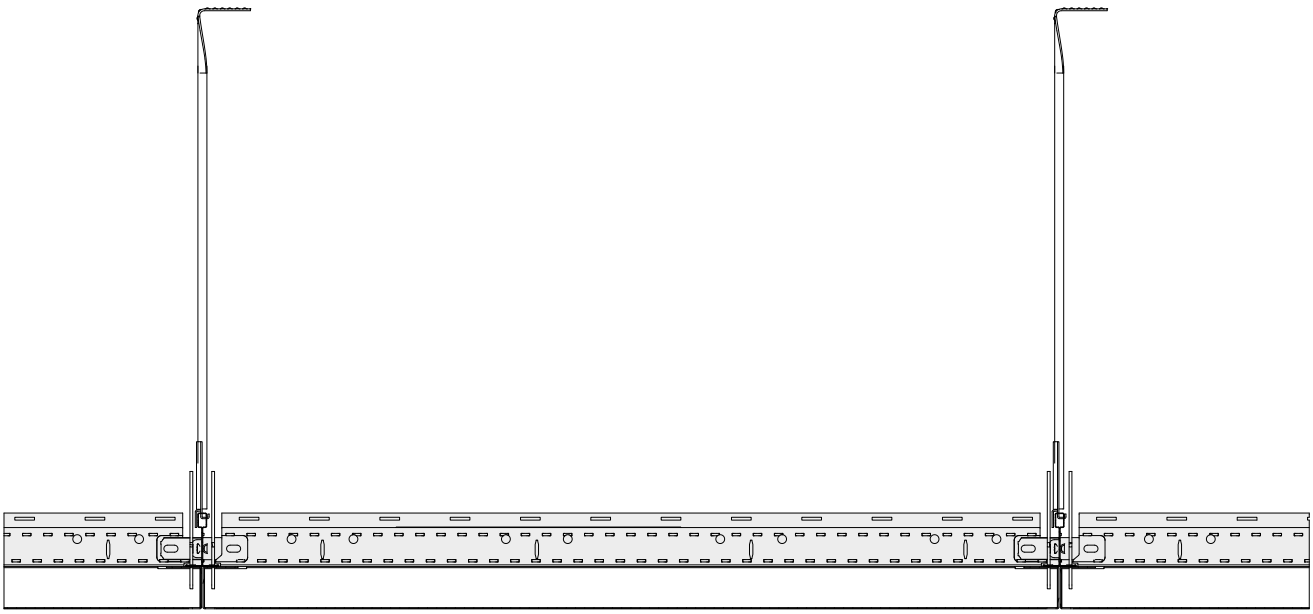
Technical Support
Please contact our technical team for all questions relating to access, security, bespoke features, acoustics, service integration or load support.

Perspective Drawing

1 Emac Hanger
2 Main Runner
3 Cross Tee
4 SAS170 Tile
5 Torsion Spring



Section and detail drawings



SAS**170**

SAS200

A concealed, hook-on suspended metal ceiling system ideal for ambitious design challenges.

SYSTEM GROUP	GRID
Suspended ceiling	Concealed grid SAS J-Bar suspension

TILE	
Hook-on	Square edge

ACOUSTICS	
0.4 - 1.0	**15-41dB**
NRC	Dnfw*

ACCESS	SYSTEM WEIGHT	LIFE EXPECTANCY
Lift and tilt	**2lbs/ft²** Approx. Based on 2' x 2' tiles 1⅛" deep*	**25yr** In excess of

***Note** SAS products are tested in accordance with UK standard Dnfw this means CAC will be 2-2.5dB greater. For more information, please see page 19

SAS PLUS

HAVE A QUESTION?

Configurable with other products. Call us.
Contact us on enquiries@sasint.us

SAS**200**

SAS200 is a concealed grid suspended ceiling system offering significant creative flexibility. The highly adaptable system is often used as a basis for fully bespoke designs. Due to its inherent versatility, the J-Bar hook on system can be used in a wide variety of applications.

Module Sizes
There are no standard tile sizes for SAS200. Tiles can be up to 10' in length and no less than 1' wide. Bespoke module sizes and shapes are available on request.

Access
Tiles can simply be lifted and removed from the grid.

Finishes
SAS200 is available in all standard SAS finishes, please refer to page 110. Bespoke finishes are available on request.

Perforations
SAS200 can be manufactured with any standard SAS perforation. For our full range of perforations, please refer to page 84. Bespoke perforations are also an option.

Acoustic Materials
Acoustic mineral wool pad with black tissue face, foil back and sides. Other acoustic materials are available, please refer to page 17.

Service Integration
Tiles can be formed with apertures during manufacturing and post painted for integration with lights and other services.

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

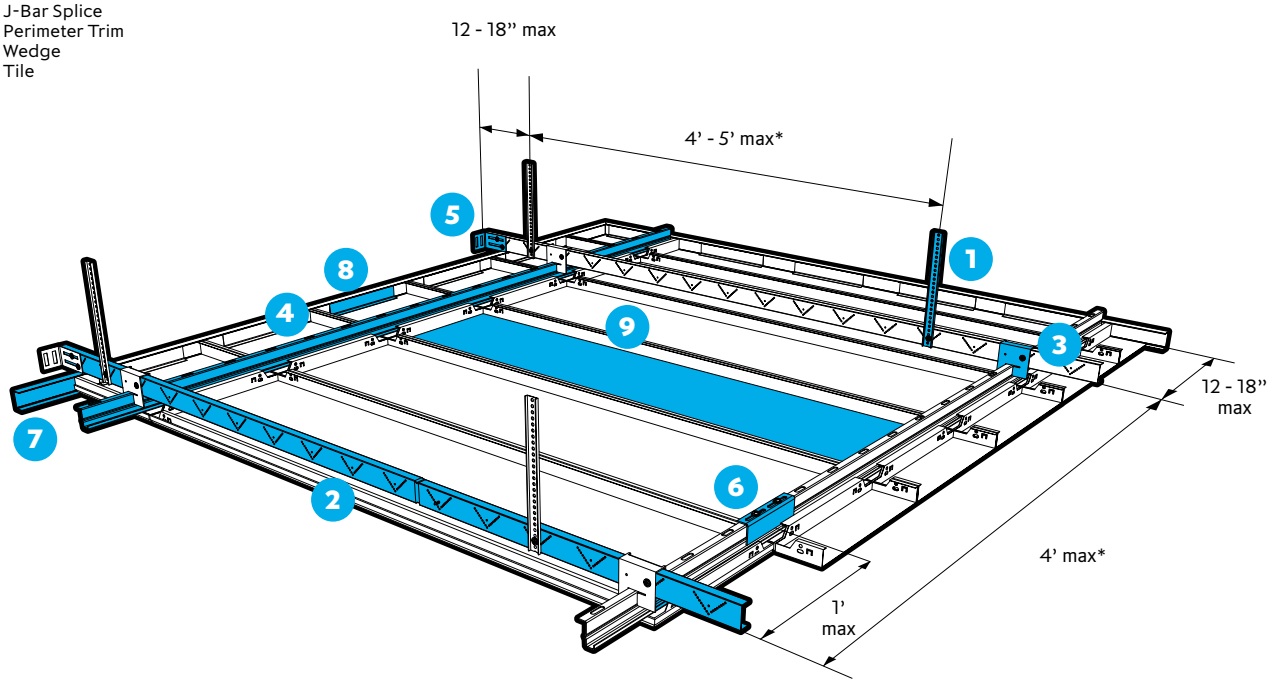
Please note Panels are supplied with a standard ⅛ inches wide, black gasket.

SAS**200**

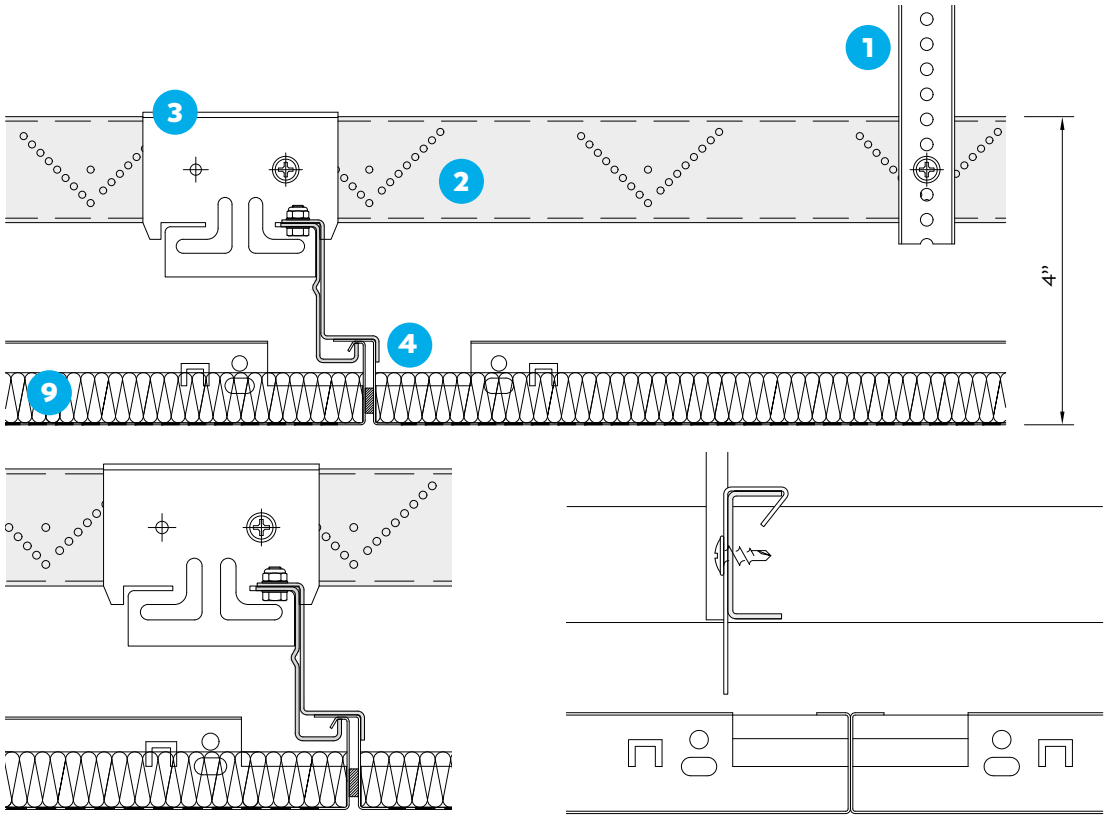
Perspective Drawing

1 Emac Hanger
2 Emac Channel
3 J-Bar to Channel Bracket
4 J-Bar
5 Emac Wall Anchor
6 J-Bar Splice
7 Perimeter Trim
8 Wedge
9 Tile

*Lightweight installations only, see page 248 for full details.



Section and detail drawings



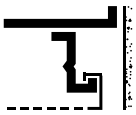
SAS**200**

KPMG, Sovereign Street

Location
Leeds, UK
Architect
Sheppard Robson

Contractor
Morgan Sindell/ISG Interior Exterior
Purpose
Commercial

SAS**205**



A concealed, hook-on suspended metal ceiling system specifically for corridor applications.

SYSTEM GROUP	GRID
	
Suspended Ceiling	Concealed Grid SAS J-Bar suspension

TILE	
	
Hook-on	Square edge

ACOUSTICS	
0.4 - 1.0	**15-41dB**
NRC	Dnfw*

ACCESS	SYSTEM WEIGHT	LIFE EXPECTANCY
	**1.8lbs/ft²** Approx.	**25yr**
Full – Lift and swing down	Based on 4' x 1' tiles 1 3⁄16" deep*	In excess of

***Note** SAS products are tested in accordance with UK standard Dnfw this means CAC will be 2-2.5dB greater. For more information, please see page 19

SAS PLUS

HAVE A QUESTION?

Configurable with other products. Call us.
Contact us on enquiries@sasint.us

SAS**205**

SAS205 is a SAS200 variant, designed specifically for corridor applications. The suspended ceiling system is supported at it's perimeters, up to a maximum of 10' widths.

Areas requiring frequent access for maintenance, such as hospitals, residential-blocks and hotels are ideal applications. SAS205 is also commonly specified for commercial offices to blend seamlessly with other SAS suspended ceiling systems.

Module Sizes
There are no standard tile sizes for SAS205. Tiles can be up to 10' in length and no less than 1' wide. Bespoke module sizes and shapes are available on request.

Access
Swing down and hang. Tiles can pivot on one edge to hang in place, offering full void access while keeping tiles safe from harm. This access method is subject to corridor height and width.

Finishes
SAS205 is available in all standard SAS finishes, please refer to page 110. Bespoke finishes are available on request.

Perforations
SAS205 can be manufactured with any standard SAS perforation. For our full range of perforations, please refer to page 84. Bespoke perforations are also an option.

Acoustic Materials
Acoustic mineral wool pad with black tissue face, foil back and sides. Other acoustic materials are available, please refer to page 17.

Service Integration
Tiles can be formed with apertures during manufacturing and post painted for integration with lights and other services.

Please note Loads in excess of 5.5lbs require independent suspension.

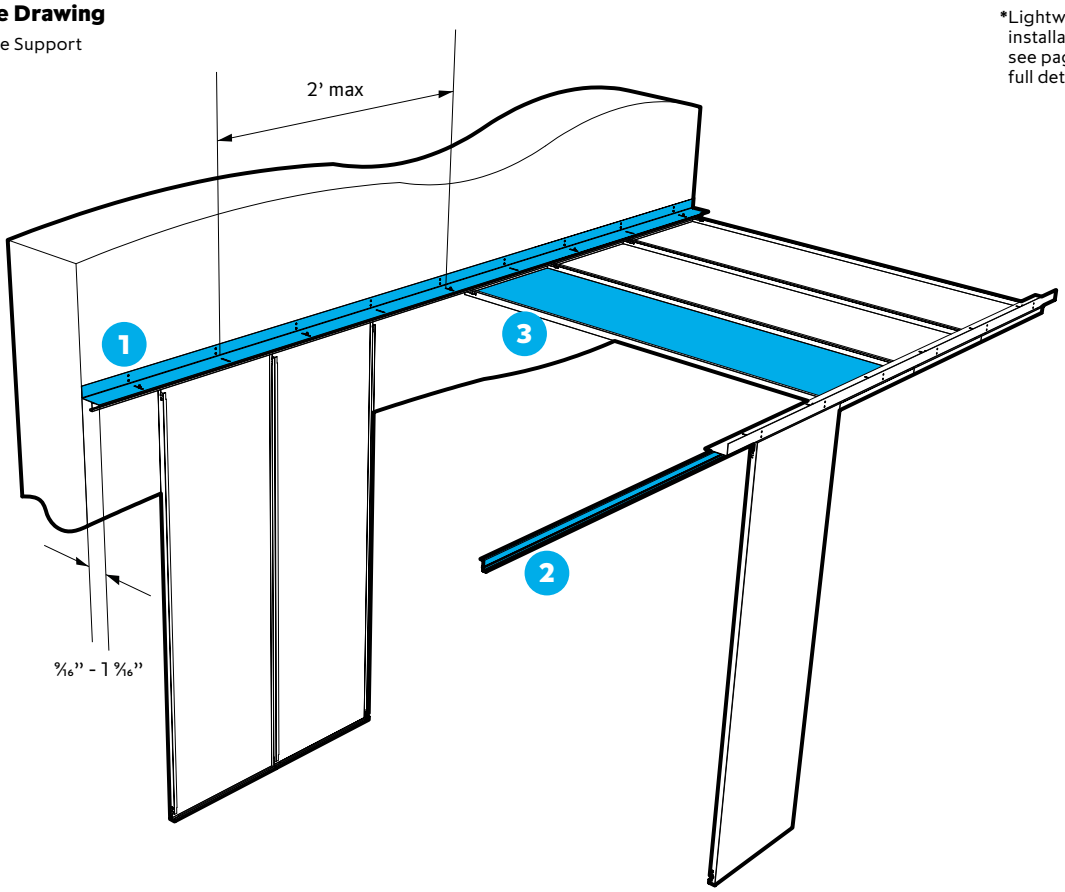
Technical Support
Please contact our technical team for all questions relating to access, security, bespoke features, acoustics, service integration or load support.

SAS**205**

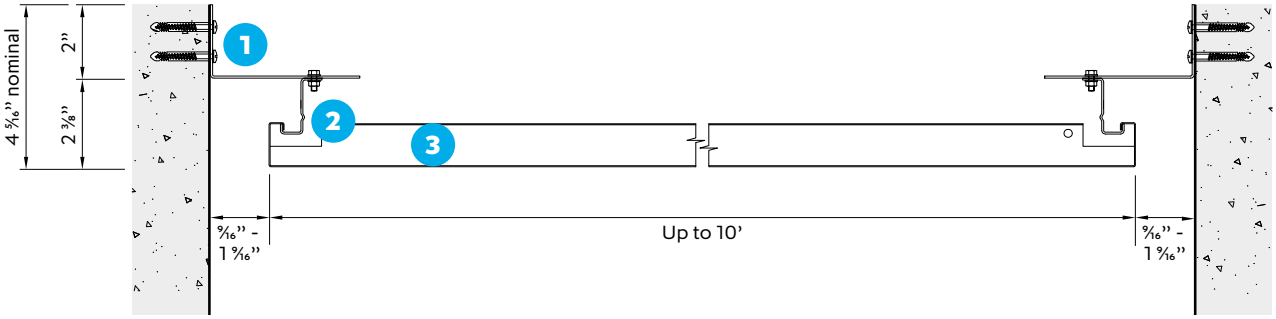
Perspective Drawing

1 Closure Angle Support
2 J-Bar
3 SAS205 Tile

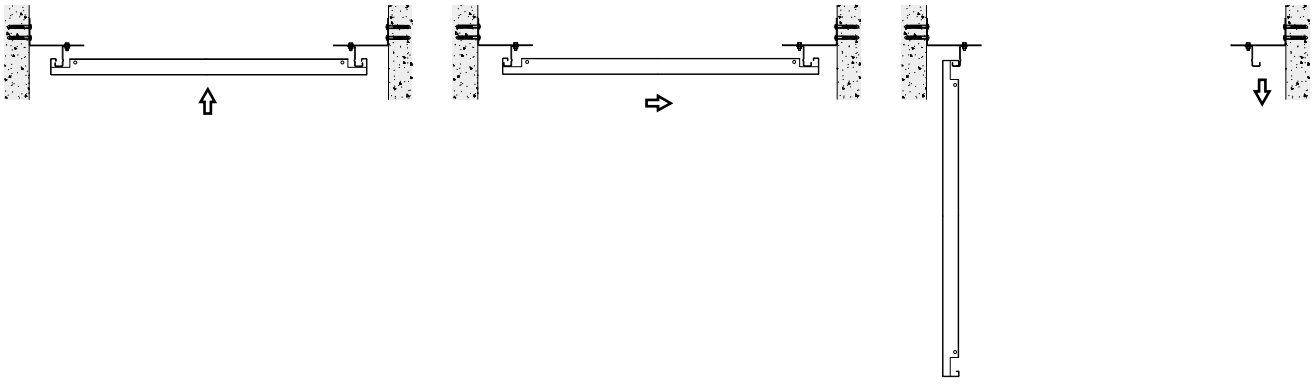
*Lightweight installations only, see page 248 for full details.



Section drawing



Swing Down Tile



SAS**205**

Louis Vuitton

Location
London, UK
Architect
David Chipperfield Architects

Contractor
BAM Construct UK Ltd
Purpose
Commercial

SAS320

An acoustic tile lay-in system without grid, intended for use in corridor or plasterboard surround applications.

SYSTEM GROUP	GRID
Suspended ceiling	None – suspended from trims, lights etc.

TILE	
Lay-in	Square edge

ACOUSTICS	
0.7 - 1.0	**15-50dB**
NRC	Dnfw*

ACCESS	SYSTEM WEIGHT	LIFE EXPECTANCY
Full – removable tiles	**1.4-1.9lbs/ft²**	**25yr**
	Based on 1 3/16 deep tiles*	In excess of

***Note** SAS products are tested in accordance with UK standard Dnfw this means CAC will be 2-2.5dB greater. For more information, please see page 19

SAS PLUS

HAVE A QUESTION?

Configurable with other products. Call us.
Contact us on enquiries@sasint.us

SAS**320**

A tile-only system, SAS320 has no grid work, reducing costs and allowing for quick and simple installations. The system is suspended from edge trims or other suitable features such as lights or grilles. Intended for corridor and plasterboard surround applications, SAS320 is ideal for residential and commercial sectors with targeted acoustic demands. Tiles can be of any size to suit most building modules and trimmed for improved aesthetics across undulating walls.

Module Sizes
There are no standard tile sizes for SAS320. Tiles can be up to 10' in length and no less than 1' wide.
Bespoke module sizes and shapes are available on request.

Access
Tiles can be lifted and removed for void access. No grid work offers clear access to services above.

Finishes
SAS320 is available in all standard SAS finishes, please refer to page 110. Bespoke finishes are available on request.

Perforations
SAS320 can be manufactured with any standard SAS perforation, and Ultramicro perforation for a brighter finish. For our full range of perforations, please refer to page 84. Bespoke perforations are also an option.

Acoustic Materials
Acoustic mineral wool pad with black tissue face, foil back and sides. Other acoustic materials are available, please refer to page 17.

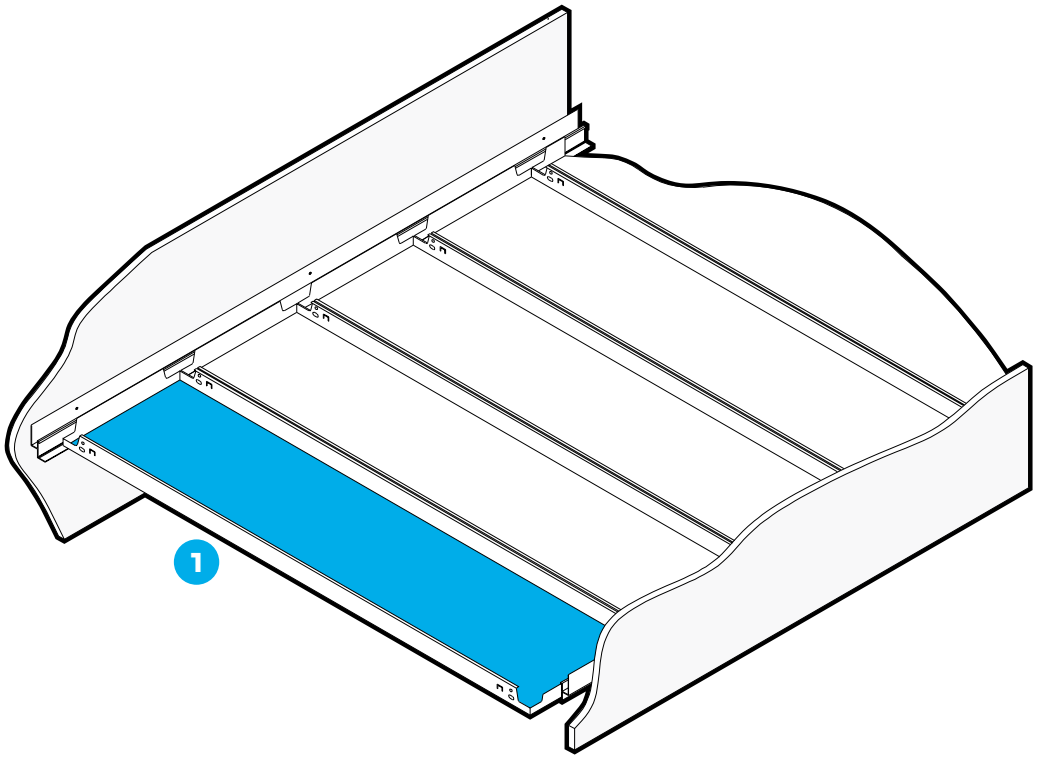
Service Integration
Tiles can be formed with apertures during manufacturing and post painted for integration with lights and other services.

Please note Loads in excess of 15lbs require independent suspension.

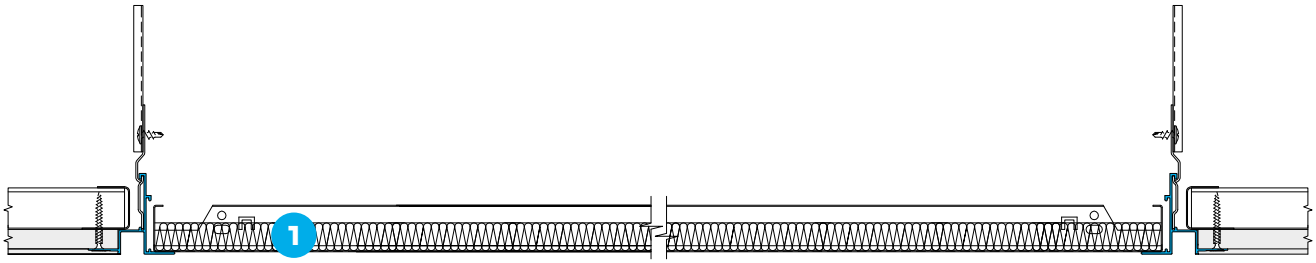
Technical Support
Please contact our technical team for all questions relating to access, security, bespoke features, acoustics, service integration or load support.

Perspective Drawing

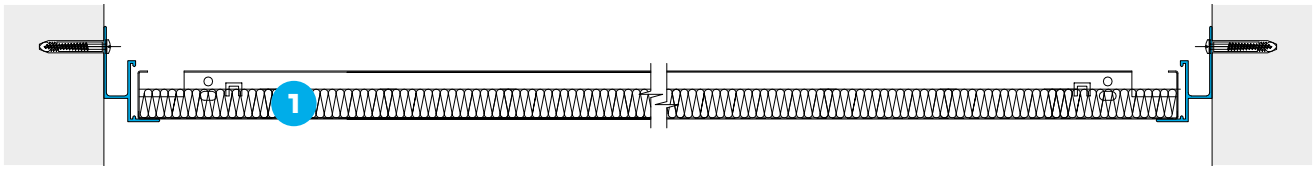
1 SAS320 Tile



Section Drawings



Suspended within plasterboard ceiling.



Suspended between walls using perimeter trims.
Perimeter trims also available.

SAS**320**

Zig Zag Building, London

Location
London, UK
Architect
HLW International

Contractor
BW Interiors Ltd
Purpose
Commercial

SAS330

A highly versatile, premium suspended ceiling system with lay-in tiles and exposed grid.

SYSTEM GROUP	GRID
Suspended ceiling	Exposed grid – SAS C-Profile or Omega C-Profile suspension

TILE
Lay-on

ACOUSTICS	
0.7 - 1.0	**15-50dB**
NRC	Dnfw*

ACCESS	SYSTEM WEIGHT	LIFE EXPECTANCY
Lift and tilt	Linear grid approx. **2.8lbs/ft²** Tartan grid approx. **3.2lbs/ft²*** Based on 5' x 5' module	**25yr** In excess of

***Note** SAS products are tested in accordance with UK standard Dnfw this means CAC will be 2-2.5dB greater. For more information, please see page 19

SAS PLUS

HAVE A QUESTION?

Configurable with other products. Call us.
Contact us on enquiries@sasint.us

SAS**330**

The industry benchmark suitable for any building module, the versatility of SAS330 has seen it specified in landmark projects worldwide. Available in linear or tartan grid forms, the system combines beautiful aesthetics with high performance in equal measure.

Delivering unsurpassed creative potential, ceiling tiles can be curved, coffered and manufactured in virtually any polygonal shape. They are available in a variety of high quality finishes, both plain and perforated. In addition, SAS330 offers service integration details sympathetic to the overall design.

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

Module Sizes
SAS330 ceiling tiles can be manufactured in increments up to 10' lengths. The specifier should note that maximum panel sizes are limited by industry tolerance guidelines.

Finishes
SAS330 is available in all standard SAS finishes, please refer to page 110. Bespoke finishes are available on request.

Perforations
SAS330 tiles can be manufactured with any standard SAS perforation pattern. For our full range of perforations, please refer to page 84. Bespoke perforations are also an option.

Acoustic Materials
Acoustic mineral wool pad with black tissue face, foil back and sides. Other acoustic materials are available depending on performance requirements, please refer to page 17.

Service Integration
Ceiling tiles and C-Profiles can be formed with apertures during manufacturing and post painted for integration with other services.

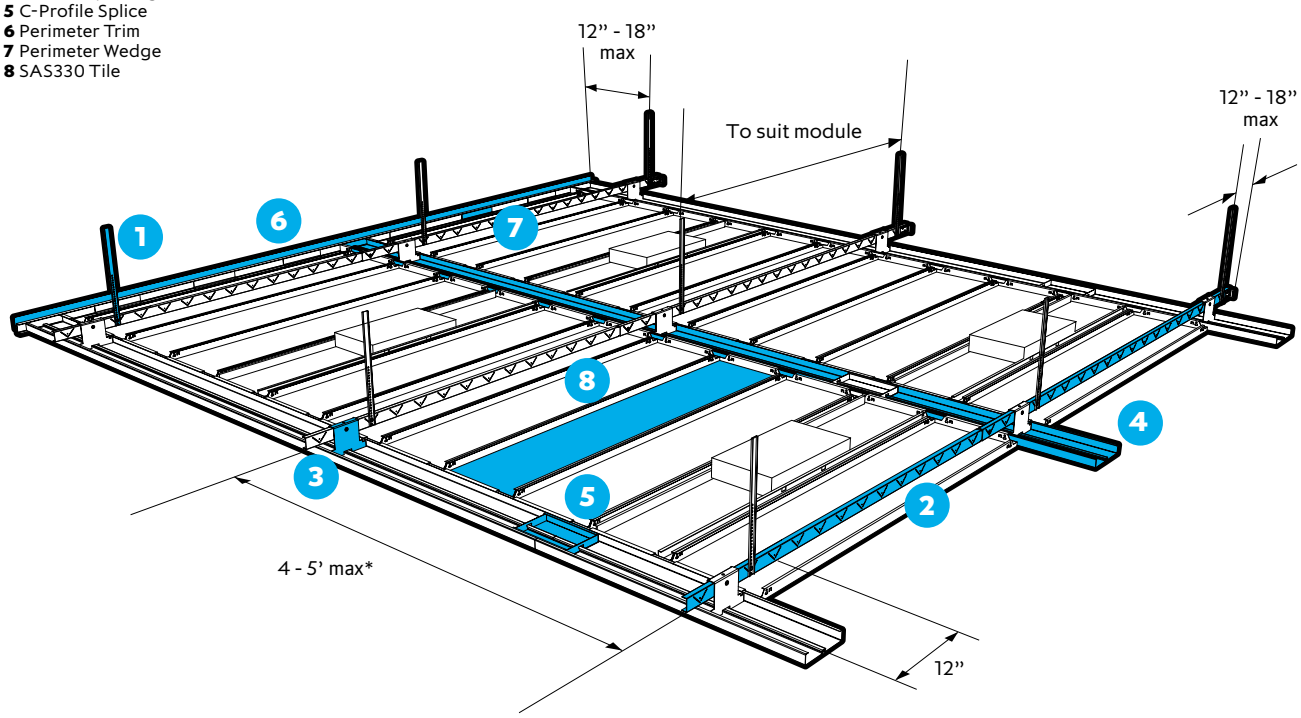
Please note Additional loads applied to SAS330 ceiling tiles must not exceed 15lbs. Anything in excess of 15lbs requires independent suspension.

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

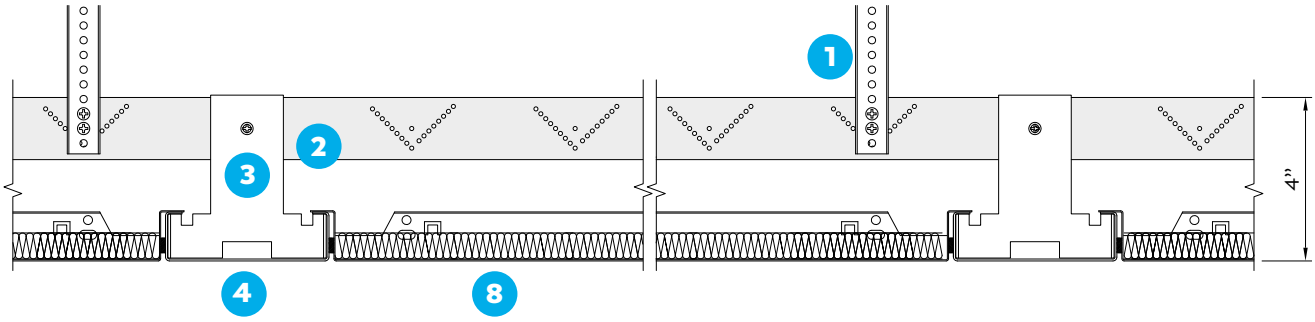
Perspective Drawing

Linear
1 Emac Hanger
2 Emac Channel
3 C-Profile Hook-over Suspension Bracket
4 C-Profile / Omega C-Profile
5 C-Profile Splice
6 Perimeter Trim
7 Perimeter Wedge
8 SAS330 Tile

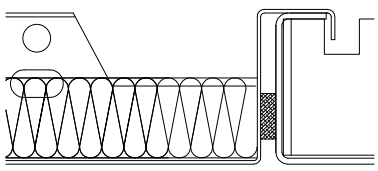
*Lightweight installations only, see page 249 for full details.



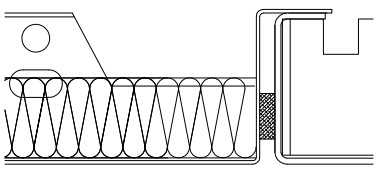
Section Drawing



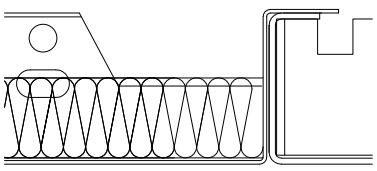
French hook



With gasket



Without gasket

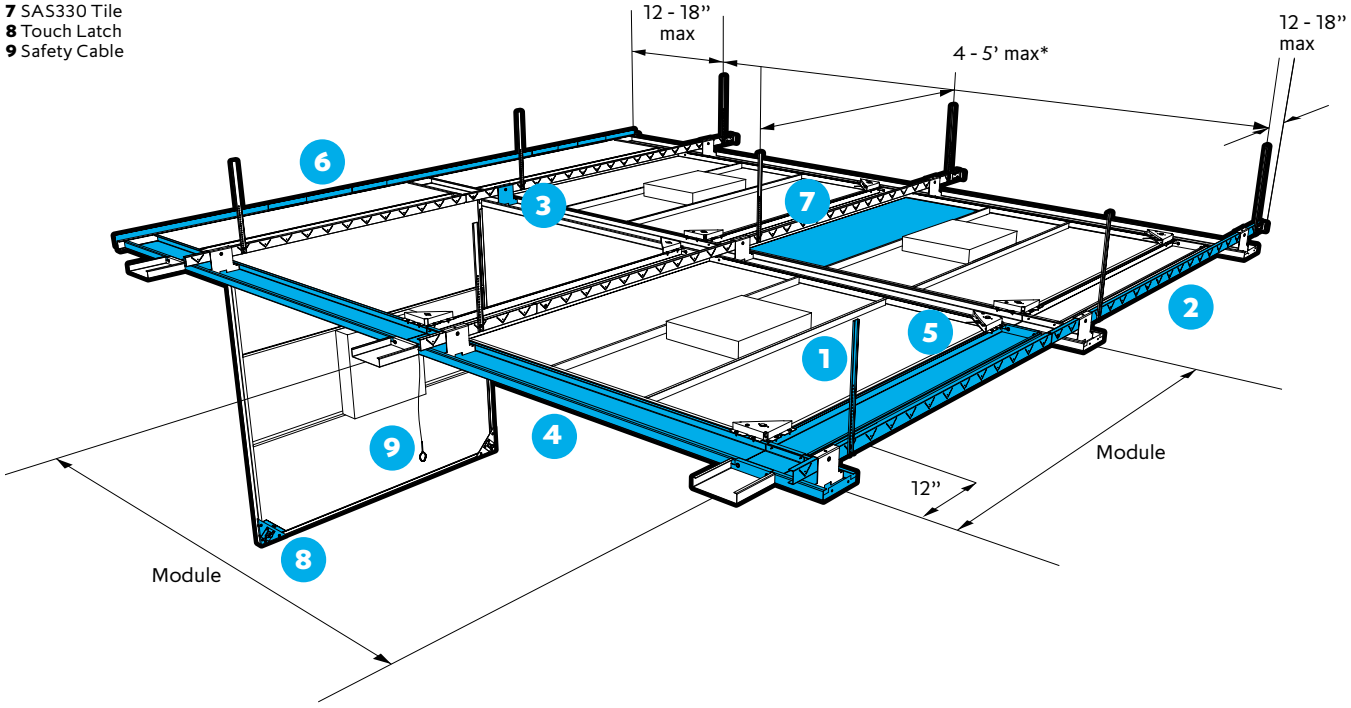


SAS**330** | Tartan

Perspective Drawing

Tartan
1 Emac Hanger
2 Emac Channel
3 C-Profile Suspension Bracket for threaded Rod
4 C-Profile / Omega C-Profile
5 C-Profile Noggin
6 Perimeter Trim
7 SAS330 Tile
8 Touch Latch
9 Safety Cable

*Lightweight installations only, see page 249 for full details.



Grid Options

Linear Grid
C-Profiles set out to run in one direction across the ceiling plane

Tartan Grid
C-Profiles set out to run in two perpendicular directions (cross noggins) across the ceiling plane.

C-Profile
A flush, smooth finish C-Profile available in a range of widths up to 1'.

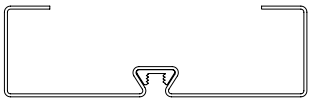
Omega C-Profile
Featuring a continuous thread-form facilitating easy location and relocation of partitioning. By means of an ¼" bolt, partitioning can be relocated without causing damage to the ceiling. Also available in widths up to 1'.

C-Profiles in widths ≤4" can be open ended, using splices to connect longer runs. C-Profiles in excess of these widths must be closed ends, butt-jointed and bolted to other profiles. A range of narrower C-Profile and Omega C-Profile aluminum extrusions are available if preferred.

An optional foam gasket provides a tight seal between profile and tile. Gasket is supplied loose for on-site installation.

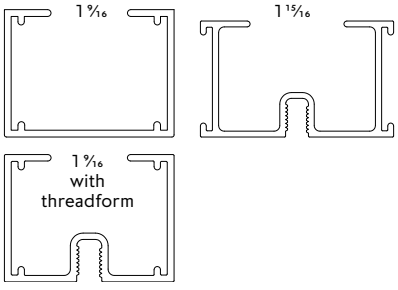
C-Profile Options
Applicable to both linear and tartan.

C-Profile



Omega C-Profile

Extruded Aluminum Profiles



Touch Latch and Pivot Pin

This mechanism allows access by simply pushing the panel up to release. If necessary, a fixed bolt can be unscrewed to completely remove the tile.

Hinge Notch / French Hook

This integral feature allows tiles to be hung vertically from C-Profiles which provides unobstructed ceiling void access. Complete panel runs can be hung together during maintenance without causing damage to the tile.

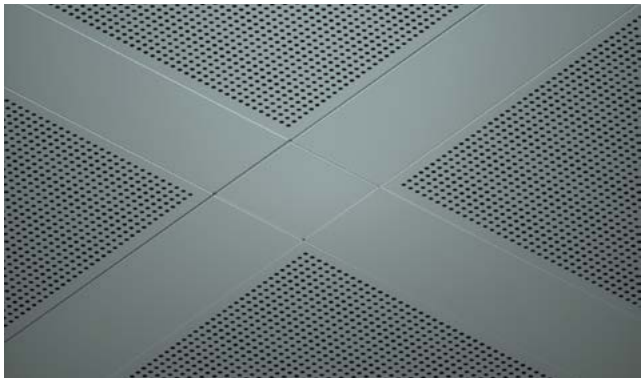
Flying Arm

This is a hook-over bracket supplied fixed to the upstand of the panel. Access is obtained by pushing up the opposite end of the panel and sliding back. This reveals the flange which can then be lowered to a vertical position (lift & tilt).

End Arm

Similar to the flying arm, a hook plate is fixed to the tile edge (supplied loose for on-site fixing by installer). The tile can be completely lifted out of the grid and hooked back over the C-Profile, safely off the ground.

Mock Crossing



Traditional tartan grid systems make the use of trim strips and crossing boxes suspended from threaded rods and hanger brackets. This detail can be replicated by pressing mock crossing details into the C-Profile. Using C-Profiles instead of crossing boxes provides a far more rigid and durable structure. C-Profiles also provide flexibility to avoid costly bridging around ductwork in the void.

SAS**330**

1 Angel Court

Location
London, UK
Architect
Felcher Priest

Contractor
Mace Group Ltd / COMO
Purpose
Commercial

SAS380

A high performance, heavy load suspended ceiling system with exposed grid and lay in tiles.

SYSTEM GROUP	GRID
	
Suspended ceiling	Exposed grid – SAS C-Profile or Omega C-Profile suspension

TILE

Hook-over

ACOUSTICS	
0.7 - 1	**15-50dB**
NRC	Dnfw*

ACCESS	SYSTEM WEIGHT	LIFE EXPECTANCY
	**2.8lbs/m²**	**25yr**
Lift and tilt	Based on 4' x 4' module	In excess of

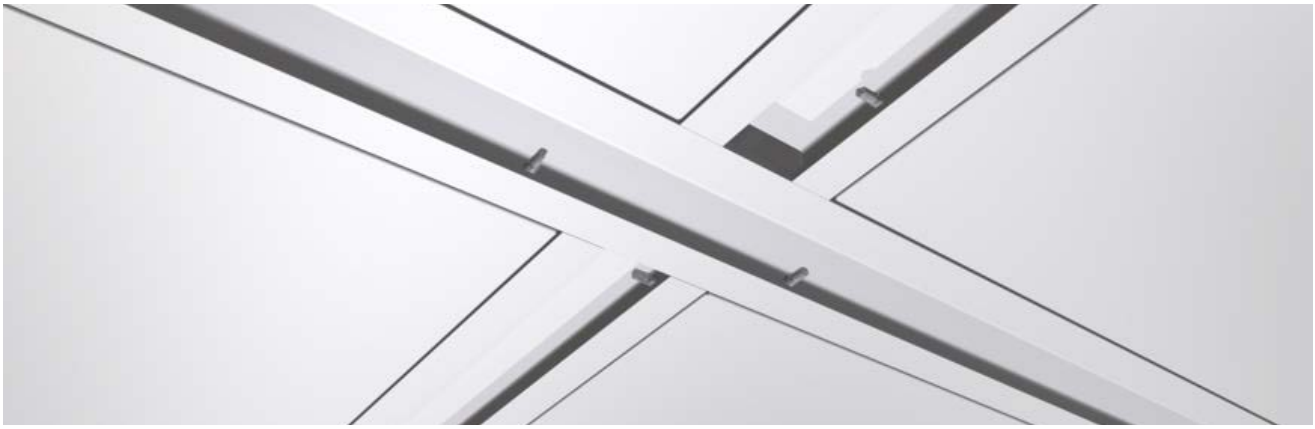
***Note** SAS products are tested in accordance with UK standard Dnfw this means CAC will be 2-2.5dB greater. For more information, please see page 19

SAS PLUS

HAVE A QUESTION?

Configurable with other products. Call us.
Contact us on enquiries@sasint.us

SAS**380**



SAS380 is an exposed grid suspended ceiling system for dual layer or heavy load requirements. The reinforced grid is ideal for service integration, capable of supporting cable trays and lights directly from the grid.

A performance system specifically designed for highly demanding applications, SAS380 is ideal for Data Centre specifications.

Access
Tile can simply be lifted and removed from the grid. No need for specialist tools.

Module Sizes
Standard module sizes are 4' x 4' grid. Bespoke panels sizes and grid arrangements are possible. Please contact our technical team for further details.

Finishes
SAS380 is available in all standard SAS finishes and bespoke finishes are available on request. For further details please refer to page 110 of the Metal Ceilings brochure, visit our website or contact our sales team.

Perforations
SAS380 can be manufactured with any standard SAS perforation. For our full range of perforations, please refer to page 84 of the Metal Ceilings brochure, or visit our website. Bespoke perforations are also an option.

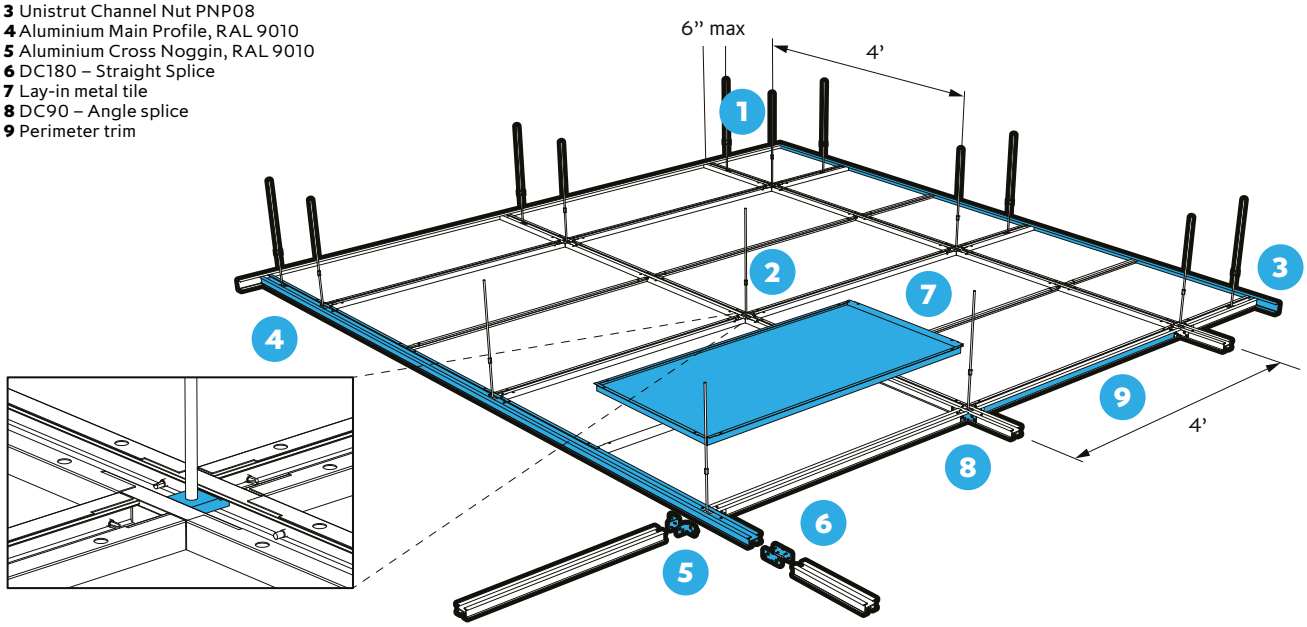
Acoustic Materials
Acoustic mineral wool pad with black tissue face, foil back and sides. Other acoustic materials are available, please refer to page 17 of the Metal Ceilings brochure or visit our website.

Service Integration
Tiles can be formed with apertures during manufacturing and post painted for integration with lights and other services. Due to the high load bearing capacity of the SAS380, lights can be suspended directly from the grid.

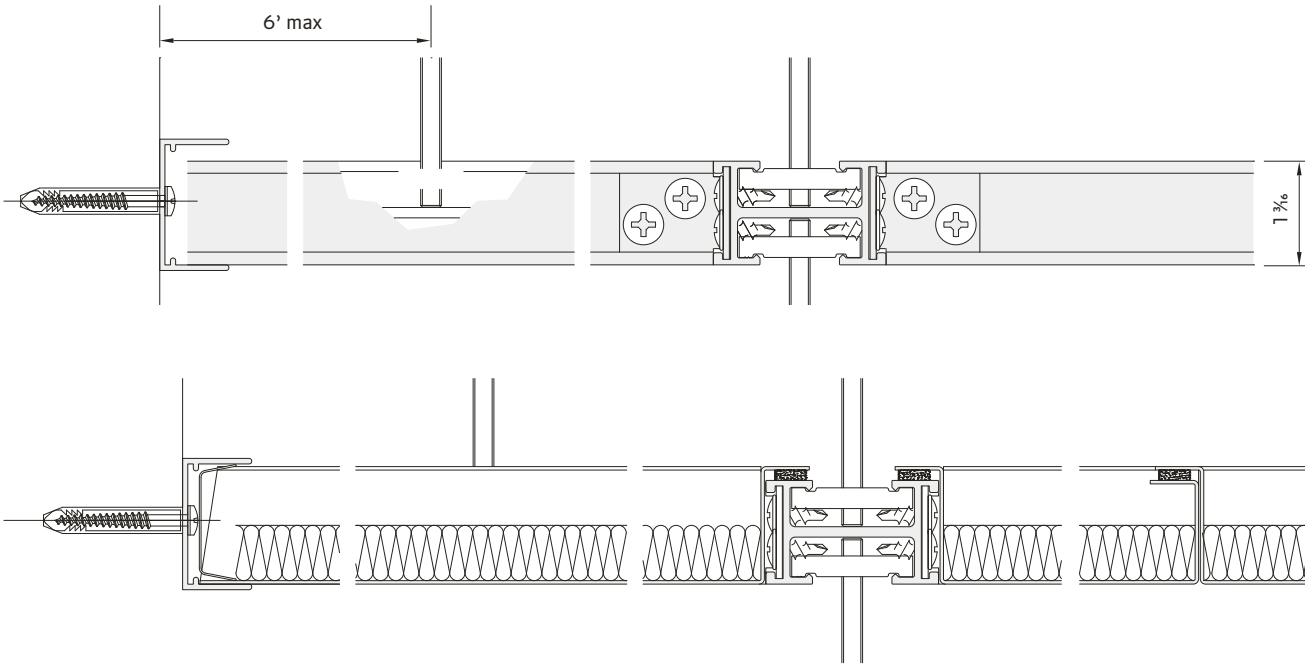
Technical Support
Load capacity has been calculated precisely based on grid configuration. Any changes to grid configurations are likely to impact performance. Please contact our technical team for assistance and advice with any necessary alterations. Our technical team can also answer all questions relating to access, security, bespoke features, acoustics, service integration and/or load support.

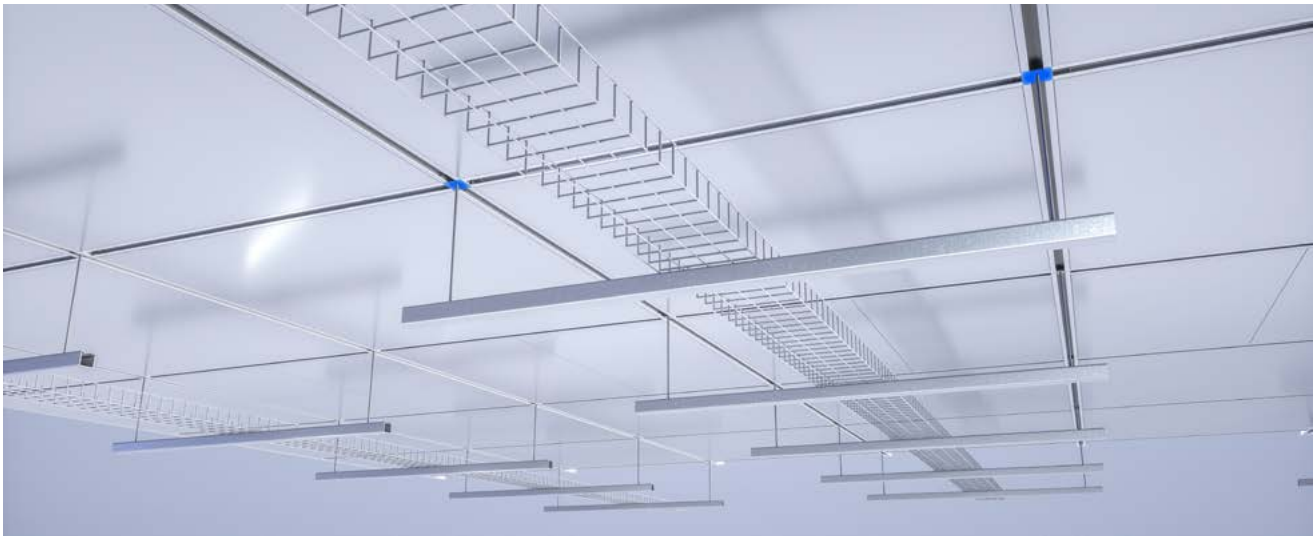
Perspective Drawing

Linear
1 Threaded Rod
2 Rod Connector
3 Unistrut Channel Nut PNP08
4 Aluminium Main Profile, RAL 9010
5 Aluminium Cross Noggin, RAL 9010
6 DC180 – Straight Splice
7 Lay-in metal tile
8 DC90 – Angle splice
9 Perimeter trim

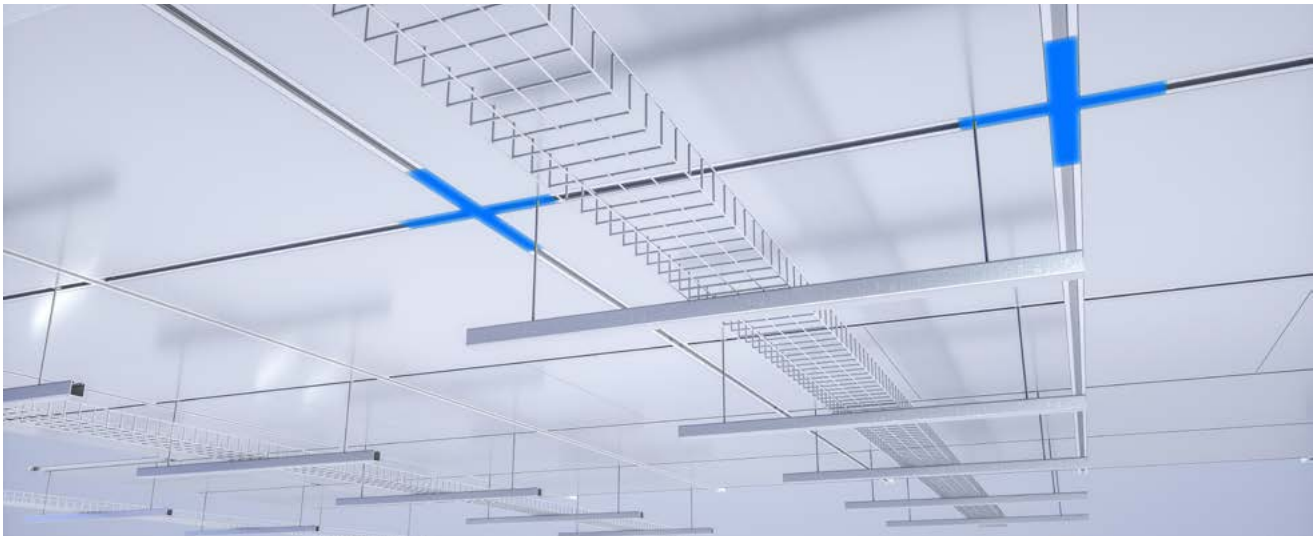


Section Drawing

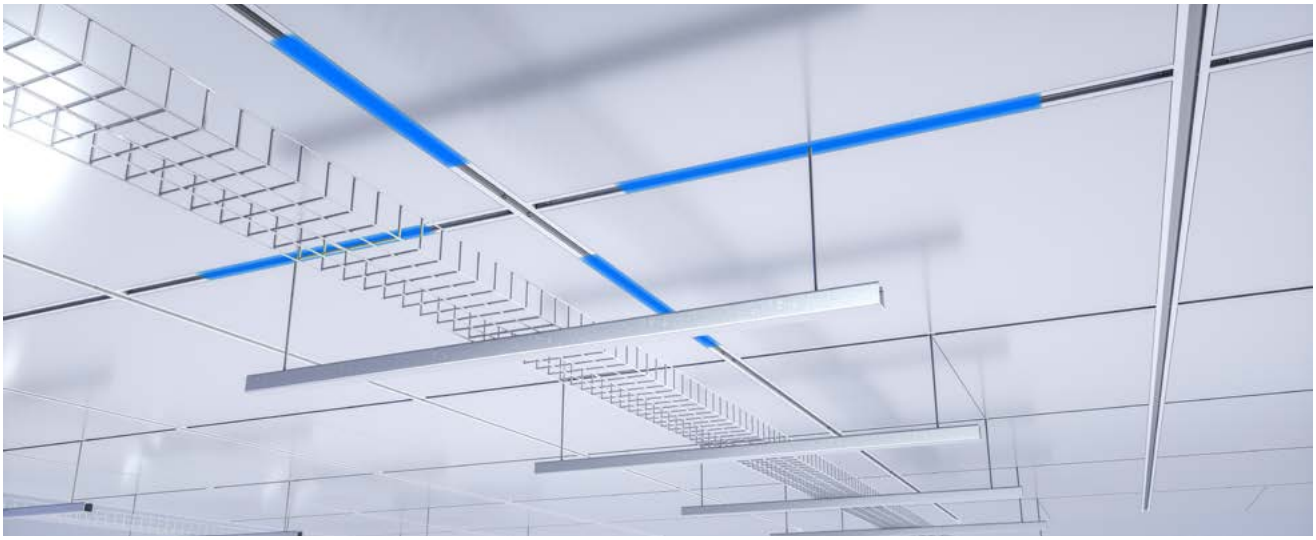




Load Case Zone 1 - 264lbs maximum load at each grid intersection, directly below grid suspension.

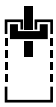


Load Case Zone 2 -132lbs maximum load within 7 7/8" of grid suspension in the same bay.



Load Case Zone 3 - 132lbs maximum anywhere outside of zone 2, where load must be in adjacent bays

SAS**500**



A rectilinear baffle system offering acoustic performance in exposed soffit interiors.

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

TILE	
	
Enclosed baffle	Square edge

ACOUSTICS	
0.7 - 1.0	**N/A**
NRC	Dnfw*

ACCESS	SYSTEM WEIGHT	LIFE EXPECTANCY
Baffles are open systems	**3.8lbs/ft** + Grid	**25yr**
	Based on nominal 4ft baffle	In excess of

***Note** SAS products are tested in accordance with UK standard Dnfw this means CAC will be 2-2.5dB greater. For more information, please see page 19.

SAS PLUS

HAVE A QUESTION?

Configurable with other products. Call us.
Contact us on enquiries@sasint.us

SAS**500**

SAS500 acoustic baffles offer a visually engaging alternative to suspended acoustic ceiling systems, ideal for exposed soffit areas. Baffles offer good sound absorption, effectively controlling reverberation within these highly sound reflective interiors. Available in numerous colors and sizes, the baffles can be suspended at a range of heights for further visual interest.

Baffle Sizes
Baffles can come in a variety of lengths and depth, minimum 4 inches maximum 18 inches. Bespoke baffle sizes and shapes are also 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
SAS500 is available in all standard SAS finishes, please refer to page 110. Bespoke finishes are available on request.

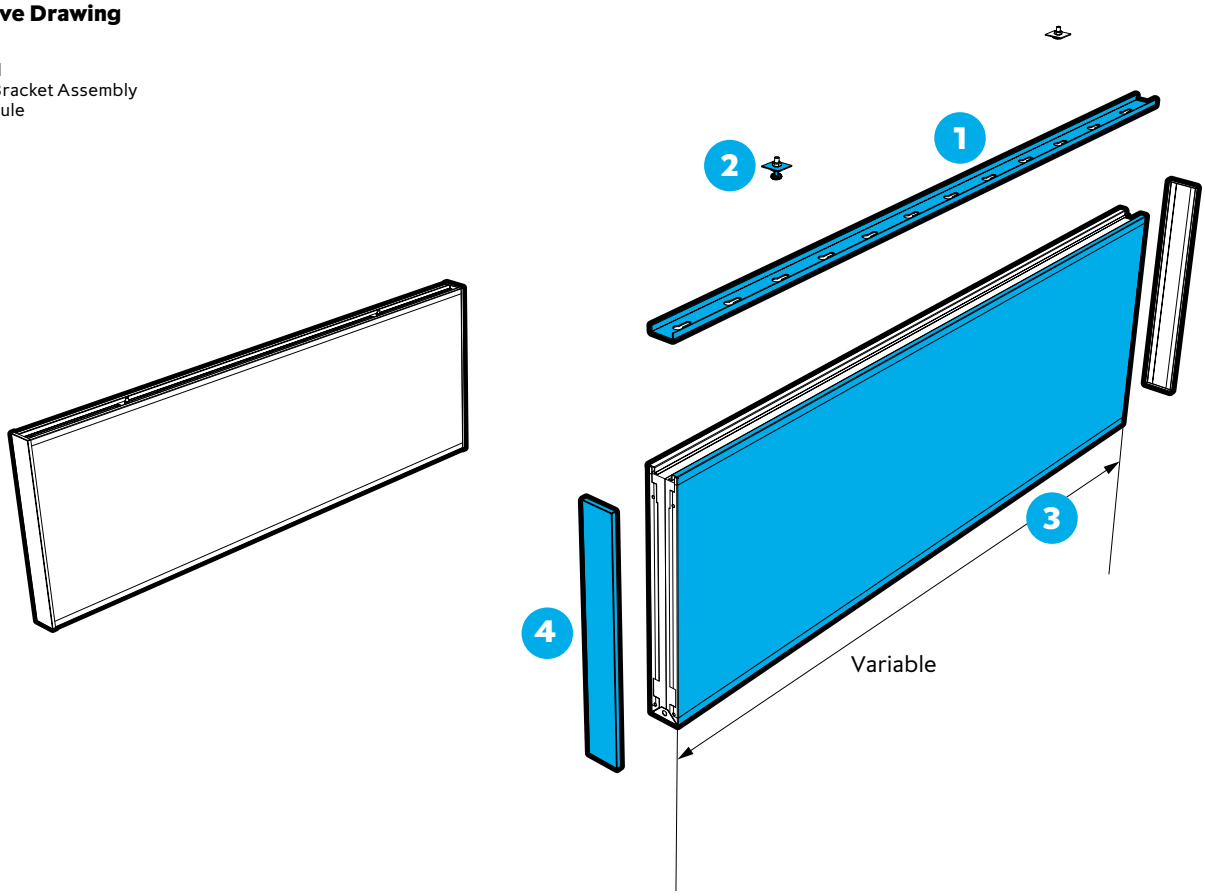
Perforations
SAS500 can be manufactured with any standard SAS perforation. For our full range of perforations, please refer to page 84. Bespoke perforations are also an option.

Acoustic Materials
Acoustic mineral wool pad with black tissue face. Other acoustic materials are available, please refer to page 17.

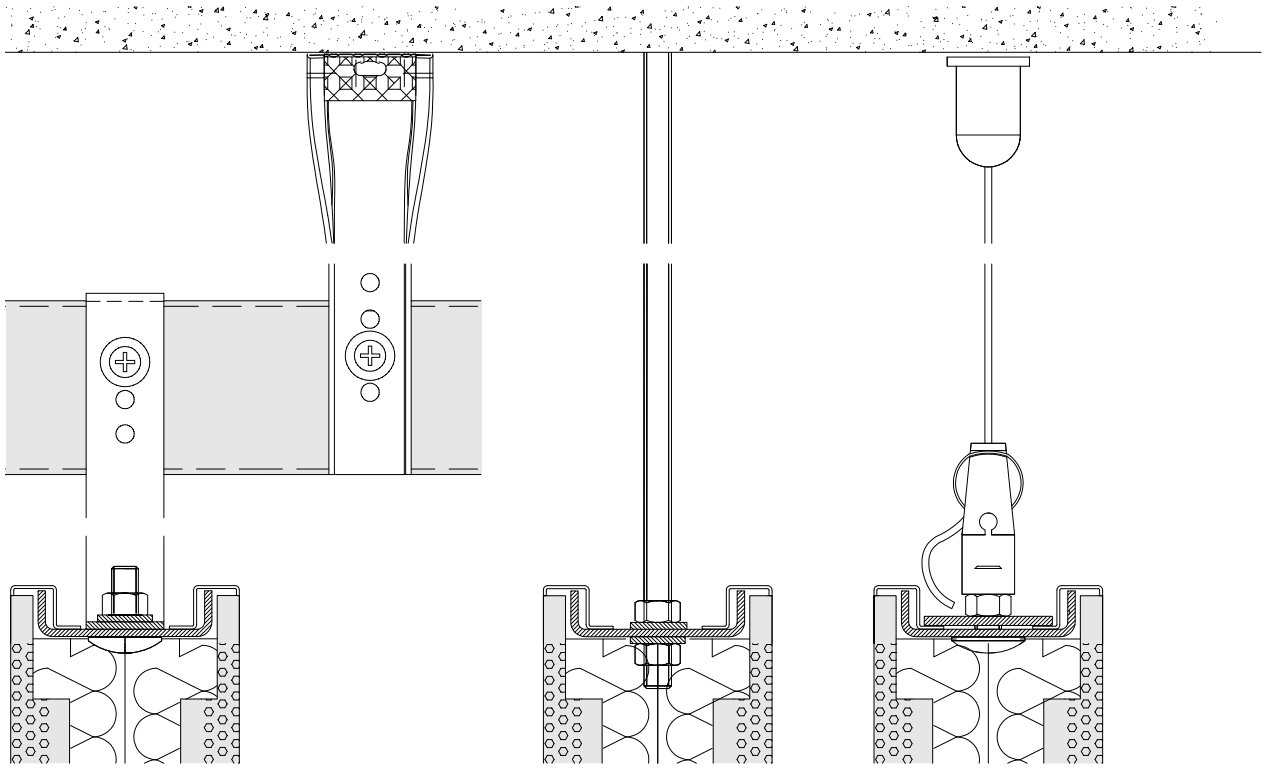
Technical Support
Please contact our technical team for all questions relating to access, security, bespoke features, acoustics, service integration or load support.

Perspective Drawing

Linear
1 Carrier Rail
2 Clamping Bracket Assembly
3 Baffle Module
4 End Cap



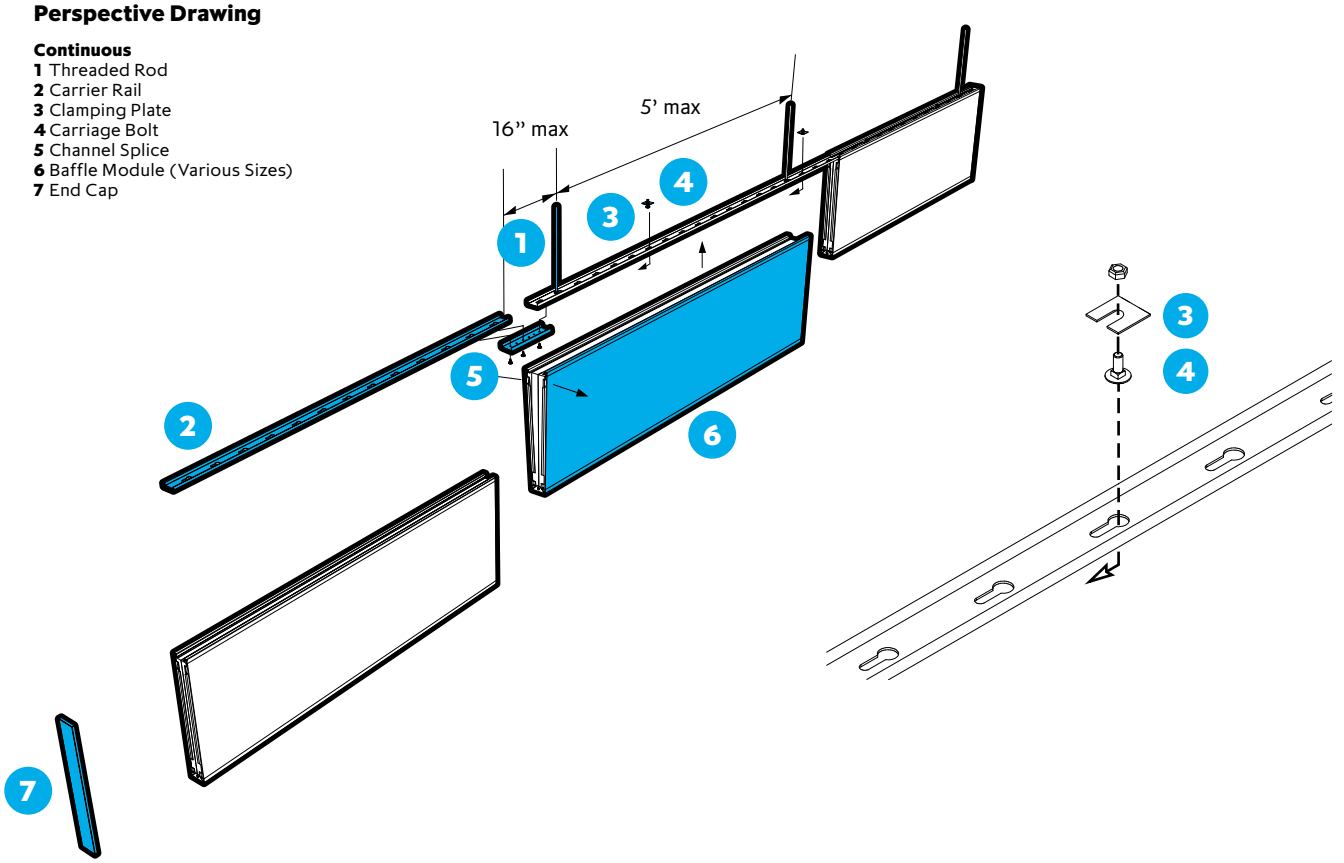
Grid Hanging | **Threaded Rod Hanger** | **Cable Hanging**



SAS**500** | Continuous

Perspective Drawing

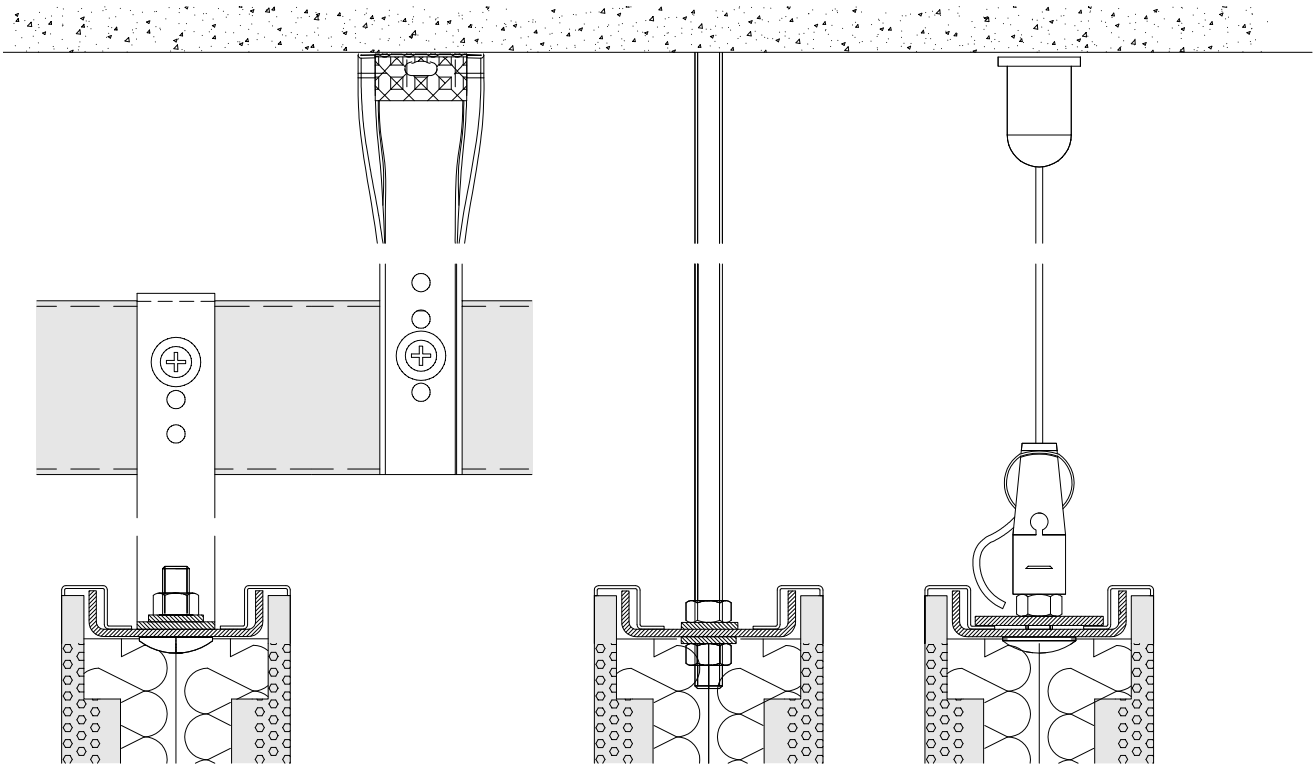
Continuous
1 Threaded Rod
2 Carrier Rail
3 Clamping Plate
4 Carriage Bolt
5 Channel Splice
6 Baffle Module (Various Sizes)
7 End Cap



Grid Hanging

Threaded Rod Hanger

Cable Hanging

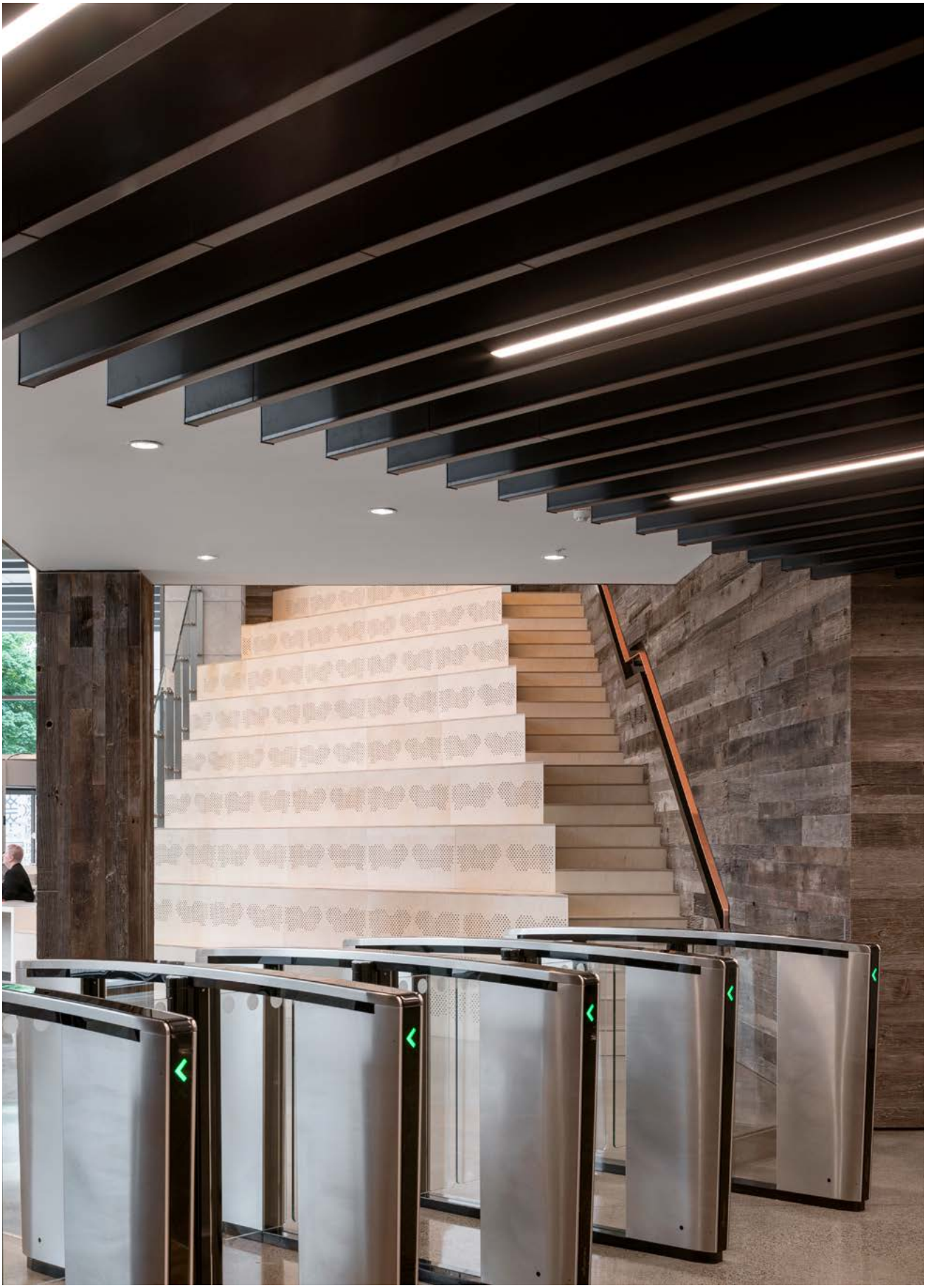


SAS**500**

Lendlease, Barangaroo

Location
Sydney, Australia
Architect
Hassell Studio Sydney

Contractor
Lendlease
Purpose
Commercial



SAS**500**

LinkedIn EMEA HQ

Location
Dublin, Ireland
Architect
RKD Architects

Contractor
Walls Construction
Purpose
Commercial

SAS**510**

A waveform baffle system offering acoustic performance in exposed soffit interiors.

SYSTEM GROUP	SUSPENSION METHOD
	Suspended from carrier rail using grid hangings, threaded rod or cable hangers
Baffle	

TILE	
	
Enclosed baffle	Square edge

ACOUSTICS	
0.7 - 1.0	**N/A**
NRC	Dnfw

ACCESS	SYSTEM WEIGHT	LIFE EXPECTANCY
Baffles are open systems	**6.4lbs/ft** + Grid	**25yr**
	Based on standard 3'6" x 16" x 2" baffle	In excess of

SAS PLUS

HAVE A QUESTION?

Configurable with other products. Call us.
Contact us on enquiries@sasint.us

SAS**510**

SAS510 acoustic waveform baffles offer a visually engaging alternative to suspended acoustic ceiling systems, ideal for exposed soffit areas. Baffles offer good sound absorption, effectively controlling reverberation within these highly sound reflective interiors. The radii of the baffles can form individual elements or continual rhythmic lines stretching across a ceiling plane.

Baffle Sizes
Baffles can come in a variety of lengths and depth, minimum 4 inches maximum 18 inches. Bespoke baffle sizes and shapes are also 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.

Baffle Shapes
There is no standard shape for SAS510, although waveforms are predominant. For waveform patterns, we would not recommend radii less than 3' 6".

SAS510 can also be formed into other, bespoke shapes. Please contact our technical design team for more information.

Finishes
SAS510 is available in all standard SAS finishes, please refer to page 110. Bespoke finishes are available on request.

Perforations
SAS510 can be manufactured with any standard SAS perforation. For our full range of perforations, please refer to page 84. Bespoke perforations are also an option.

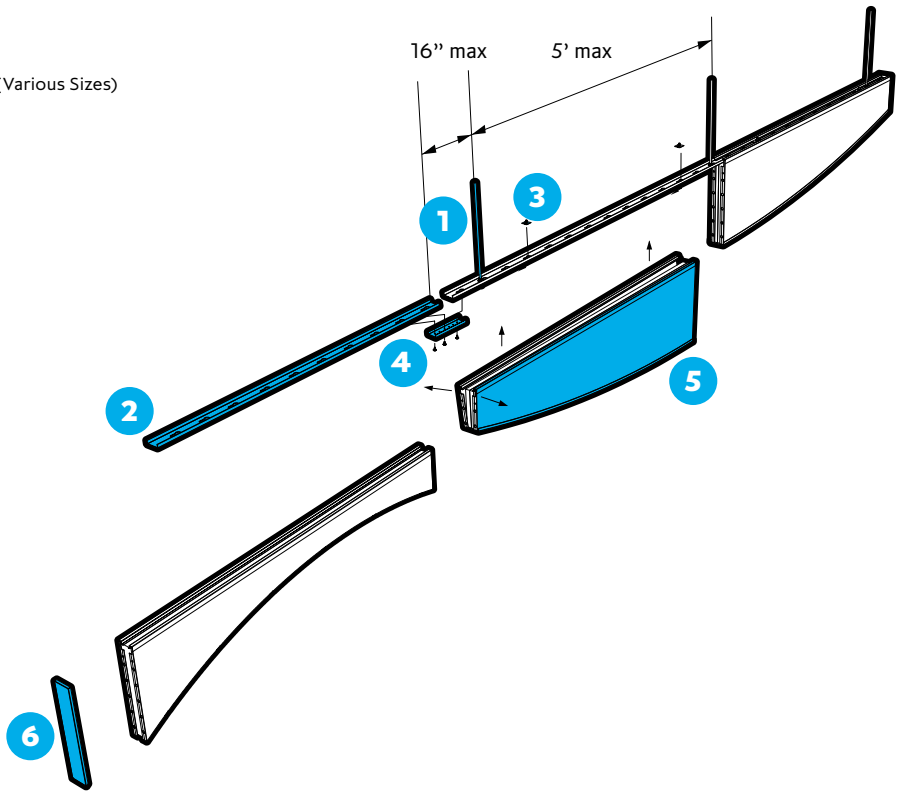
Acoustic Materials
Acoustic mineral wool pad with black tissue face, foil back and sides. Other acoustic materials are available, please refer to page 17.

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

SAS510

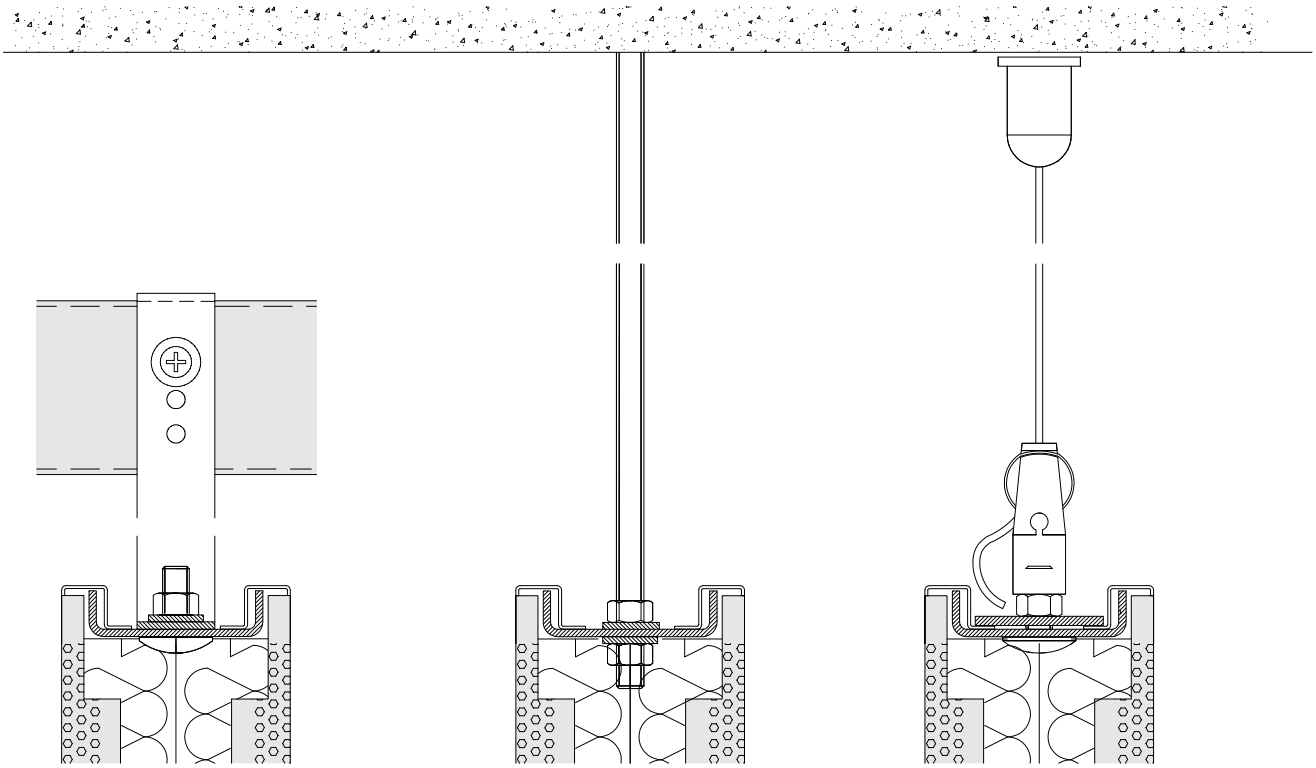
Perspective Drawing

1 Threaded Rod
2 Carrier Profile
3 Clamping Plate
4 Channel Splice
5 Baffle Module (Various Sizes)
6 End Plate



*Lightweight installations only, see page 250 for full details.

Grid Hanging | **Threaded Rod Hanger** | **Cable Hanging**



SAS**510**

Birmingham New Street Station

Location
Birmingham, UK
Architect
Atkins

Contractor
Mace Ltd
Purpose
Transport

SAS600

Modular plain or perforated acoustic raft and modules with service integration options.

SYSTEM GROUP	SUSPENSION METHOD
	Threaded rod with suspension channel
Ceiling rafts	

PANEL	
	
Hook-on	Square or Rectangle

ACOUSTICS	
Design dependent	Design dependent
NRC	Dnfw

ACCESS	SYSTEM WEIGHT	LIFE EXPECTANCY
Rafts are open systems. When grouped as islands, full access is available	**2.8**lbs/ft² Linear	**25**yr
	Based on 4' x 2' tiles	In excess of

SAS PLUS

HAVE A QUESTION?

Configurable with other products. Call us.
Contact us on enquiries@sasint.us

SAS**600**

SAS600 offers a variety of applications from the purely aesthetic to high performance acoustics with service integration. The rafts and modules are available in a range of curved, flat or angled profiles as standard. Bespoke designs can be achieved to realise highly aspirational interiors.

The flexibility of SAS600 rafts and modules makes them ideal for both new build and retrofit acoustic solutions.

Module Sizes
Length: 1' - 10'
Width: 1' - 4'

Module Shapes
Rafts and modules can be manufactured either flat or curved. Curved designs allow a larger acoustic area to be incorporated into the design.

Bespoke module sizes and shapes are available on request.

Finishes
SAS600 is available in all standard SAS finishes, please refer to page 110. Bespoke finishes are available on request.

Perforations
SAS600 can be manufactured with any standard SAS perforation pattern. For our full range of perforations, please refer to page 84. Bespoke perforations are also an option.

Acoustic Materials
Tissue wrapped acoustic mineral wool pad. Other acoustic materials are available, please refer to page 17.

Service Integration
Rafts and modules can be manufactured with other M&E services.

Cross Ventilation
Ceiling mounted acoustic rafts provide acoustic absorption whilst allowing the concrete soffit to be fully exposed for energy-efficient natural cross ventilation cooling.

Combination Ceilings
Rafts and modules provide high levels of sound absorption. For demanding environments they can be installed in conjunction with a suspended metal ceiling.

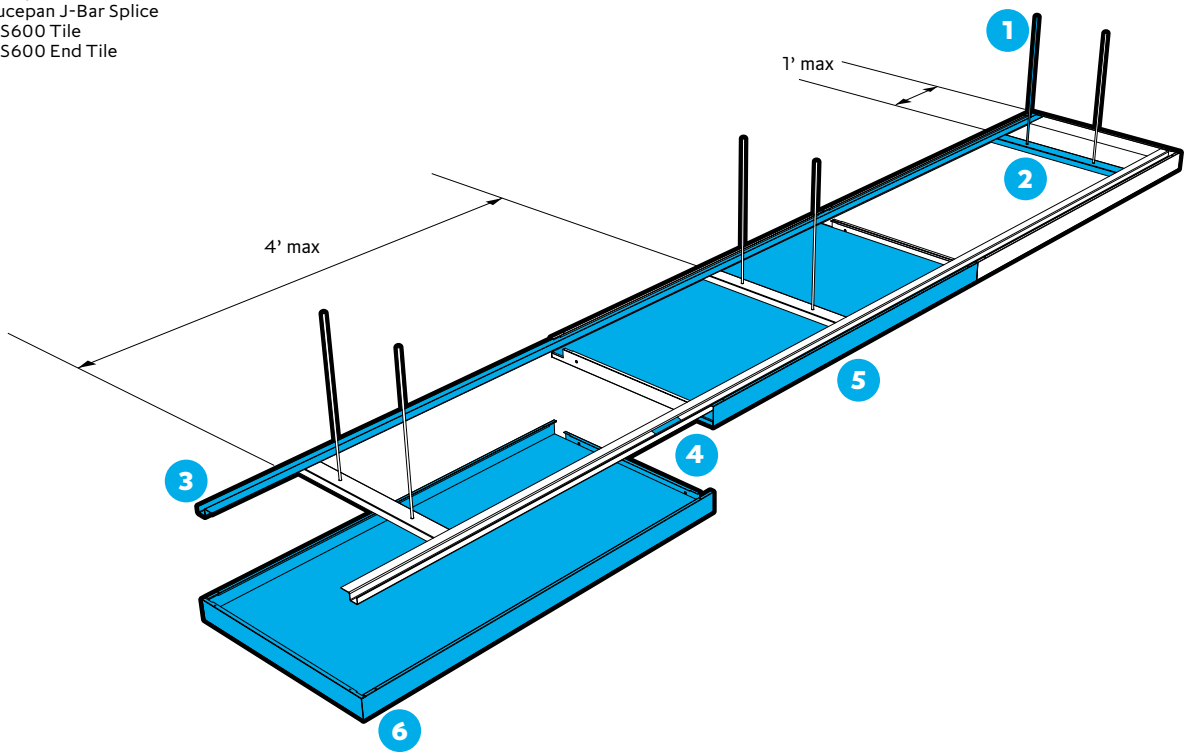
Technical Support
Please contact our technical team for all questions relating to access, security, bespoke features, service integration or load support.

SAS600

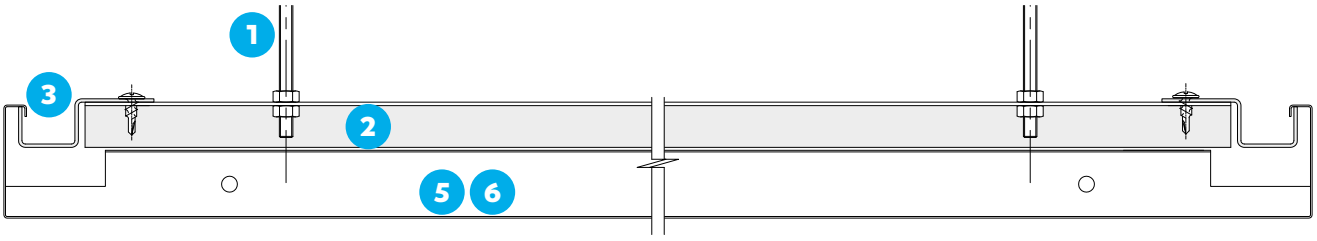
Perspective Drawing

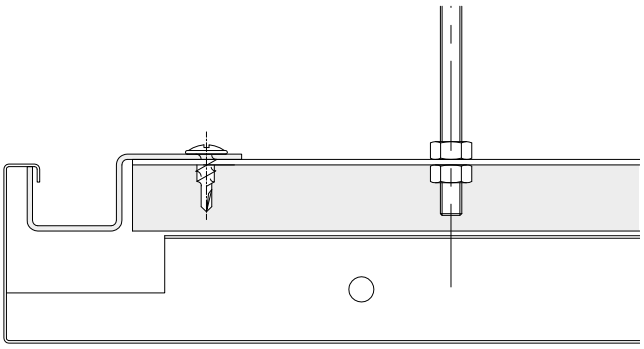
1 Threaded Rod
2 Support Channel
3 Saucepan J-Bar
4 Saucepan J-Bar Splice
5 SAS600 Tile
6 SAS600 End Tile

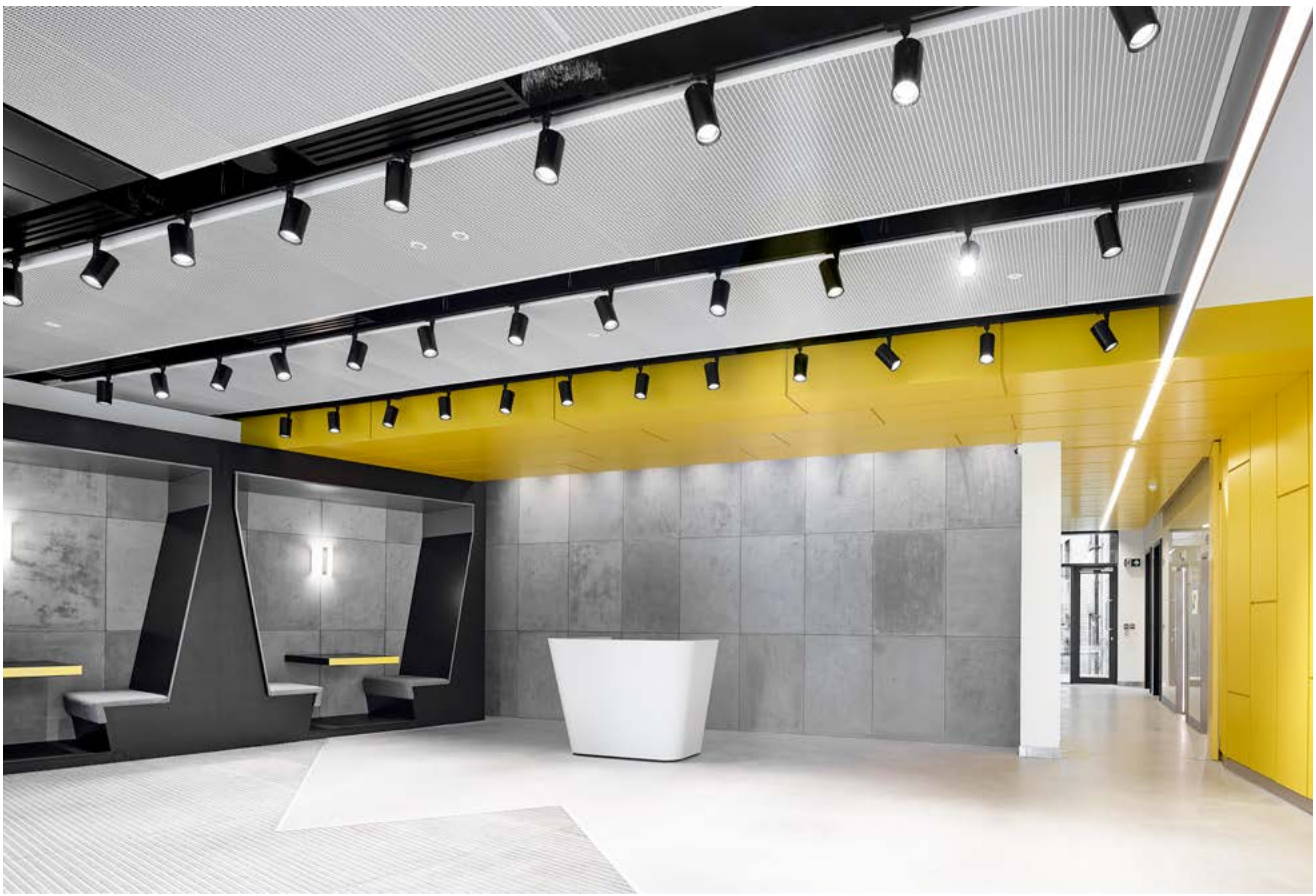
*Lightweight installations only, see page 250 for full details.



Section and detail drawings







SAS**600**

2 Semple Street

Location
Edinburgh, Scotland
Architect
Michael Laird Partnership

Contractor
McLaughlin and Harvey
Purpose
Commercial

SAS610

Acoustic raft with service integration options.

SYSTEM GROUP	SUSPENSION METHOD
	Threaded rod or wire rope
Ceiling rafts	

PANEL

Rectangle

ACOUSTICS	
Design dependent	Design dependent
NRC	Dnfw

ACCESS	SYSTEM WEIGHT	LIFE EXPECTANCY
Rafts are open systems. When grouped as islands, full access is available	**30**lbs/item	**25**yr
	Based on 8' 2" x 2'7" tiles	In excess of

SAS PLUS

HAVE A QUESTION?

Configurable with other products. Call us.
Contact us on enquiries@sasint.us

SAS**610** Deltawing

SAS610 is a high performance acoustic product. It offers total absorption at mid-frequencies across the entire surface area, making it at least 15% better than any other raft. The unique geometry and laminate mineral wool infill provide the most efficient means of introducing sound absorption into a space – twice that of a Class A ceiling.

Module Sizes
Length: 8'2" x 2' 7" x 3" (Standard unit sizes)

Module Shapes
The Deltawing raft has been specifically engineered for optimum acoustic performance. The tapering shape and module size is fixed.

Finishes
SAS610 is available in all standard SAS finishes, please refer to page 110. Bespoke finishes are available on request.

Perforations
Only specific perforations can be used on SAS610 as the open area ratio has been carefully considered for maximum acoustic performance.

Visible perforation on lower face – D1522 – 22% open area

Perforation on upper face – D2841 – 41% open area

Other perforations may be considered, please contact our technical team to discuss your requirements.

Acoustic Materials
Acoustic mineral wool pads fully enclosed within the raft structure. Tissue wrapped pads are included in the top of the raft and are removable for access to cable routing.

Service Integration
Rafts and modules can be manufactured to incorporate lights and other M&E services.

Cross Ventilation
Ceiling mounted acoustic rafts provide acoustic absorption whilst allowing the concrete soffit to be fully exposed for energy-efficient natural cross ventilation cooling.

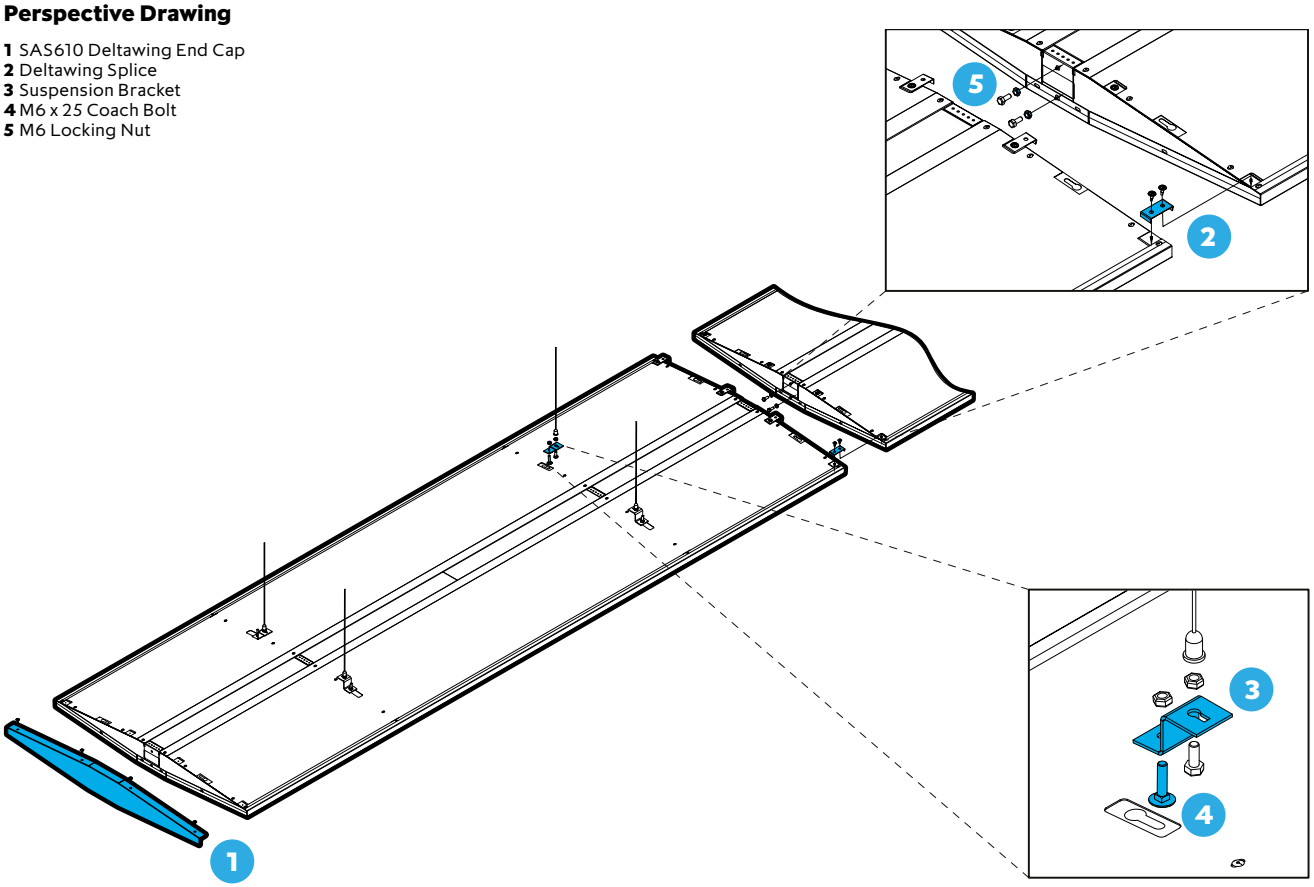
Combination Ceilings
Rafts and modules provide high levels of acoustic absorption. For demanding environments they can be installed in conjunction with a suspended metal ceiling.

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

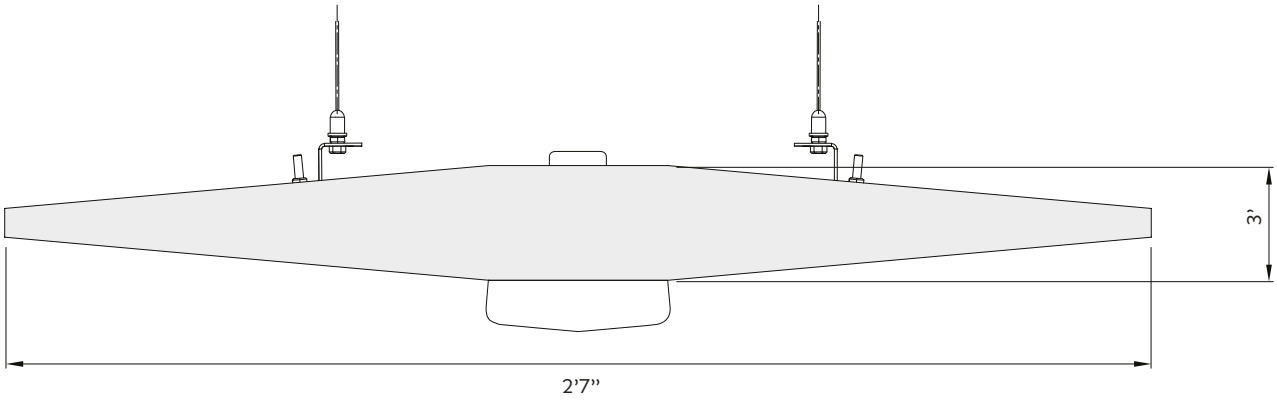
SAS**610** Deltawing

Perspective Drawing

1 SAS610 Deltawing End Cap
2 Deltawing Splice
3 Suspension Bracket
4 M6 x 25 Coach Bolt
5 M6 Locking Nut



Section and detail drawings



SAS**610**

SAS700

A simple to install, linear profile system ideal for budget applications requiring aesthetic treatment.

SYSTEM GROUP	SUSPENSION METHOD
Linear profile ceiling	SAS carrier profile – threaded rod suspension

PROFILE	MATERIAL
Clip-on	**Steel**

APPLICATION	END CAPS
Interior only	✓

ACCESS	SYSTEM WEIGHT	LIFE EXPECTANCY
Limited access (standard system)	**0.5-0.7**lbs/lft + Grid	**25**yr
	Project dependent	In excess of

SAS PLUS

HAVE A QUESTION?

Configurable with other products. Call us.
Contact us on enquiries@sasint.us

SAS**700**

SAS700 is intended for projects requiring an aesthetic finish where tight budget control is a major factor. The system is ideally suited to expansive retail environments and other, similar high traffic areas requiring smoke extraction applications.

A highly-cost effective steel linear profile option, SAS700 comprises a steel rolled profile which simply clips into the carrier.

Profile Sizes

Standard Length	10'
Standard Depths	2 3/8" or 3 3/4"
Standard Width	1 3/16"

Bespoke profiles are available on request. Longer continuous runs can be achieved through splices.

Access
Standard SAS700 systems have limited void access.

Finishes
SAS700 is available in all standard SAS finishes, please refer to page 110. Bespoke finishes are available on request.

End Cuts
SAS700 can be cut to size on-site during installation. SAS would only recommend square cut ends due to the inherent properties of steel.

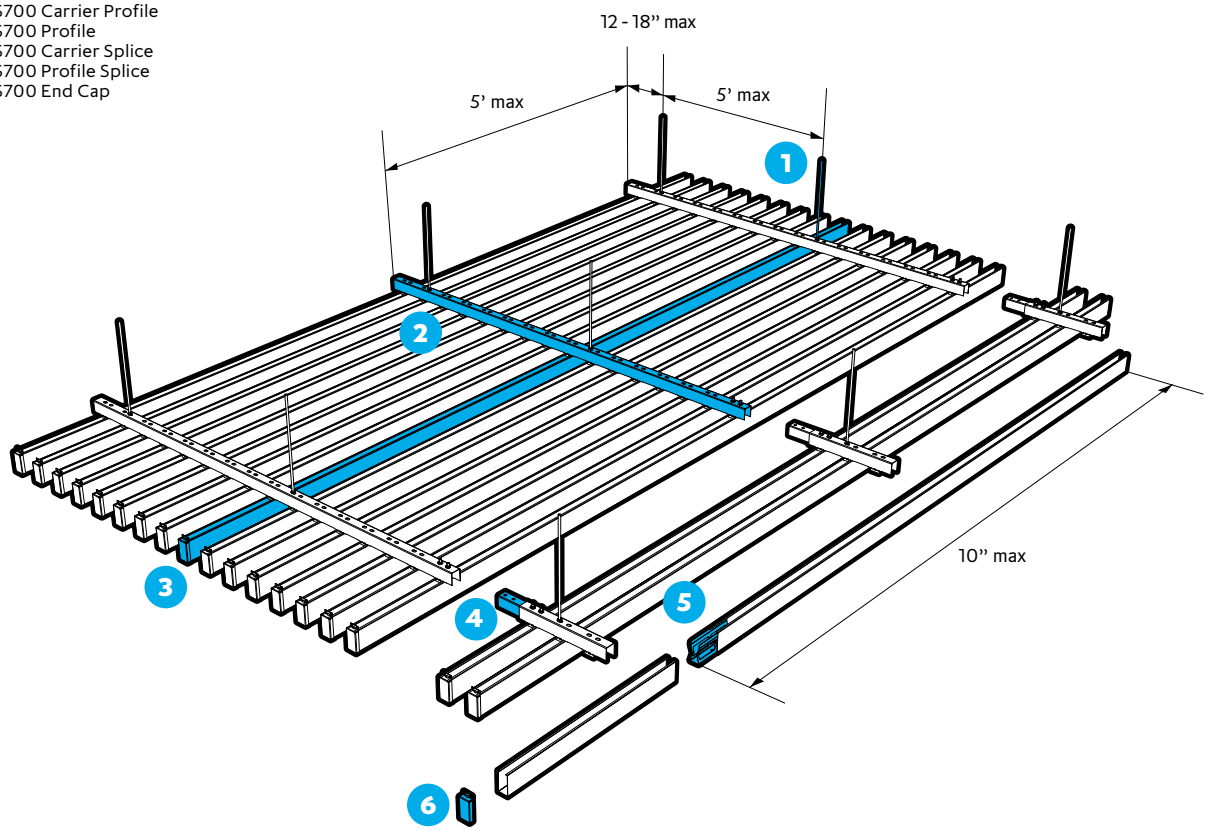
Service Integration
Service integration is limited to separately mounted services in between profiles.

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

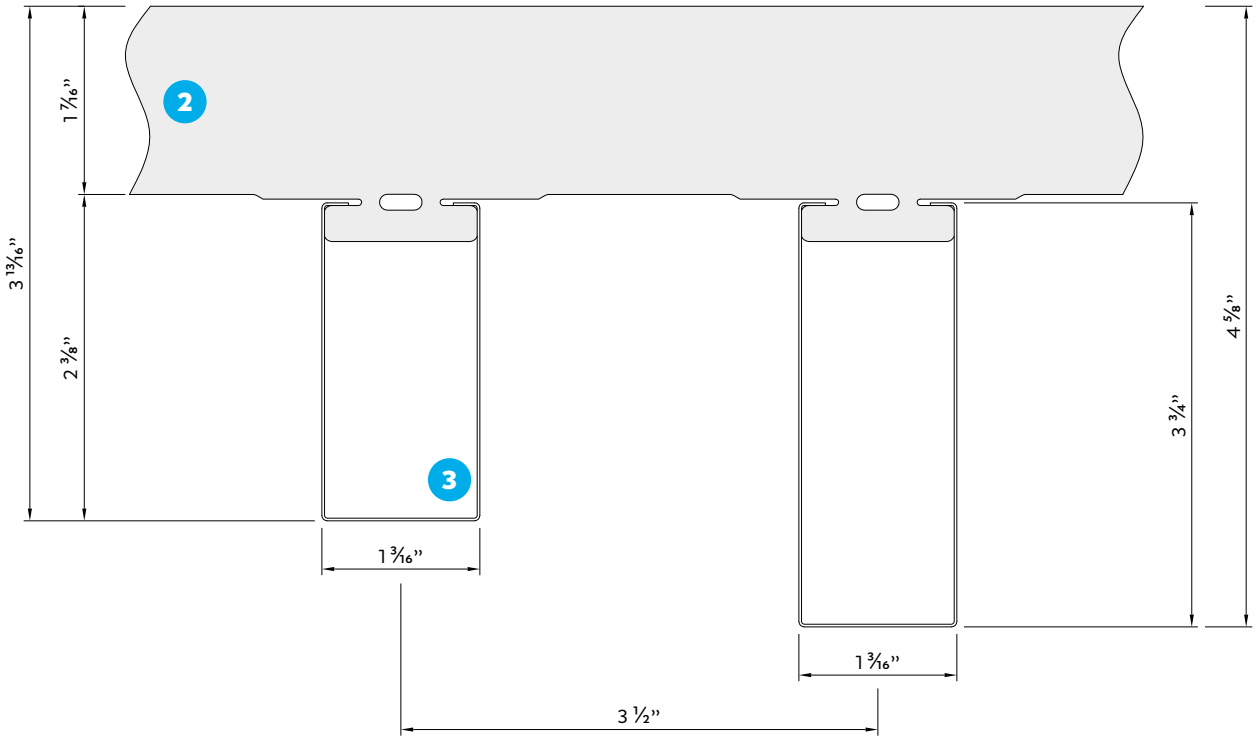
SAS**700**

Perspective Drawing

1 Threaded Rod
2 SAS700 Carrier Profile
3 SAS700 Profile
4 SAS700 Carrier Splice
5 SAS700 Profile Splice
6 SAS700 End Cap



Section Drawing



SAS**700**

Grand Central

Location
Birmingham, UK
Architect
Haskoll Architects

Contractor
Mace Ltd
Purpose
Retail

SAS720

A robust linear plank ceiling system suitable for service integration as an integral design feature.

SYSTEM GROUP	GRID
Linear profile ceiling	Notched EMAC grid EMAC Hanger suspension

PROFILE	MATERIAL
Plank C-Profile	**Steel**

APPLICATION	END CAPS
Interior and exterior	✓

ACCESS	SYSTEM WEIGHT	LIFE EXPECTANCY
Full – demountable profiles	**0.6**lbs/lft + Grid	**25**yr In excess of

SAS PLUS

HAVE A QUESTION?

Configurable with other products. Call us.
Contact us on enquiries@sasint.us

SAS**720**

SAS720 is a linear ‘plank’ system, available in a variety of widths and depths depending on aesthetic preference. Highly robust and sturdy, SAS720 is suitable for service integration as an integral design feature, offering significant creative flexibility.

SAS720 comprises steel rolled c-profiles which hook over the carrier. Costs can be controlled through wider profile spacing if required.

Profile Sizes

Length	10'
Width	2" - 12"

Bespoke profiles sizes and waveform profiles are available on request. Longer continuous runs can be achieved through splices and profiles are secured using barbed edge clips located at the end of profiles.

Access
SAS720 profiles can simply be demounted for void access.

Finishes
SAS720 is available in all standard SAS finishes, please refer to page 110. Bespoke finishes are available on request.

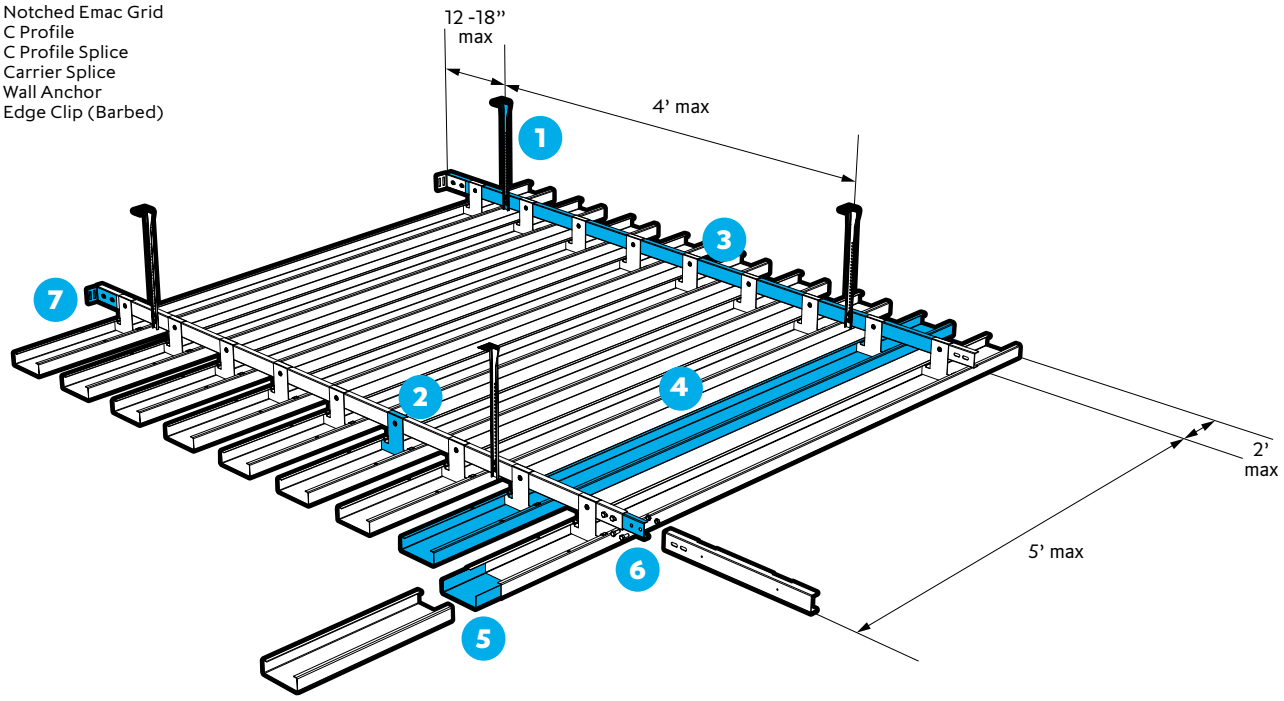
Service Integration
SAS720 profiles can be formed with apertures during manufacturing for integration with lights and other services.

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

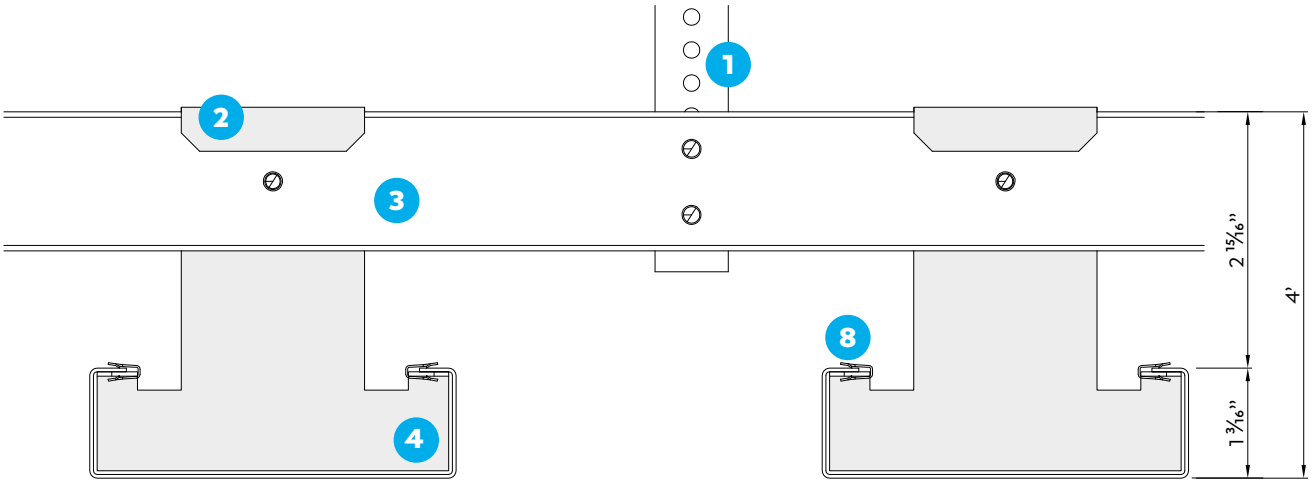
SAS720

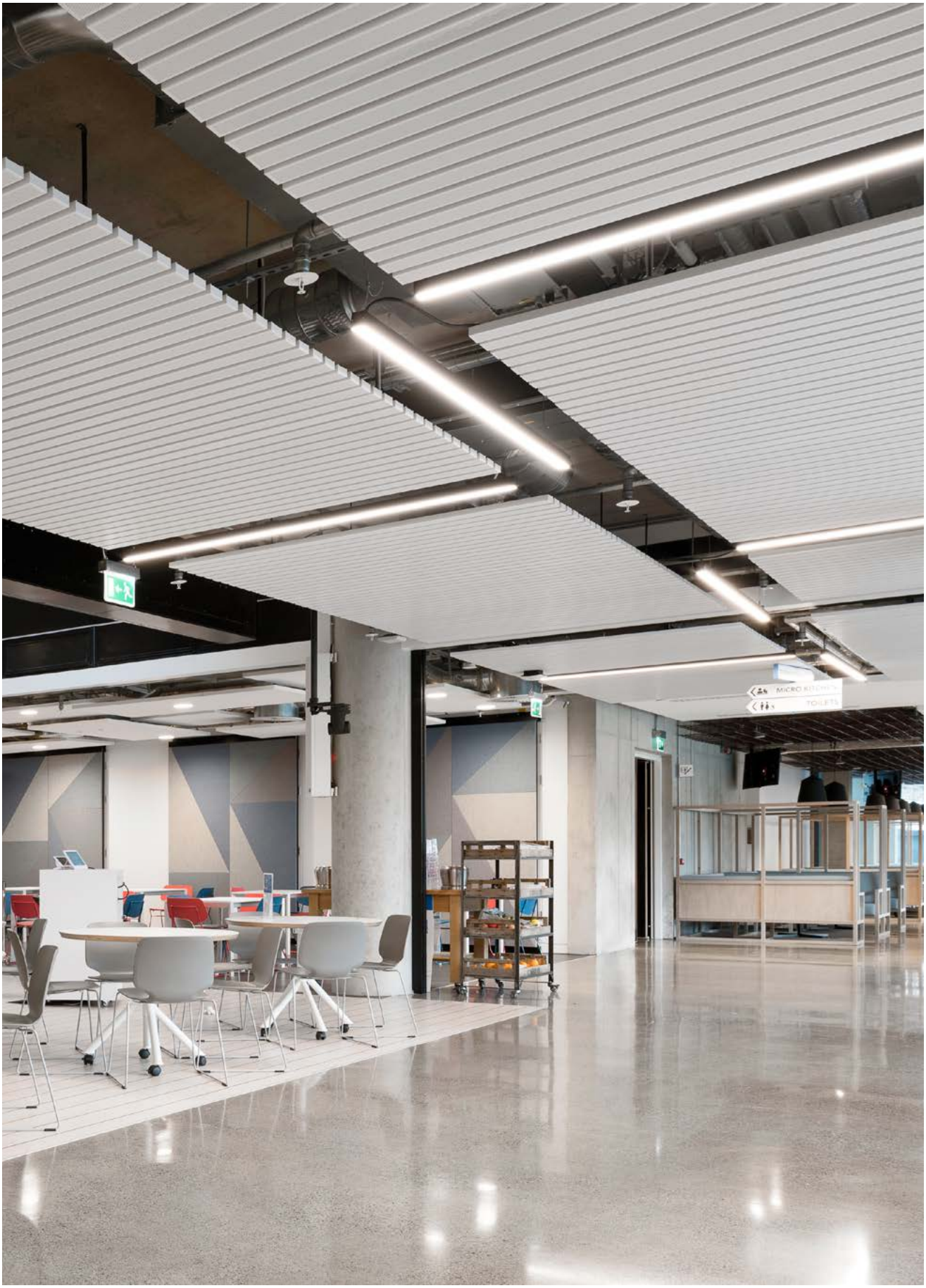
Perspective Drawing

1 Emac Hanger
2 SAS720 C Profile Bracket
3 Notched Emac Grid
4 C Profile
5 C Profile Splice
6 Carrier Splice
7 Wall Anchor
8 Edge Clip (Barbed)



Section Drawing





SAS**720**

LinkedIn EMEA HQ

Location
Dublin, Ireland
Architect
RKD Architects

Contractor
Walls Construction
Purpose
Commercial

SAS730

A discontinuous aluminum profile ceiling offering alternate profiles for a completely different aesthetic.

SYSTEM GROUP	SUSPENSION METHOD
Linear profile ceiling	EMAC Channel

PROFILE	MATERIAL
Clip-in H and U form extrusions	**Aluminum**

APPLICATION	END CAPS
Interior and exterior	**X**

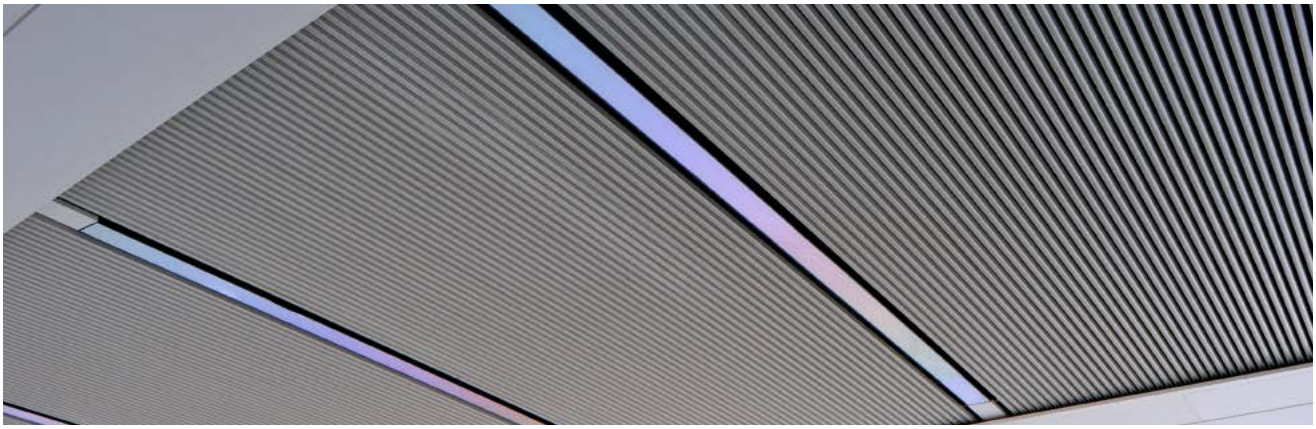
ACCESS	SYSTEM WEIGHT	LIFE EXPECTANCY
Limited access – standard system	**0.8**/lft + Grid	**25**yr In excess of

SAS PLUS

HAVE A QUESTION?

Configurable with other products. Call us.
Contact us on enquiries@sasint.us

SAS**730**



SAS730 is a linear profile system offering ‘H’ and ‘U’ formed profiles for an alternative aesthetic finish. The system is ideally suited to premium retail environments and other, similar high traffic areas requiring smoke extraction applications.

As an aluminum-extruded profile system, SAS730 offers superior quality, bespoke finishes and can accommodate complex geometry.

Profile Sizes

Length	10' Max.
Width	1' Min

Bespoke profile sizes and waveform profiles are available on request. SAS730 is limited to 10' lengths max.

Access
SAS730 offers limited access as standard. Integral access hatches can be achieved as a non-standard offering.

Finishes
SAS730 is available in all standard SAS finishes, please refer to page 110. Bespoke finishes are available on request, including polished and anodised.

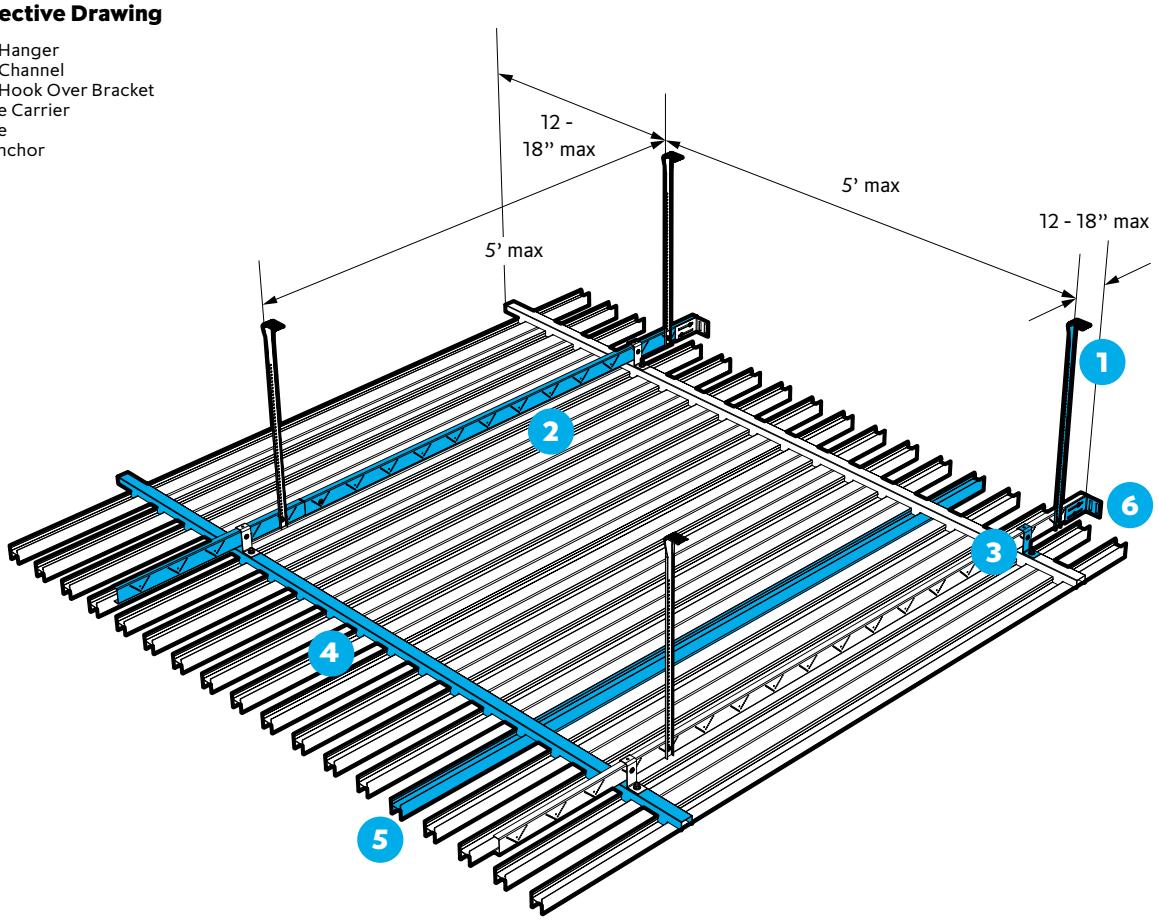
Service Integration
Service integration is limited to separately mounted services in between profiles.

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

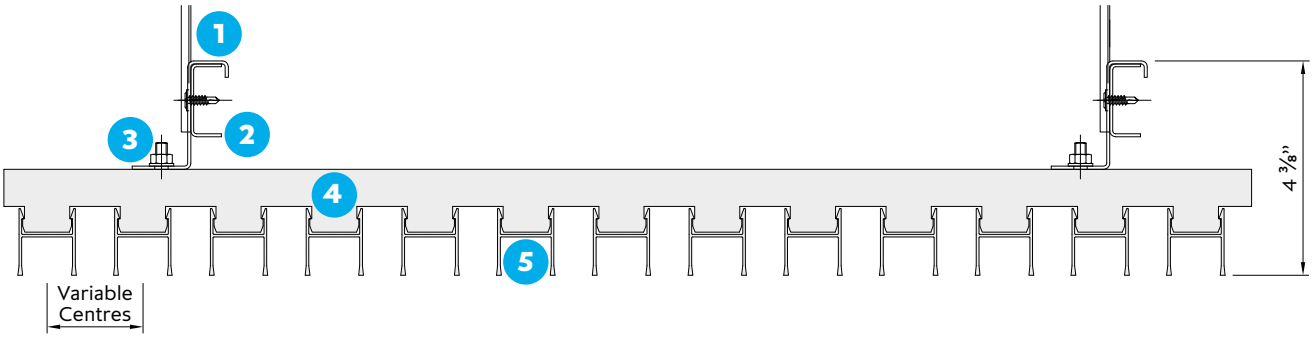
SAS730

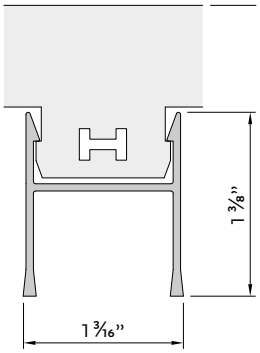
Perspective Drawing

1 Emac Hanger
2 Emac Channel
3 Emac Hook Over Bracket
4 H-Line Carrier
5 H-Line
6 Wall anchor



Section and detail drawings

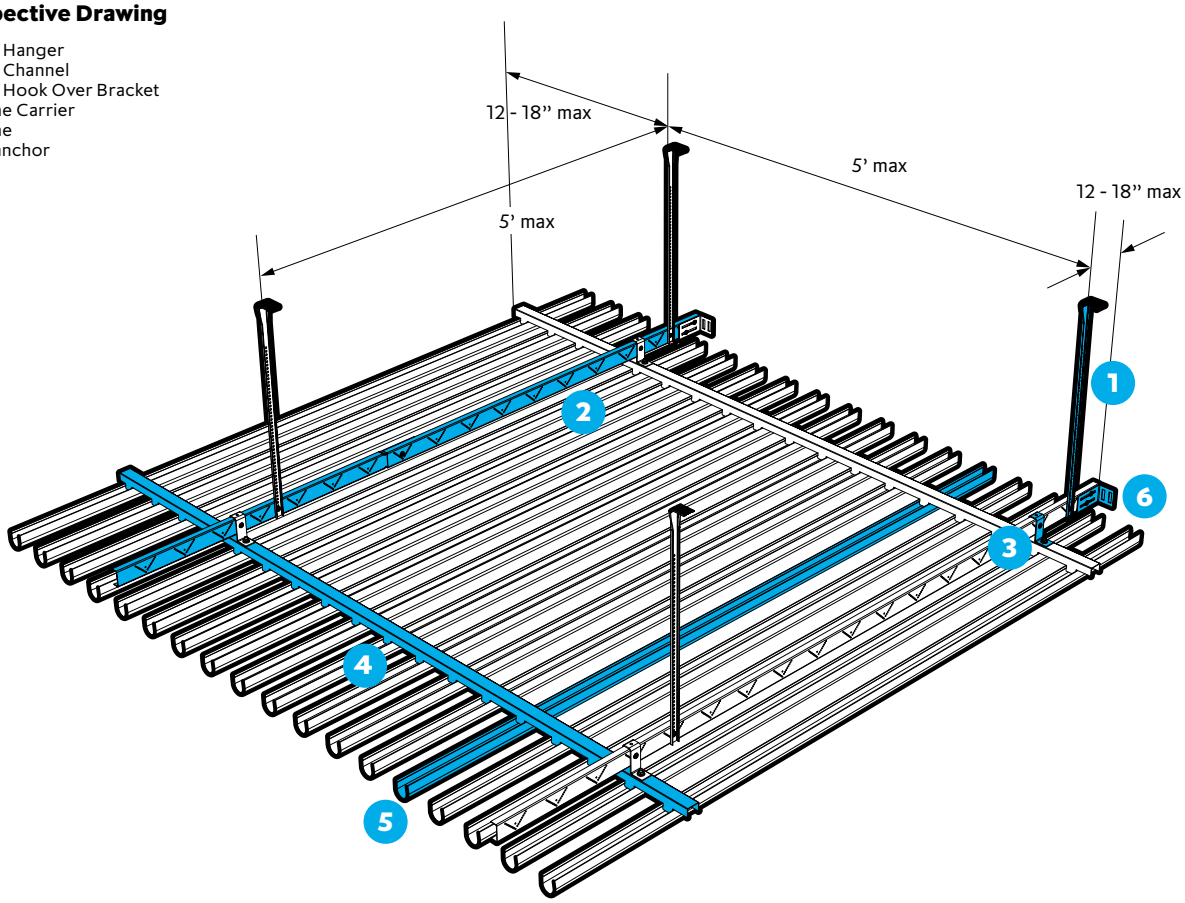




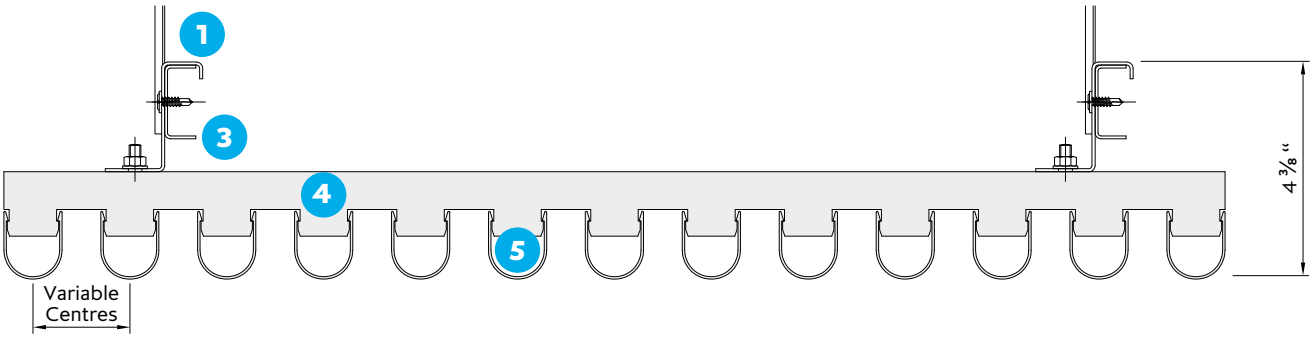
SAS730

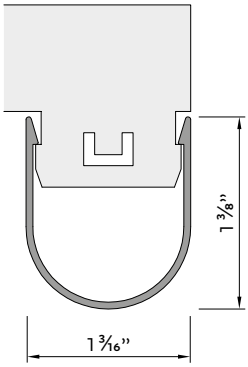
Perspective Drawing

1 Emac Hanger
2 Emac Channel
3 Emac Hook Over Bracket
4 U-Line Carrier
5 U-Line
6 Wall anchor



Section and detail drawings





Other profiles available for further information please contact the technical design team.

SAS**730**

Westfield, Stratford City

Location
London, UK
Architect
Westfield Shopping Towns Ltd

Contractor
Westfield Shopping Towns Ltd
Purpose
Retail

SAS**730**

M&S

Location
London, UK
Architect
MCM Architecture

Contractor
ISG Interior Exterior
Purpose
Retail

SAS740

A premium linear profile ceiling, offering enhanced aesthetics, void access, service integration and acoustic performance.

SYSTEM GROUP	GRID
Linear profile ceiling	EMAC grid EMAC Hanger suspension

PROFILE	MATERIAL
Bolt-on rectilinear – as standard	**Aluminum**

ACOUSTICS	APPLICATION	END CAPS
0.65 - 1 NRC	Interior and exterior	✓

ACCESS	SYSTEM WEIGHT	LIFE EXPECTANCY
Full void access	**0.7-1.2**lbs/lft + Grid	**25**yr In excess of

SAS PLUS

HAVE A QUESTION?

Configurable with other products. Call us.
Contact us on enquiries@sasint.us

SAS**740**

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

The aluminum system is suitable for spaces requiring a premium aesthetic alternative to suspended tile or open cell ceilings.

Profile Sizes

Length	10'

SAS740 can accommodate a wide range of bespoke profile shapes, sizes and waveform profiles, all available on request. Longer continuous runs can be achieved through splices.

Access
Void access can be achieved through demounting profiles or access panels.

Finishes
SAS740 is available in all standard SAS finishes, please refer to page 110. Bespoke finishes are available on request, including polished and anodised.

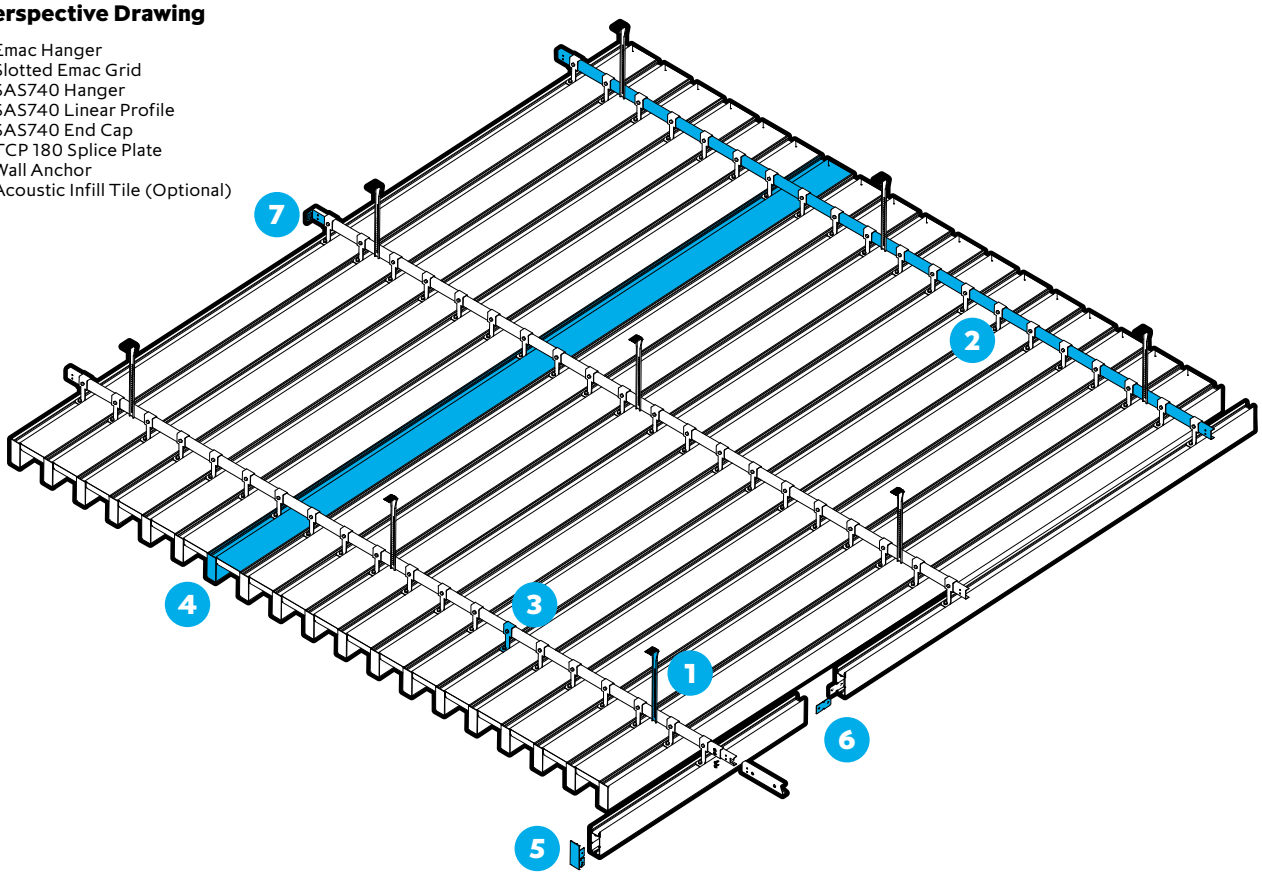
Acoustic Materials
SAS740 can be specified with acoustic tiles in between linear profiles containing an acoustic mineral wool pad with black tissue face, foil back and sides. Typically supplied in RAL 9005 black PPC as standard. Other acoustic materials are available, please refer to page 17.

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

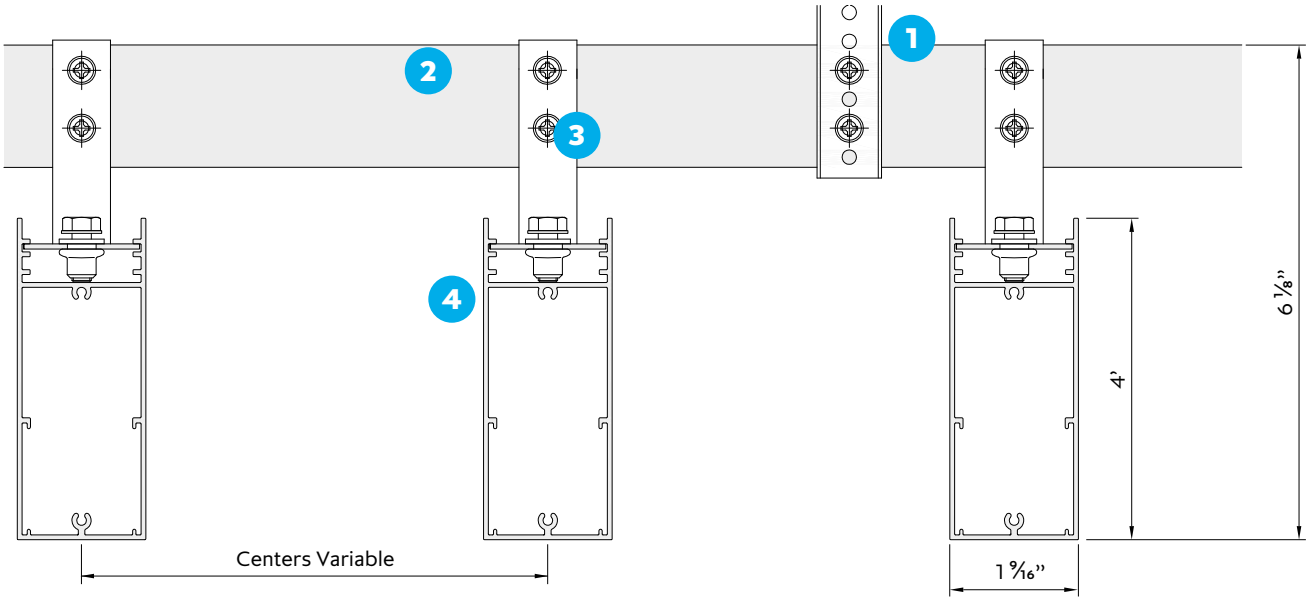
SAS740

Perspective Drawing

1 Emac Hanger
2 Slotted Emac Grid
3 SAS740 Hanger
4 SAS740 Linear Profile
5 SAS740 End Cap
6 TCP 180 Splice Plate
7 Wall Anchor
8 Acoustic Infill Tile (Optional)



Section Drawing – Hanger Short

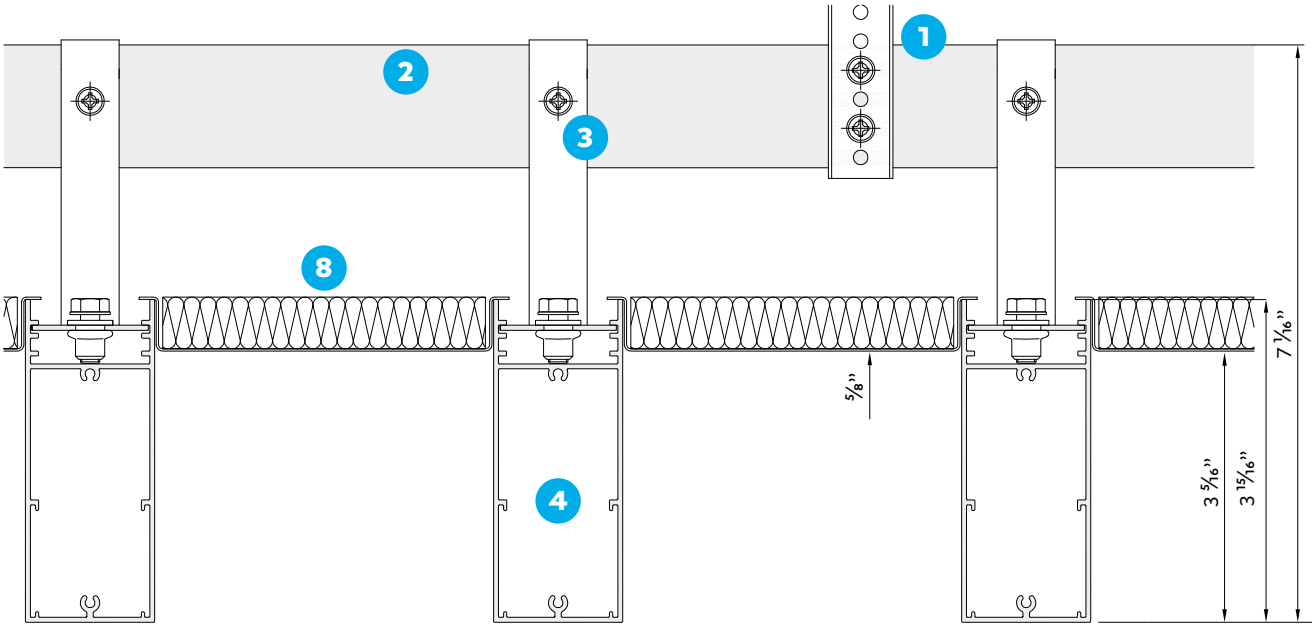


* Sound absorption for acoustics dependent on profile centres

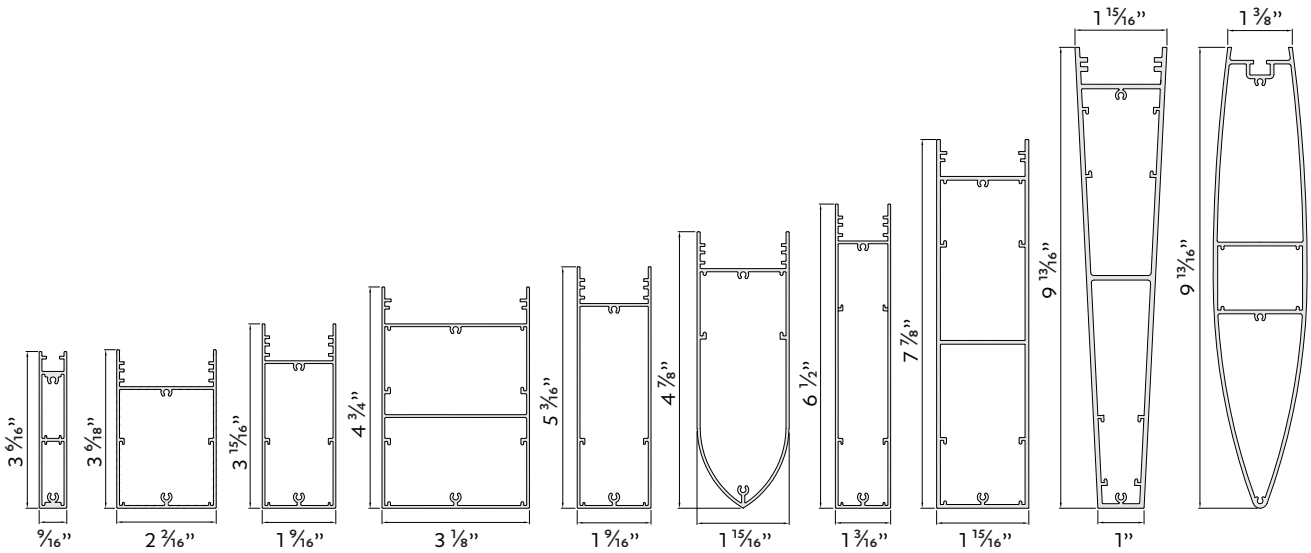
SAS740

Section Drawing – Hanger Long

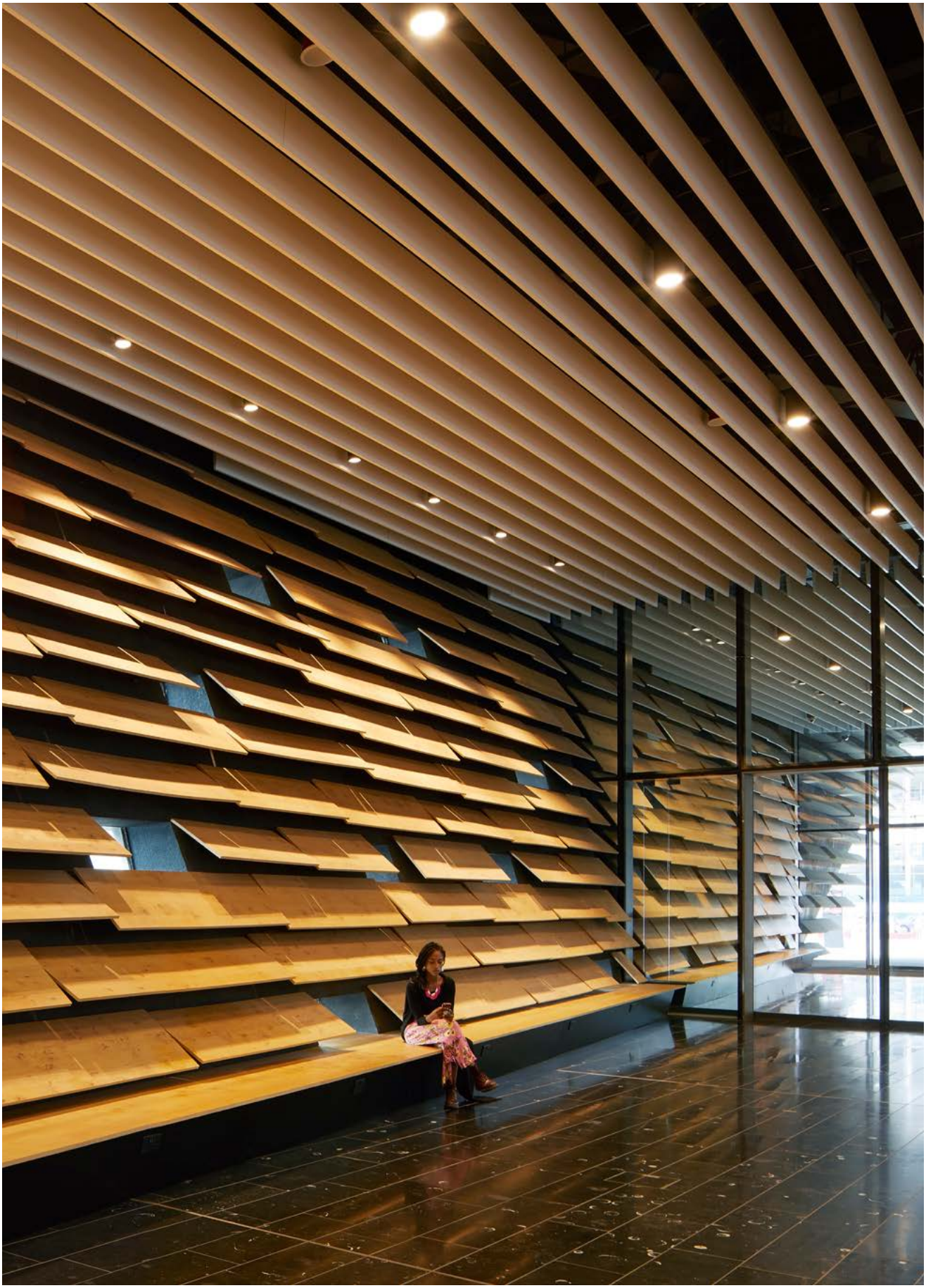
1 Emac Hanger
2 Slotted Emac Grid
3 SAS740 Hanger
4 SAS740 Linear Profile
5 SAS740 End Cap
6 TCP 180 Splice Plate
7 Wall Anchor
8 Acoustic Infill Tile (Optional)



Profiles Available*



***For further information on additional profiles please contact the technical design team.**



SAS**740**

V&A Museum

Location
Dundee, Scotland
Architect
Kengo Kuma & Cre8 Architecture

Contractor
BAM Construction Ltd: Scotland
Purpose
Leisure

SAS**740**

Ocean Network Express

Location
London,UK
Architect
Cushman & Wakefield

Contractor
Morgan Lovell
Purpose
Commercial

SAS**750**

A visually impactful, premium tubular ceiling system offering waveforms, full access and service integration.

SYSTEM GROUP	SUSPENSION METHOD
Linear profile ceiling	SAS carrier rail threaded rod suspension

PROFILE	MATERIAL
Tubular – as standard	**Aluminum / Steel**

APPLICATION	END CAPS
Interior and exterior (aluminum)	✓

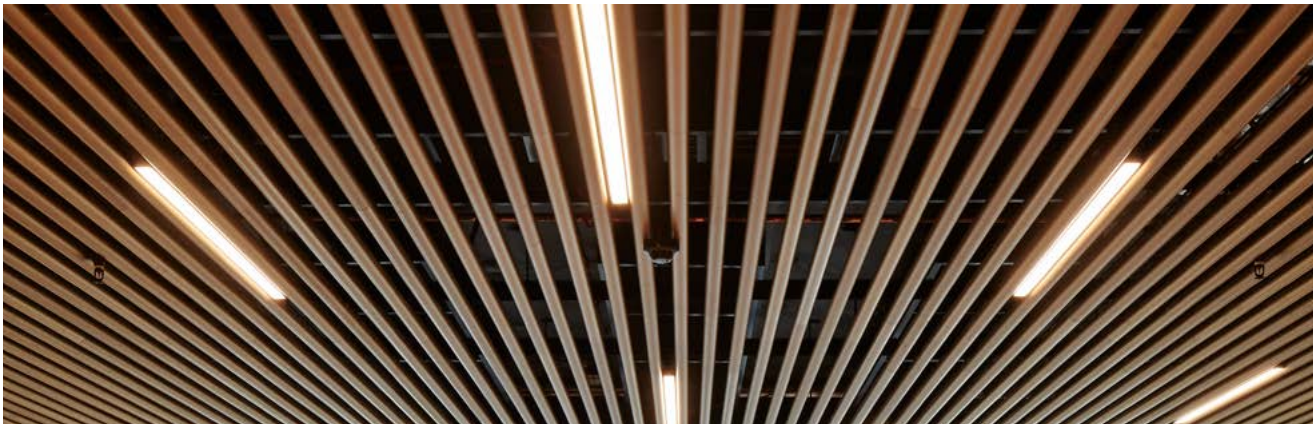
ACCESS	SYSTEM WEIGHT	LIFE EXPECTANCY
Full void access	**0.3 - 1** lbs/lft	**25** yr
	Depending on diameter and grid	In excess of

SAS PLUS

HAVE A QUESTION?

Configurable with other products. Call us.
Contact us on enquiries@sasint.us

SAS**750** Tubeline



SAS750 Tubeline fosters dynamic and impactful design along with practical considerations such as access and service integration. Tubeline offers specifiers numerous design features, such as curves and waveforms, as well as horizontal, vertical, interior and exterior mounting.

Available as either aluminum extrusions or rolled steel tubular sections.

Profile Sizes

Length	10'
Dimensions	1" 2"

SAS750 can accommodate a wide range of bespoke profile shapes, sizes and waveform profiles, all available on request. Longer continuous runs can be achieved through splices.

Access

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

Finishes

SAS750 Tubeline is available in all standard SAS finishes, please refer to page 110. Bespoke finishes are available on request, including polished and anodised (aluminum only).

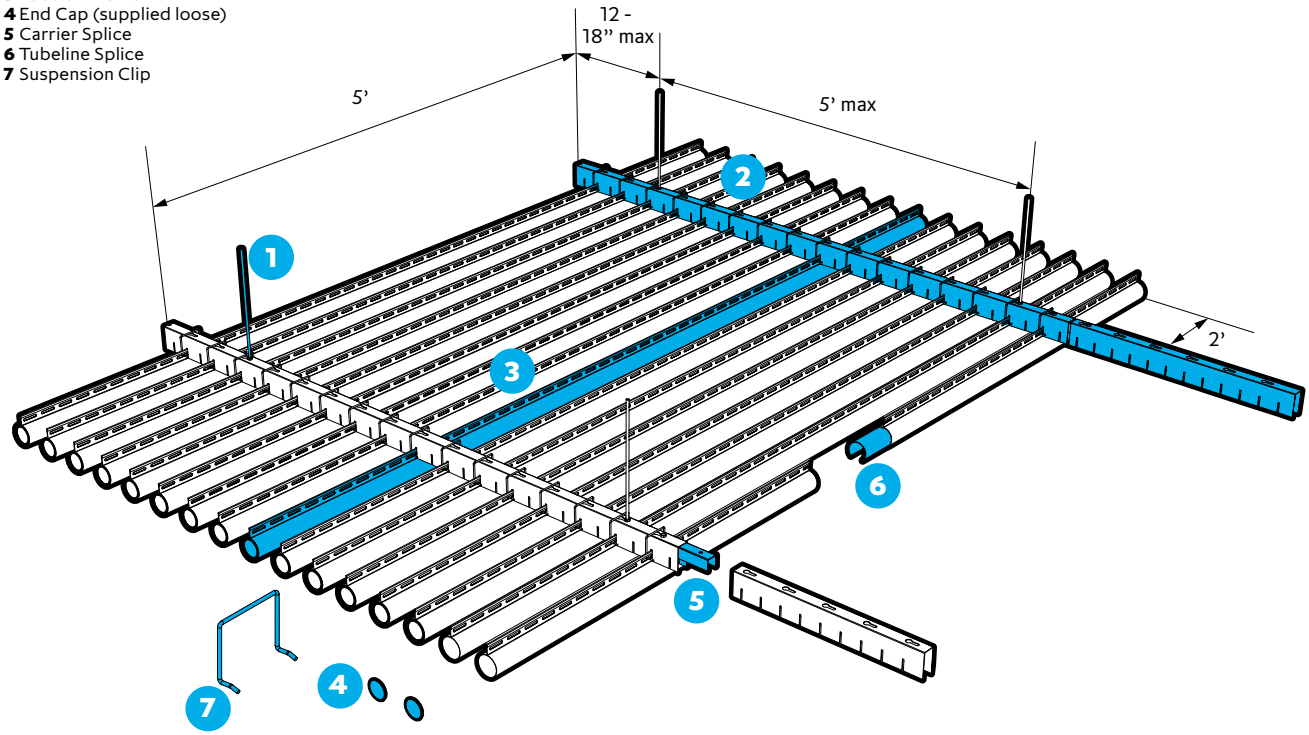
Technical Support

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

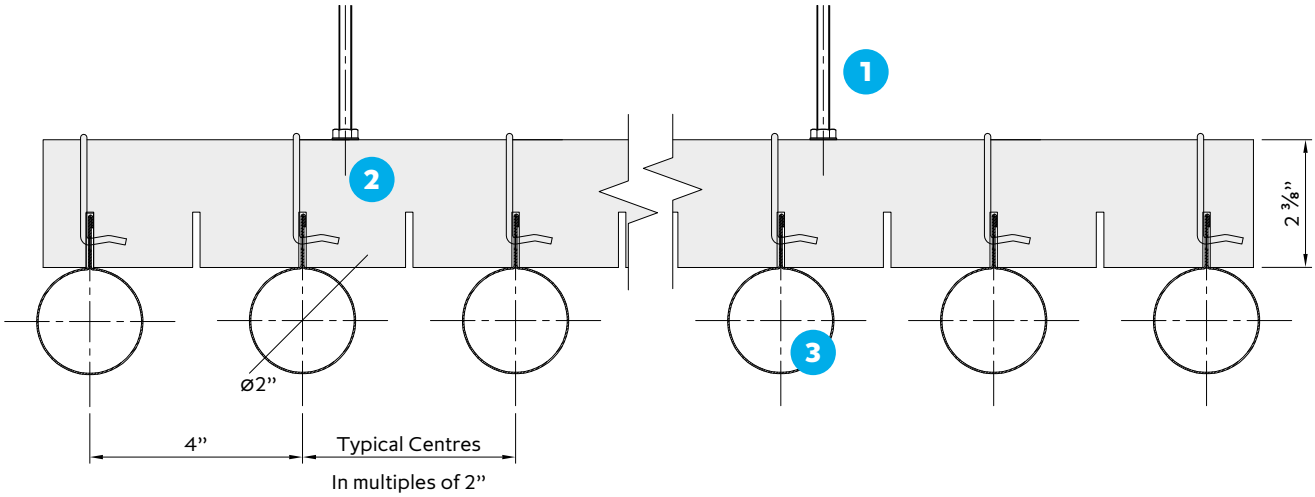
SAS**750** Tubeline

Standard Perspective Drawing

1 Threaded Rod (by others)
2 Tubeline Carrier
3 Tubular Profile
4 End Cap (supplied loose)
5 Carrier Splice
6 Tubeline Splice
7 Suspension Clip



Standard Section Drawing



SAS**750**

John Lewis

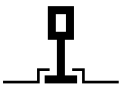
Location
Birmingham, UK
Architect
John Lewis Design Team, Brooker Flynn Architects

Contractor
Mace Ltd
Purpose
Retail

SAS800

A lightweight and quick to install, modular open cell ceiling with monolithic appearance for smoke extraction applications.

SYSTEM GROUP	GRID
	9/16" Tee grid EMAC Hanger suspension
Open cell ceiling	

PROFILE

Lay-in square

ACCESS	SYSTEM WEIGHT	LIFE EXPECTANCY
	**0.6**lbs/ft²	**25**yr
Lift and tilt	Dependent on cell configuration	In excess of

SAS PLUS

HAVE A QUESTION?

Configurable with other products. Call us.
Contact us on enquiries@sasint.us

SAS**800** Trucell

SAS800 Trucell is a decorative open cell ceiling, for airflow and smoke extraction applications. The metal ceiling system comprises a series of open cell modules designed to lay onto a suspension grid. The ceiling tiles can integrate within other metal ceiling systems and plasterboard ceilings.

Trucell is ideal for retail, transport or leisure applications with high human traffic flow. Rapid and safe smoke extraction is critical in such environments.

Module Sizes
23 5/8" x 23 5/8" panels and 23 5/8" x 4' (nominal depth 1' 9/16).

Cell sizes are available in seven different configurations.

1 15/16" x 1 15/16"	4 3/4" x 4 3/4"
2 15/16" x 2 15/16"	5 7/8" x 5 7/8"
3 3/8" x 3 3/8"	7 7/8" x 7 7/8"
3 3/16" x 3 3/16"	

Bespoke modules and tile sizes are available, subject to the size being divisible by the available cell sizes.

Access
Tiles can simply be lifted and removed from the grid.

Finishes
International White Pre-coat as standard. SAS800 is also available in RAL colors and other bespoke PPC finishes on request.

Service Integration
Trucell allows fire detection and control systems, air conditioning and other services to be located within the ceiling void. Traditional decorative lighting and LEDs can be installed within single or multiple adjacent cells.

Open Area
Open area is dependent on panel size. Based on a 23 5/8" x 23 5/8" panel, the cell configurations will have the corresponding open area:

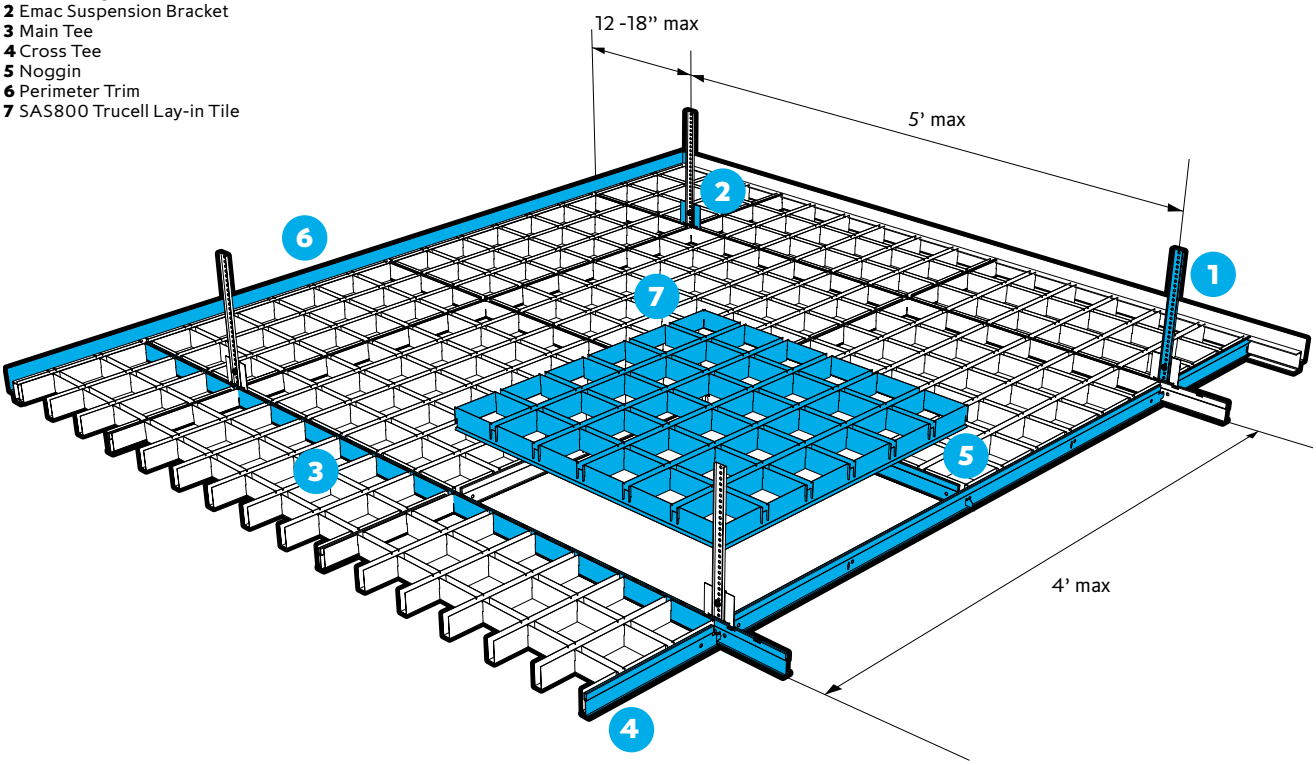
Cells	Open Area
7 7/8" x 7 7/8"	85.6%
5 7/8" x 5 7/8"	82.2%
4 3/4" x 4 3/4"	77%
3 15/16" x 3 15/16"	74%
3 3/8" x 3 3/8"	70%
2 15/16" x 2 15/16"	66.1%
2 3/8" x 2 3/8"	56%
1 15/16" x 1 15/16"	49%

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

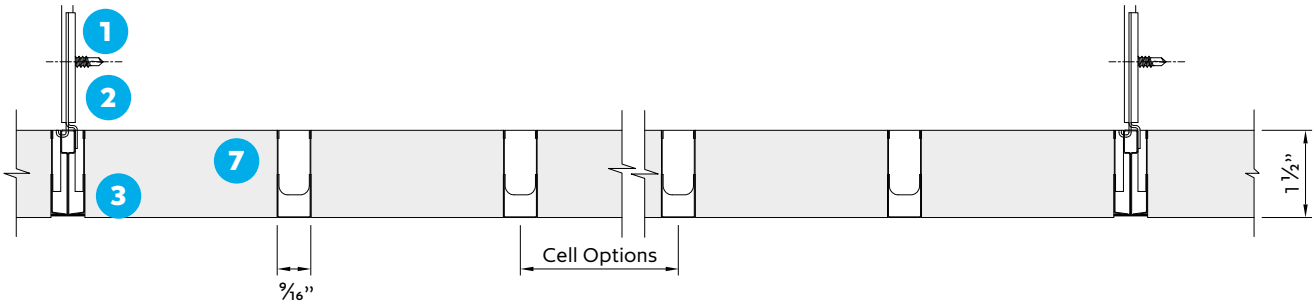
SAS**800** Trucell

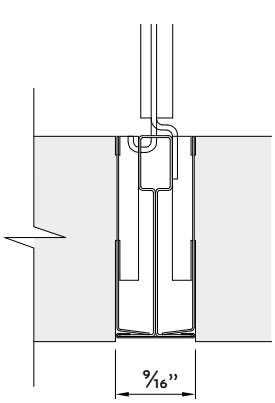
Perspective Drawing

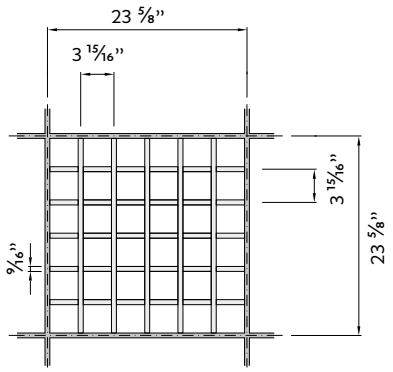
1 Emac Hanger
2 Emac Suspension Bracket
3 Main Tee
4 Cross Tee
5 Noggin
6 Perimeter Trim
7 SAS800 Trucell Lay-in Tile



Section and detail drawings



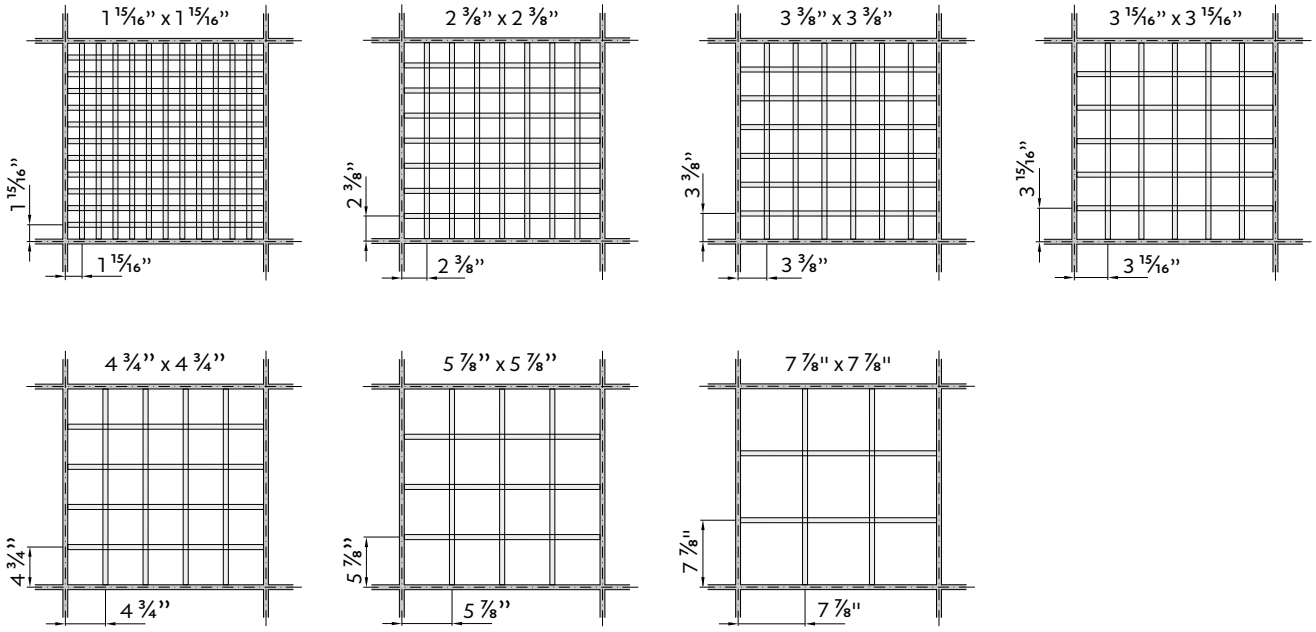




SAS**800** Trucell

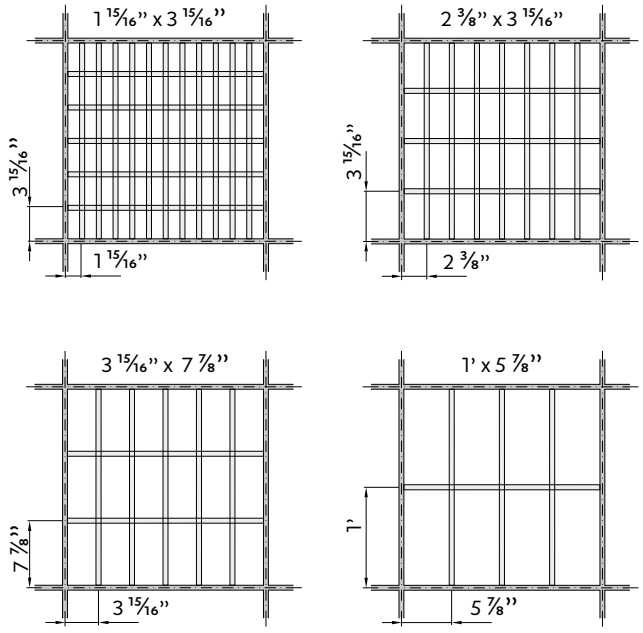
Square Cells

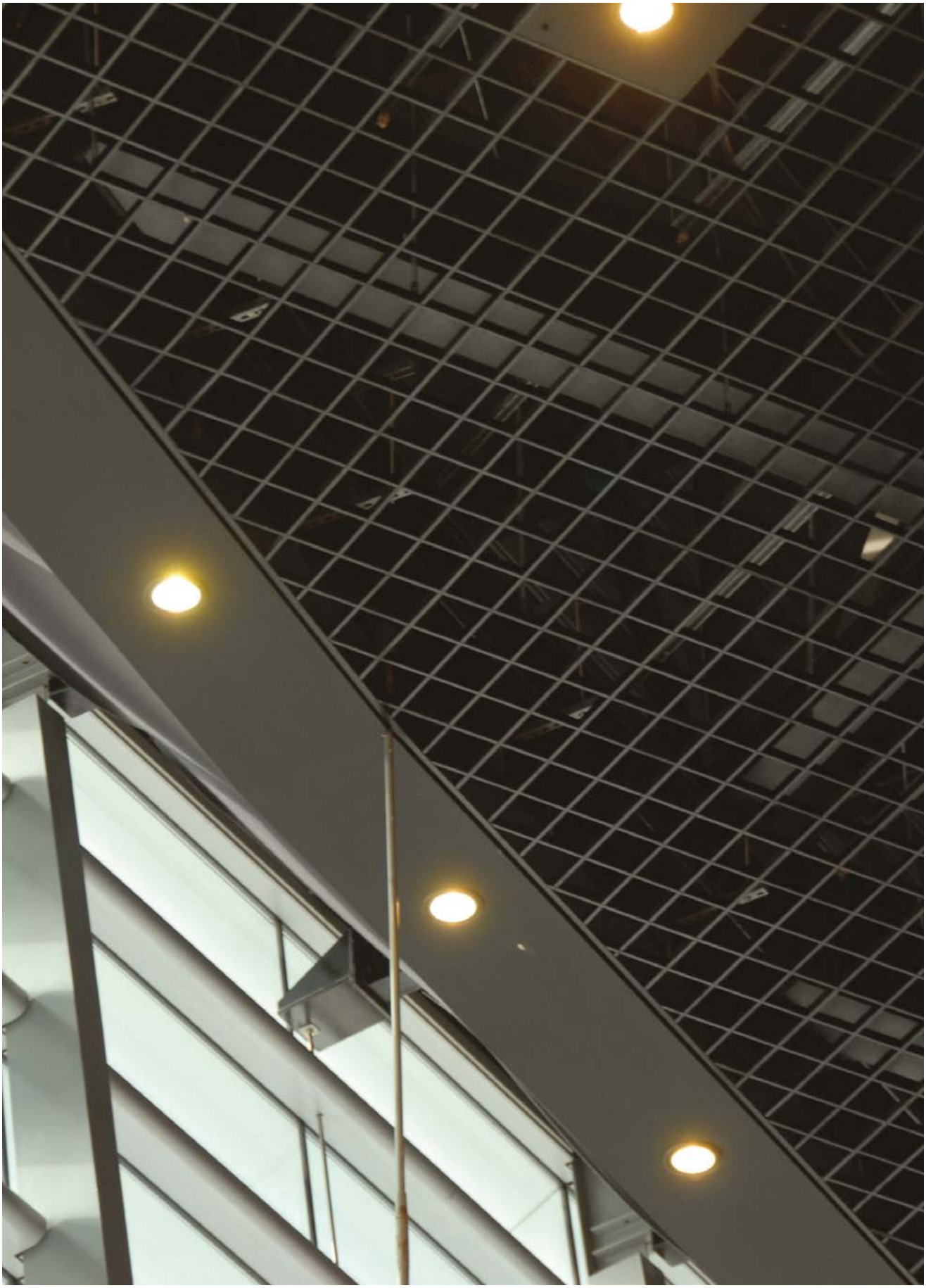
Standard cell sizes for 23 5/8" module



Rectangle Cells

Standard cell sizes for 23 5/8"module





SAS**800**

The Curve

Location
Leicester, UK
Architect
Rafael Vinoly Architects

Contractor
Lendlease
Purpose
Leisure

SAS**800**

Westpac, Barangaroo

Location
Sydney, Australia
Architect
Geyer

Contractor
Lendlease
Purpose
Commercial

SAS**810**

A lightweight and quick to install, triangular open cell ceiling with monolithic appearance for smoke extraction applications.

SYSTEM GROUP	SUSPENSION METHOD
Open cell	SAS Aluminum T Wire suspension

PROFILE	MATERIAL
Lay-in Triangular – as standard	**Aluminum**

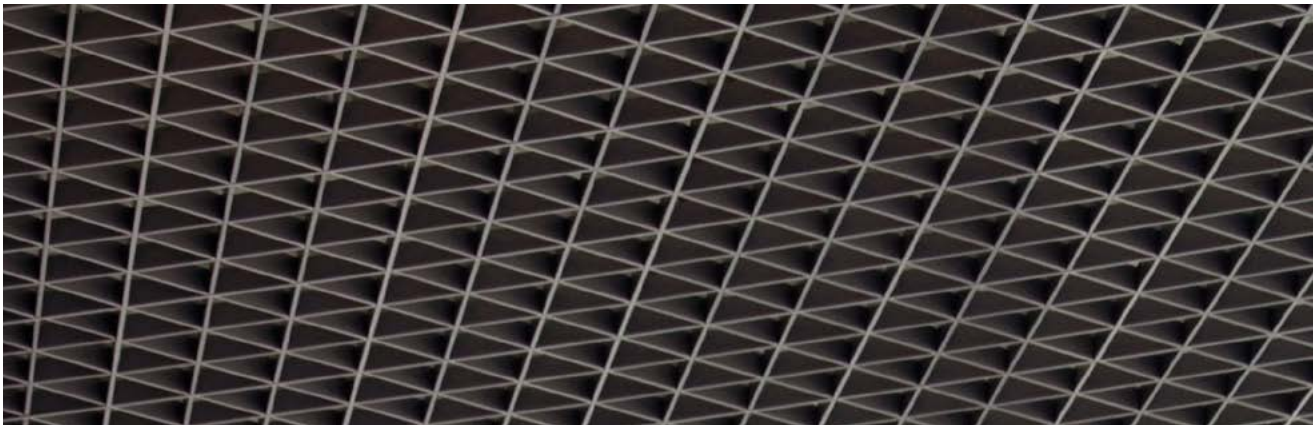
ACCESS	SYSTEM WEIGHT	LIFE EXPECTANCY
Full void access	**0.5**lbs/ft² Approx.	**25**yr In excess of

SAS PLUS

HAVE A QUESTION?

Configurable with other products. Call us.
Contact us on enquiries@sasint.us

SAS**810** Tricell



SAS810 Tricell is a decorative open cell ceiling, for airflow and smoke extraction applications. Tricell is an aesthetic development of Trucell, offering the specifier an alternate cell pattern. The ceiling tiles can integrate within other metal ceiling systems and plasterboard ceilings.

Our open cell ceiling systems are ideal for retail, transport or leisure applications with high human traffic flow. Rapid and safe smoke extraction is critical in such environments.

Module Sizes
2' 10 1/2" x 2' 10 1/2" (standard)

Each panel has a nominal cell wall thickness of 9/16" to give a precise engineered ceiling appearance.

Bespoke modules and tile sizes are available, subject to the size being divisible by the available cell sizes.

Access
Tiles can simply be lifted and removed from the grid.

Finishes
International White Pre-coat as standard. SAS810 is also available in RAL colors and other bespoke PPC finishes on request.

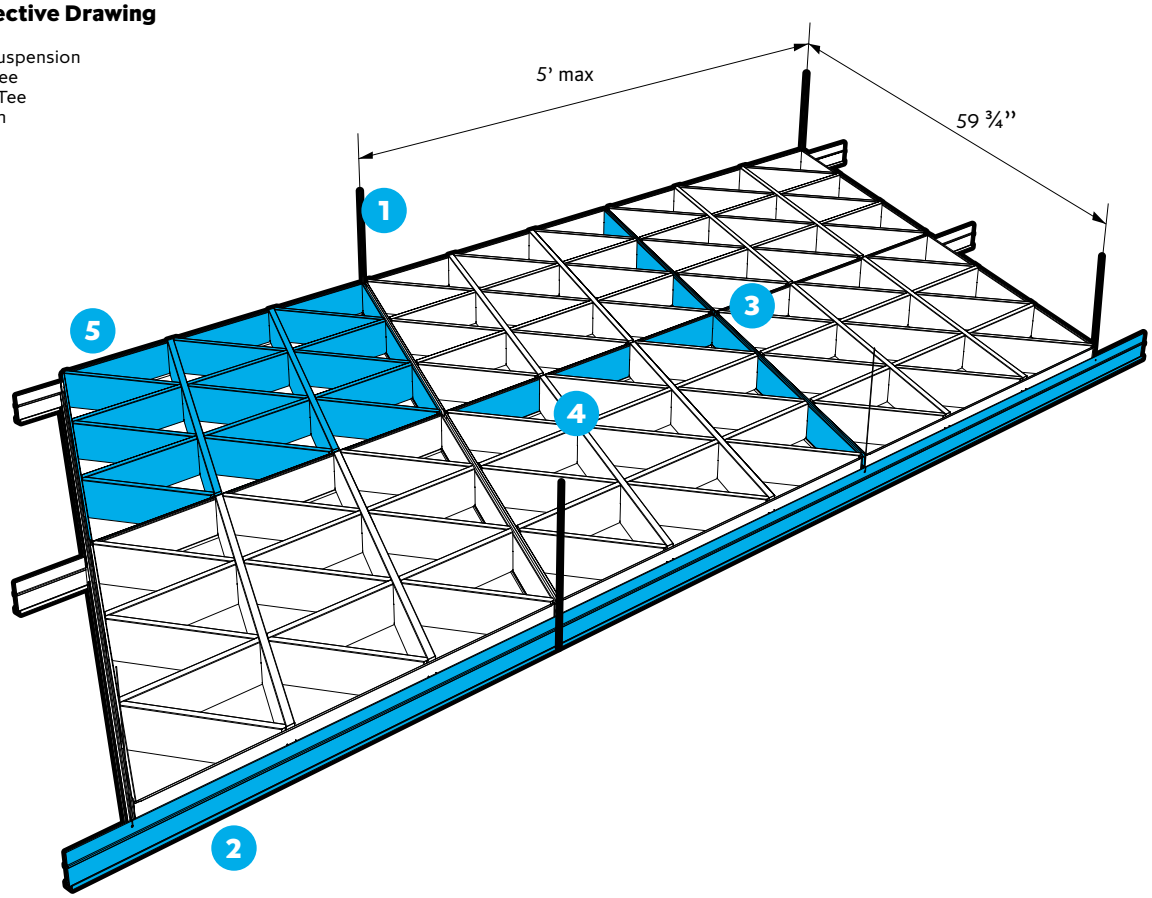
Service Integration
Tricell allows fire detection and control systems, air conditioning and other services to be located within the ceiling void. Traditional decorative lighting and LEDs can be installed within single or multiple adjacent cells.

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

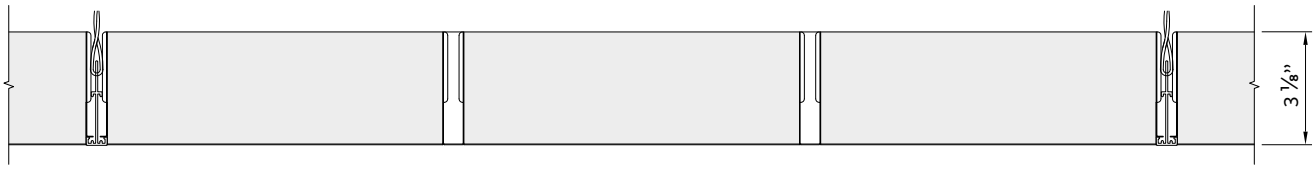
SAS**810** Tricell

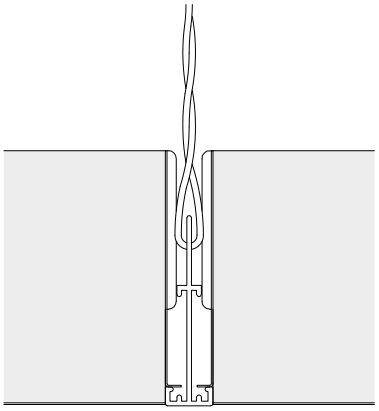
Perspective Drawing

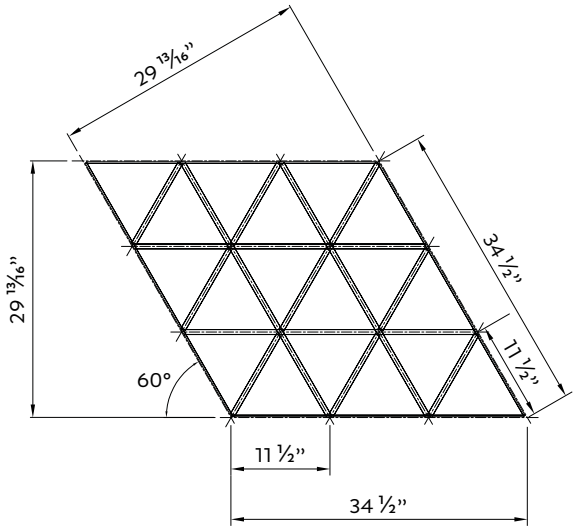
1 Wire Suspension
2 Main Tee
3 Cross Tee
4 Noggin
5 Tile

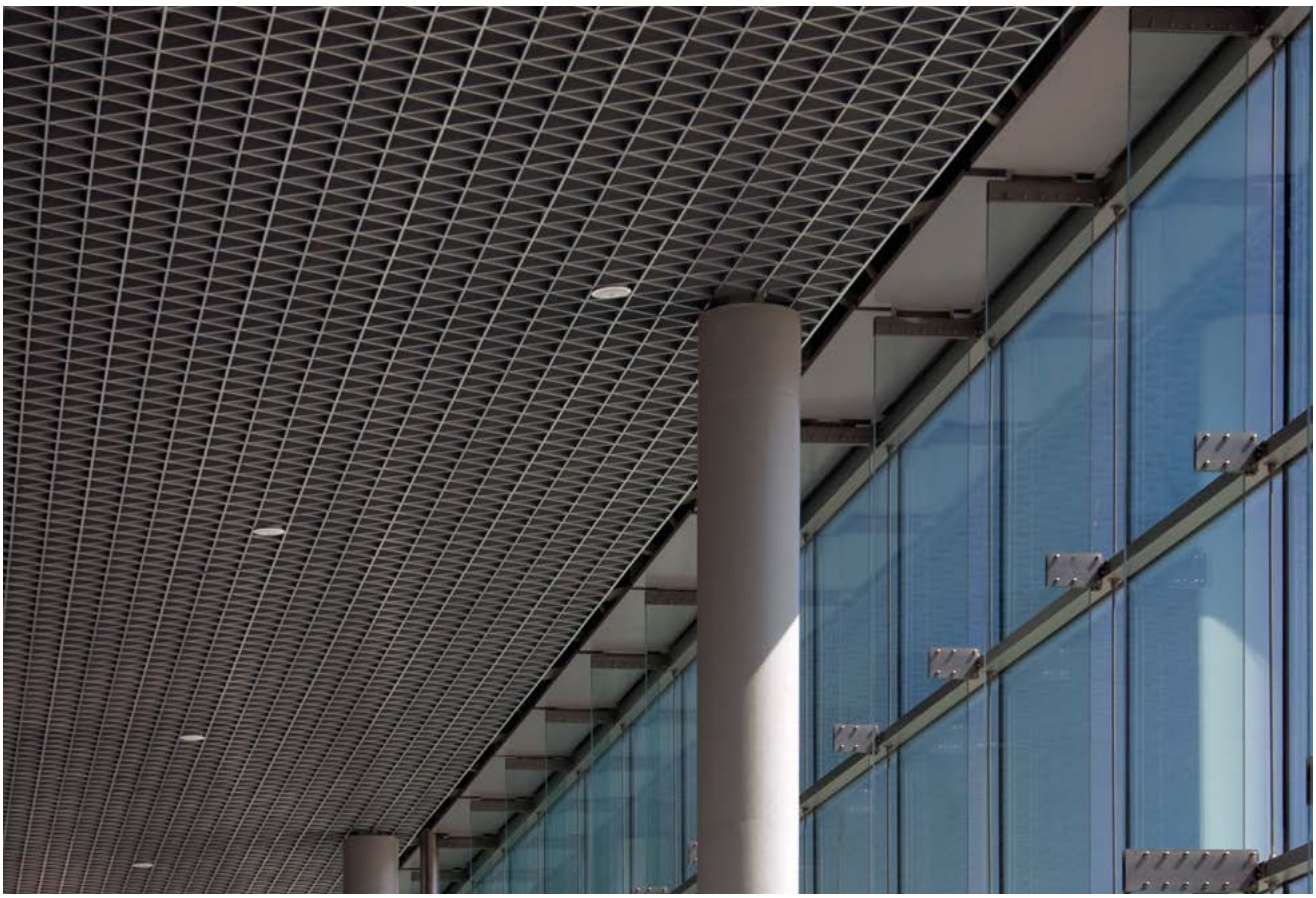


Section and detail drawings









SAS**810**

Aeropuerto de Santiago

Location
Santiago, Spain
Architect
Alberto Noguerol + Pilar Diez arquitectura

Contractor
UTE Lavacolla
Purpose
Transport

SAS900

SAS900 Polynode is an adjustable nodal ceiling system used to create multi-faceted ceiling designs.

SYSTEM GROUP	GRID
Suspended ceiling	Concealed grid SAS torsion spring suspension

TILE	ACOUSTICS
Torsion spring	**0.65 - 1** NRC

ACCESS	SYSTEM WEIGHT	LIFE EXPECTANCY
Hinge down access	**2.2**lbs/ft²	**25**yr In excess of

SAS PLUS

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SAS**900** Polynode

SAS900 Polynode is an adjustable nodal ceiling system used to create multi-faceted ceiling designs. This polynodal system meets the demand of specifiers who desire a free-form ceiling surface which contributes to modern building design.

Simple equilateral triangle tiles can create a near infinite variety of polyhedral ceiling forms. Our patented nodal system can also be used to transition from ceiling to wall.

Access
SAS900 offers full access by way of hinge down tiles, suspended vertically from two nodes. Alternatively, tiles can be completely removed.

Grid System

- System allows for faceted horizontal to vertical transitions (ceiling to wall)

Highly complex geometrical surfaces can be installed using standard components, simply by adjusting the vertical position of the node. Corner anchor points suspend tiles which can be adjusted to create a free form ceiling. Our patented nodal system can also be used to transition from ceiling to wall.

Perforation
SAS900 Polynode tiles can be supplied with any standard SAS perforation pattern. Bespoke patterns are also available on request.

Acoustic Treatment
Acoustic mineral wool with black tissue face, foil back and sides. Other acoustic treatments are available, depending on project requirement. Please contact our technical department for more information.

Weights & Sizes

- 2.2 lbs ft^2
- Standard modules are mounted on EMAC grid with 3' centres
- Standard nodes are mounted every 4'
- Tiles are triangular as standard (3' 2 9/16" on all sides)
- Min/Max tile dimensions are 11" - 4' 3"

Just one tile size significantly reduces the design and manufacturing costs associated with this type of geometric ceiling. Whilst the system is drawn as standard with triangular tiles, any number of simple polygonal shapes can be manufactured. Please contact our technical design team for more details.

Integration
Ceiling tiles can be formed with apertures during manufacturing for integration with lights and other services. SAS900 panels may require stiffeners to support centrally mounted lighting.

Lighting and other mechanical and electrical services can add significant loads to a ceiling. Loads applied to SAS900 ceiling tiles must not exceed 4lbs. For loads greater than 4lbs, we would recommend using independent suspension.

If you have a concern over loads, please contact our technical team for advice.

Finishes

- RAL 9010, 9003 and 9016 (Whites) polyester powder coat (PPC) as standard
- Available in full range of standard RAL colors
- Anti-Microbial PPC coatings (optional)

Other specialist finishes are available on request. For more information on non-standard finishes, please contact our technical services team.

Standard System
Simplest version using a single size tile. Minimal or no design input (unless deviating from tile size and perimeter detail). Standard flat grid.

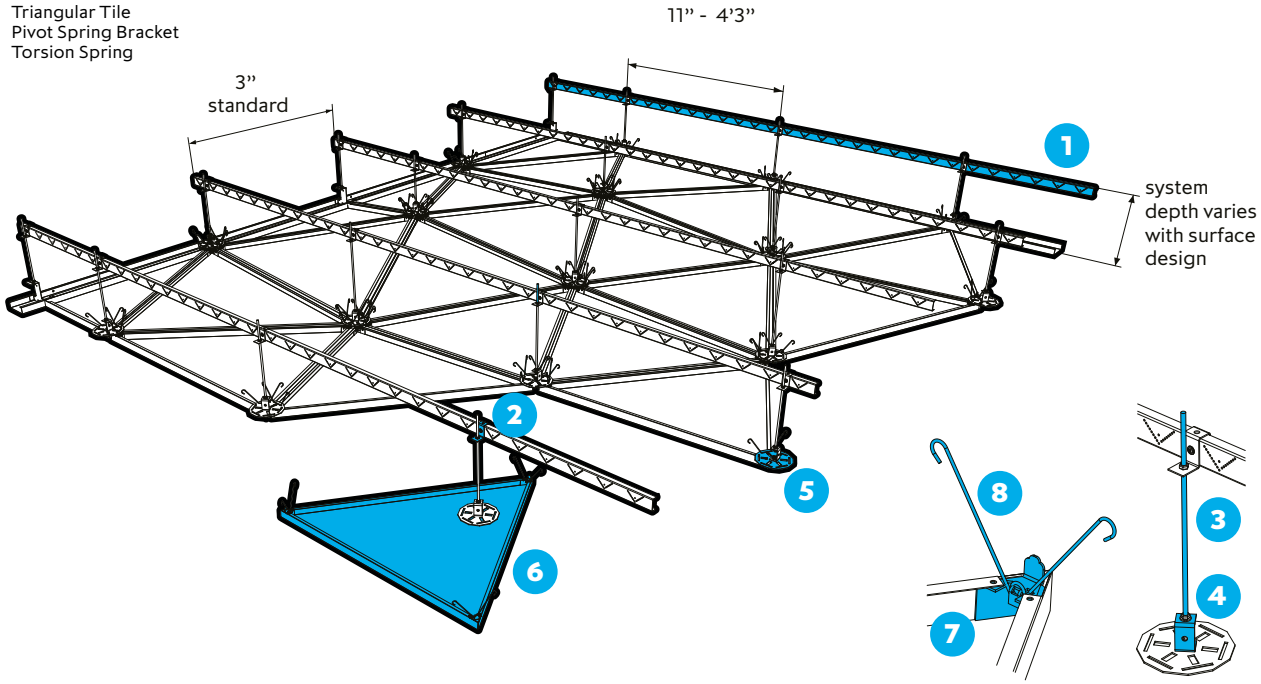
Advanced System
Simple curved grid allowing for more complex installations. May use some different size tiles. Will require some design input.

Bespoke Designs
SAS900 Polynode can replicate almost any complex geometry. For fully bespoke designs, SAS Special Projects can assist you in realising highly complex designs from concept to completion. Please contact SAS Special Projects for further information on this design service.

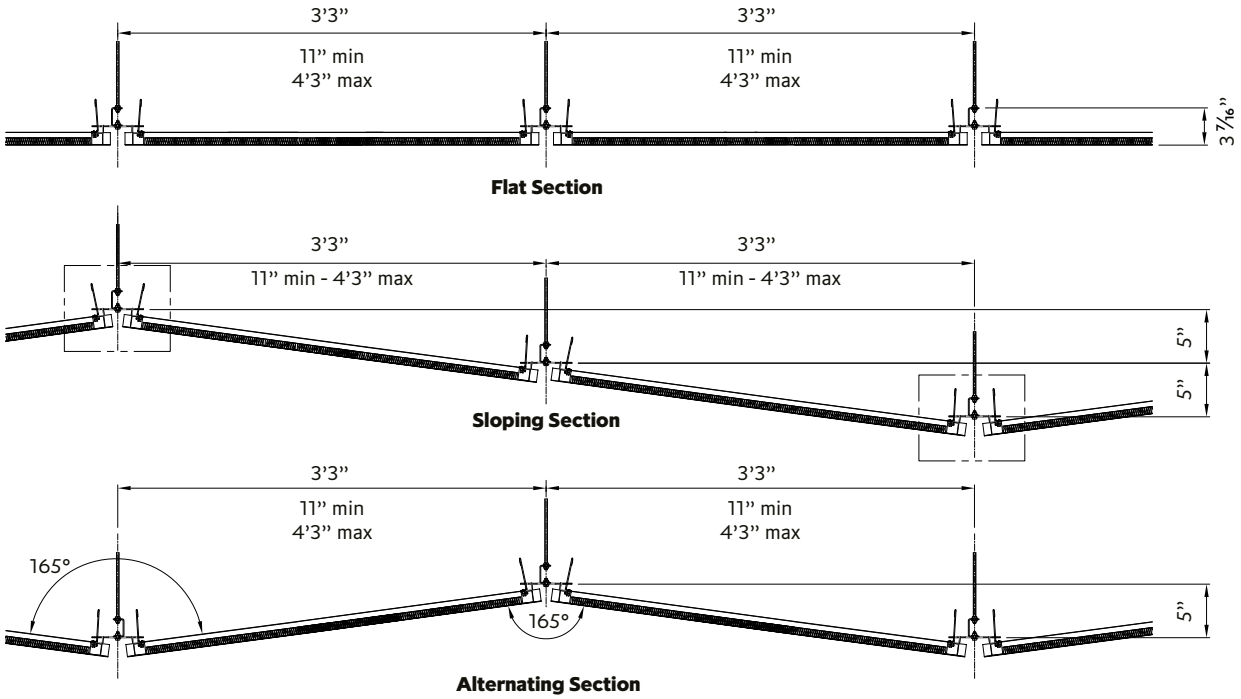
SAS**900** Polynode

Perspective Drawing

1 Emac Grid
2 Emac Hook-over Bracket
3 Threaded Rod
4 Basic Node Bracket
5 6 Point Node Plate
6 Triangular Tile
7 Pivot Spring Bracket
8 Torsion Spring

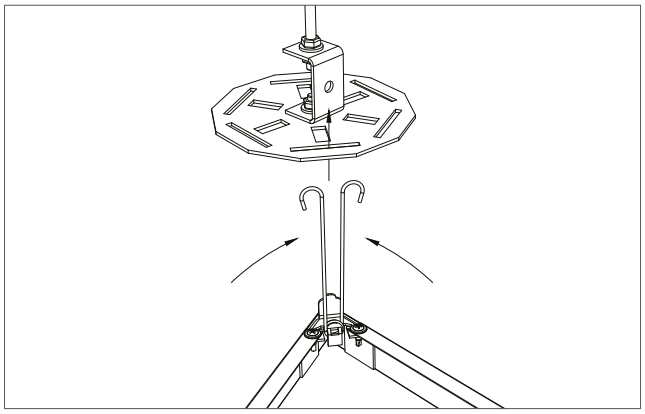


Section Drawing

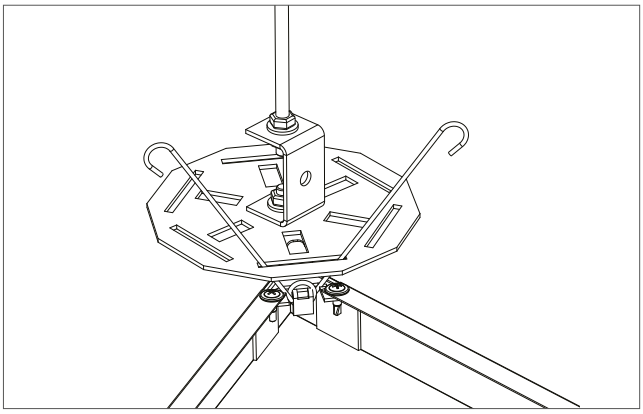


SAS**900** Polynode

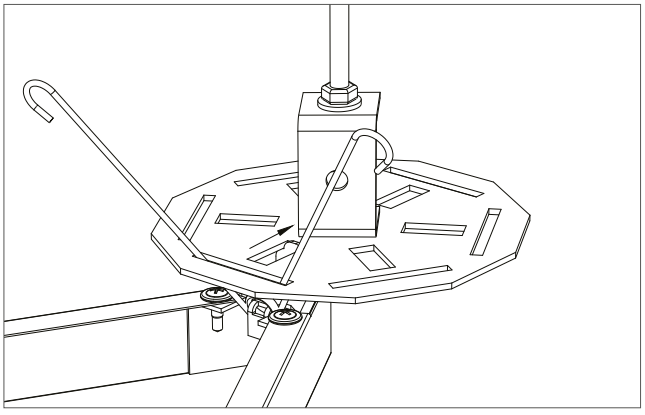
Features
At the core of SAS900 Polynode is a flexible node interface which allows a single size tile to fit.



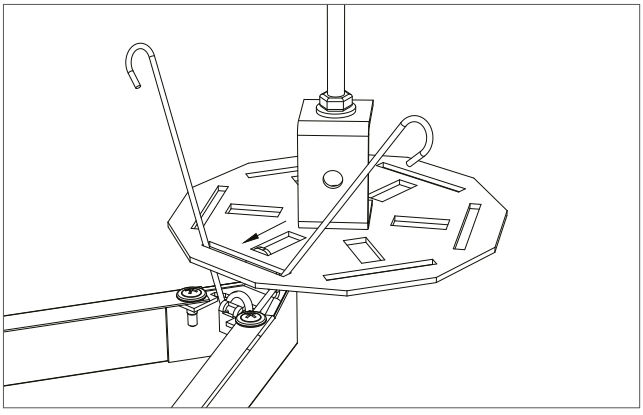
Tile installation



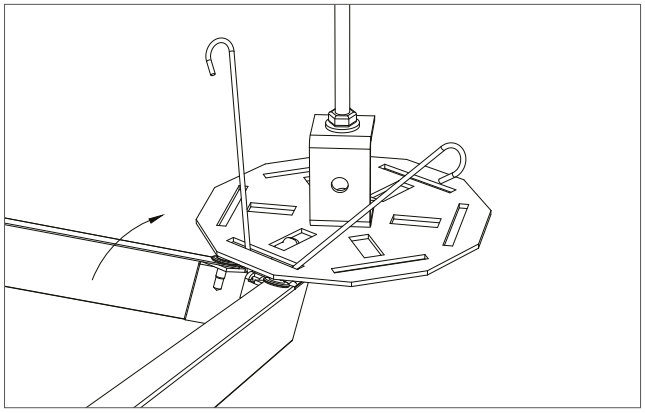
Tile in default position



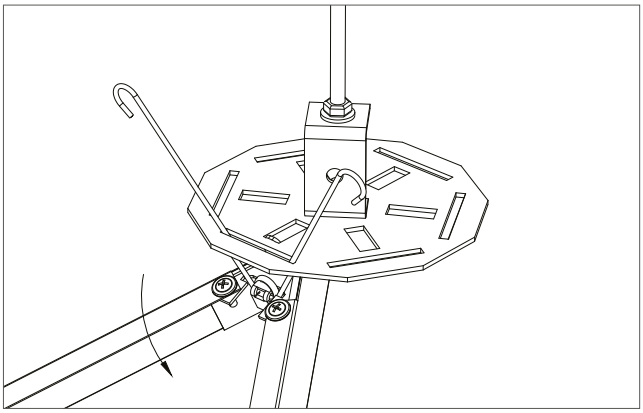
“Compressed” tile



“Stretched” tile



Pivoting up



Pivoting down

SAS**900** Polynode

SAS**900** Polynode

Trims

Trim Options

Trims offer a subtle and clean aesthetic solution to tile edges at perimeters and penetration points. SAS border and perimeter trims are designed to accommodate our full range of suspended ceiling systems.

Channel Trims
Channel trims are used to support and mask the cut edges of ceiling tiles in an attractive manner. Wedges hold the tile edge tightly in place to give a clean finish.

Shadow Gap Trims
Shadow gap details are best applied to perimeters to offer a sharp clean edge to otherwise uneven vertical surfaces.

Threaded Trims
Threaded trims are designed to match the ¼" thread-form details of Alugrid-Q and are used on full tile perimeter details

Angle Trims
Angle trims are used on full tile perimeter conditions where regular access is required. They are also typically used on one side of a corridor.

Floating / Suspended Trims
Floating trims offer a clean finish when you cannot fix to an available structure or transom, or where ceiling edges are exposed.

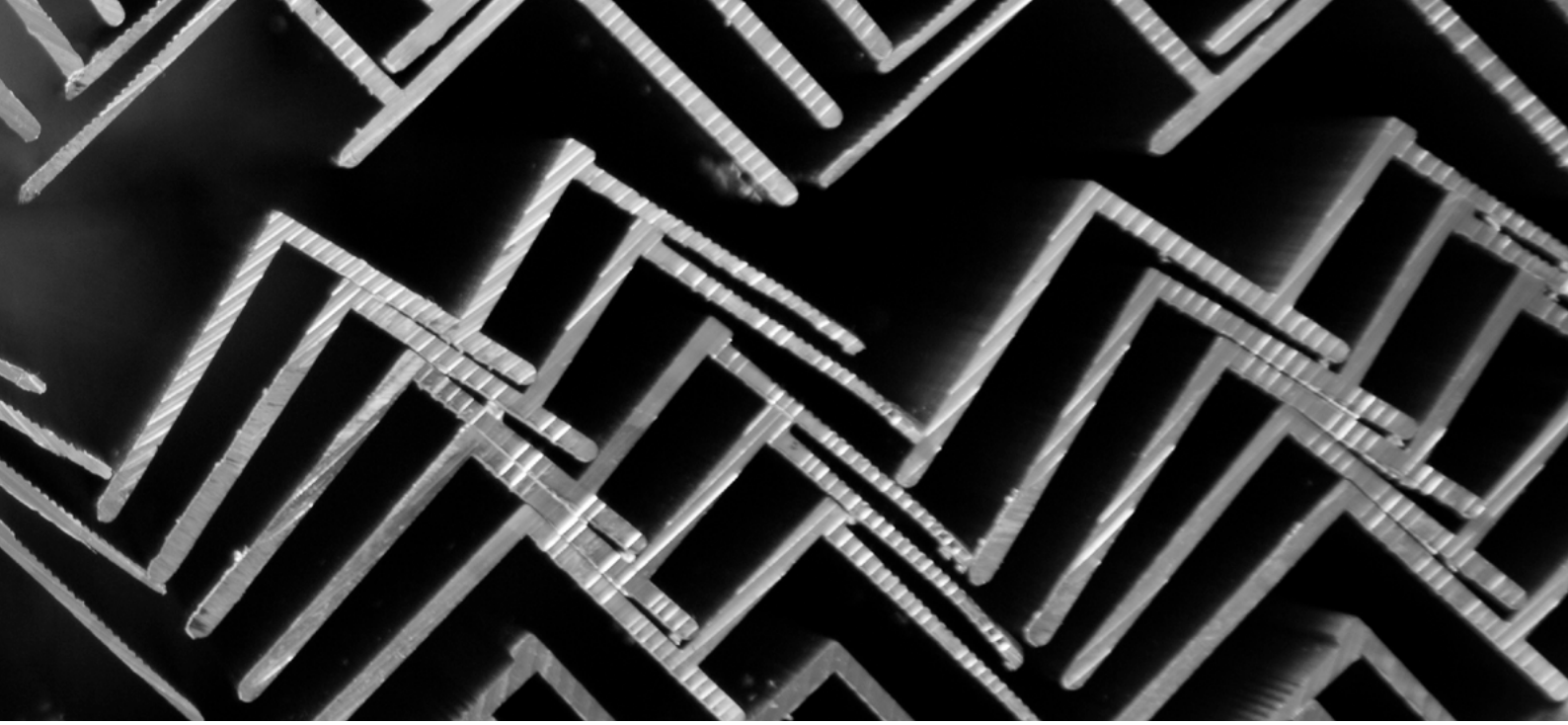
Transition Trims
Transition trims allow for the effective join between a suspended metal ceiling with a plasterboard surround. Also available with a shadow gap detail, the transition trim range provides options for all standard suspended metal ceiling systems.

Plasterboard Trims
A plasterboard margin can provide an attractive feature to a suspended ceiling and minimises the need for cut tiles. This solution is particularly effective for irregular perimeters, corridors and small cellular spaces with existing structural walls.

Column Rings
Perimeter trims and shadow gap sections can be rolled to form column rings to match perimeter details. Rectangular column trims can also be supplied prefabricated in halves for easy on-site installation.

Radiused Trims
Perimeter trims and shadow gap sections can also be rolled to form radiused profiles to match perimeter details.

When specifying or ordering any radiused trim it is necessary to indicate whether the trim required is Toe-In or Toe-Out.

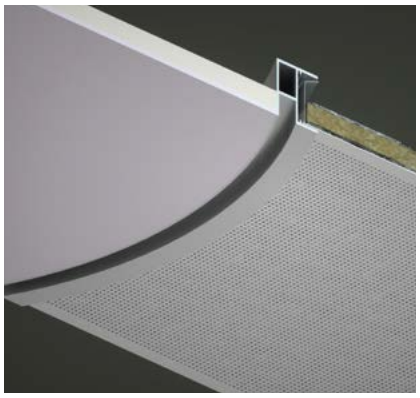


1. Toe-In and Toe-Out | Metal Tile to Plasterboard Trim

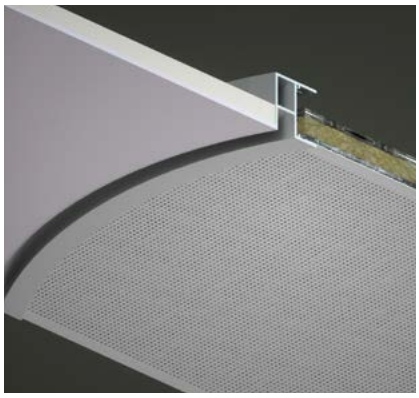
Toe-In The C-channel that accepts the cut tile is rolled in towards the tiles and rolled away from the plasterboard.

Toe-Out The C-channel is rolled away from the metal tile and rolled in towards the plasterboard.

Toe In



Toe Out



2. Toe-in and Toe-out | Plasterboard Perimeter Trim with no Metal Tile

In the case of plasterboard perimeter trims where no metal tiles are used, the plasterboard determines the toe.

Toe-In The plasterboard support edge is rolled in towards the plasterboard.

Toe-Out The plasterboard support edge is rolled away from the plasterboard.

Toe In

Toe Out

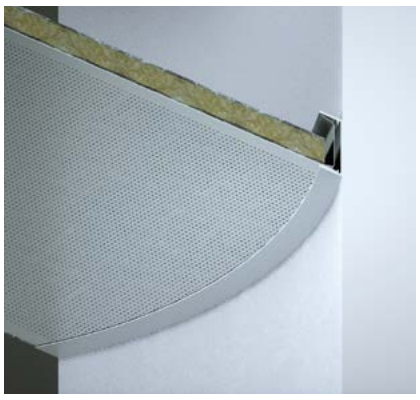
3. Toe-in and Toe-out | Radiused Trims

Where a radiused trim contacts a metal ceiling tile, the side that accepts the tile determines the toe. This can be either tile perimeter trims or tile to plasterboard trims.

Toe-In The C-channel that accepts the cut metal tile is rolled in towards the metal tiles.

Toe-Out The C-channel is rolled away from the metal tiles.

Toe In



Toe Out

Trims | Table

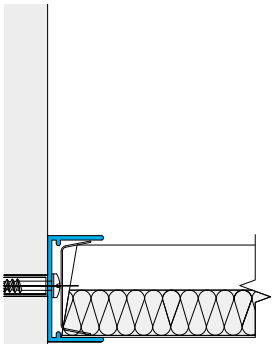
Trim	Item no	Description	Compatible Systems											Color		Page
			SAS120	SAS130	SAS150	SAS170	SAS200	SAS205	SAS320	SAS330	SAS380	SAS800	Suitable for curving	RAL 9010	RAL 9016	
CHANNEL TRIMS FOR METAL CEILING																
TCA 0108	10541	**13/16" Channel Trim**	■	■	■	■	■			■	■		■	•		220
TCA 0110	10543	**13/16" Extended Leg Channel Trim**	■	■	■	■	■			■	■		■	•		220
TCA 0124	10546	**9/16" Shadow Gap 13/16" Channel Trim**	■	■	■	■	■			■	■			•		220
FAB 0124	N/A	**9/16" Shadow Gap 13/16" Channel Trim Fabricated**	■	■	■	■	■			■	■		■	•		221
TCA 0128	10548	**13/16" Shadow Gap 13/16" Channel Trim**	■	■	■	■	■			■	■			•		221
FAB 0128	N/A	**13/16" x 13/16" Shadow Gap 13/16" Channel Trim Fabricated**	■	■	■	■	■			■	■		■	•		221
FAB 0133	N/A	**1" Shadow Gap 13/16" Channel Trim Fabricated**	■	■	■	■	■			■	■		■	•		222
TCA 0109	10542	**13/16" Extended Top Leg Channel Trim**	■	■	■	■	■			■	■		■	•		222
ANGLE TRIMS FOR METAL, OPEN CELL AND MINERAL FIBRE CEILINGS																
TCA 0101	10538	**9/16" Perimeter Angle Trim**	■	■	■	■	■			■	■	■		•		223
TCA 0105	10539	**13/16" Perimeter Angle Trim**	■	■	■	■	■			■	■	■	■	•		223
TCA 0107	10540	**13/16" Extended Leg Perimeter Angle Trim**	■	■	■	■	■			■	■	■	■	•		223
TCA 0864	334209	**3 9/16" Extended Leg Closure Angle**												•		224
TCA 0113	10544	**1" Perimeter Angle Trim**	■	■	■	■	■			■	■	■	■	•		224
TCA 0123	10545	**9/16" Shadow Gap 13/16" Angle Trim**	■	■	■	■	■			■	■	■		•		224
TCA 0127	10547	**13/16" Shadow Gap 13/16" Angle Trim**	■	■	■	■	■			■	■	■		•		225
METAL TILE TO PLASTERBOARD TRIMS																
TRU-MJ-150	10586	**Feathered Cut Metal Tile to Plasterboard Trim**	■	■	■	■	■			■	■		■	•		226
TRU-SJ-150	10580	**Feathered Cut Metal Tile to Plasterboard 9/16" Shadow Gap Trim**	■	■	■	■	■			■	■			•		226
FAB-SJ-150	N/A	**Feathered Cut Metal Tile to Plasterboard 9/16" Shadow Gap Trim Fabricated**											■	•		226
TRU-SH-150	14224	**Feathered Full Metal Tile to Plasterboard 9/16" Shadow Gap Trim**	■	■	■	■	■			■	■	■		•		227
TRU-KB-150	274106	**Feathered Full Metal Tile to Plasterboard Trim**	■	■	■	■	■			■	■	■		•		227
TCA 0144	14075	**Full Metal Tile to Plasterboard 13/16" Shadow Gap Trim**	■	■	■	■	■			■	■	■		•		227
TRU-SS-150	10581	**SAS150 Feathered Full Tile to Plasterboard Trim**			■									•		228
TRU-SG-150	10582	**SAS150 Feathered Full Tile to Plasterboard 9/16" Shadow Gap Trim**			■									•		228
TRU-TJ-330	14223	**SAS330 Feathered Full Tile to Plasterboard Trim**								■				•		228
TRU-DW-330	272083	**SAS330 Feathered Full Tile to Plasterboard Trim**								■				•		229
TRU-PB-330	10588	**SAS330 Feathered Full Tile to Plasterboard 9/16" Shadow Gap Trim**								■				•		229
TRU-LK-330	14232	**SAS330 Full Tile to Plasterboard 9/16" Shadow Gap Trim**								■				•		229
TRU-SJ-330	10587	**SAS330 Full Tile to Plasterboard 9/16" Shadow Gap Trim**								■				•		230
TRU-SL-330	187502	**SAS330 Plasterboard Shadow Gap Closure Trim**								■				•		230
SAS130 TO PLASTERBOARD TRIMS																
TRU-SJ-1508	222704	**SAS130 Feathered Full Tile to Plasterboard 9/16" Shadow Gap Trim (Plain to Suit Q15/08)**												•		231
TRU-SJ-T1508	22435	**SAS130 Feathered Full Tile to Plasterboard Trim (T15)**		■										•		231
TRU-SJ-T1516	10591	**SAS130 Feathered Full Tile to Plasterboard Trim (T15)**		■										•		231
TRU-SJ-1516	10570	**SAS130 Full Metal Tile to Plasterboard 9/16" Shadow Gap Trim (Threaded to Suit Q15/16 & Q15/19)**		■										•		232
TRU-TJ-1516	1023"	**SAS130 Full Metal Tile to Plasterboard Trim (Threaded to Suit Q15/16 & Q15/19)**		■										•		232
TRU-TJ-P1508	22437	**SAS130 Full Metal Tile to Plasterboard Trim (Plain to Suit P15/08)**		■										•		232
TRU-TJ-1508	14201	**SAS130 Full Metal Tile to Plasterboard Trim (Threaded to Suit Q15/08)**		■										•		233
TRU-SW-1508	196059	**SAS130 Full Metal Tile to Plasterboard 9/16" Shadow Gap Trim (Plain to Suit P15/08)**		■										•		233
TRU-SW-1516	10699	**SAS130 Full Metal Tile to Plasterboard 9/16" Shadow Gap Trim (Plain to Suit P15/16)**		■										•		233
PLASTERBOARD EDGE TRIMS																
FAB-ST-150	N/A	**9/16" Shadow Gap Plasterboard Trim Fabricated**												•		234
TCA 0152	10552	**Plasterboard Perimeter Trim**												•		234
TCA 0153	10553	**Bevelled Plasterboard Perimeter Trim**												•		234
TCA 0155	10555	**9/16" x 9/16" Shadow Gap Plasterboard Trim**												•		235
TRU-PT-250	10585	**1" Feathered Extended Leg Plasterboard Trim**												•		235
TRU-ST-150	10579	**9/16" Shadow Gap Plasterboard Trim**												•		235
BULKHEAD TRIMS																
TCA 0169	10697	**Cut Metal Tile to Vertical Plasterboard Bulkhead Trim**	■	■	■	■	■	■	■	■	■	■		•		236
TCA 0173	10557	**Cut Metal Tile to Vertical Plasterboard Bulkhead Trim**	■	■	■	■	■	■	■	■	■	■		•		236
TCA 0219	10564	**Full Metal Tile to Vertical Plasterboard Trim**	■	■	■	■	■	■	■	■	■	■		•		236
TCA 1203	59956	**SAS150 Full Tile Closure Detail**			■									•		237
TCA 2111	266551	**9/16" Shadow Gap 13/16" Angle Trim**					■							•		237
TRU-CJ-330	192042	**SAS330 Shadow Gap Trim**								■				•		237

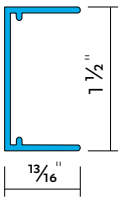
			Compatible Systems										Color		
			SAS120	SAS130	SAS200	SAS205	SAS310	SAS320	SAS330	SAS380	SAS800	Suitable for curving	RAL 9010	RAL 9016	
Trim	**Item no**	**Description**													**Page**
MITRE JUNCTION TRIMS															
TCA 0215	14091	**Cut Metal Tile 1 9/16" Mitre Junction Trim**											•		238
TCA 0310	10565	**Cut Metal Tile 3 15/16" Mitre Junction Trim**											•		238
LINEAR GRID TRIMS															
TCA 0313	14105	**Threaded C-Profile 1 15/16" wide**											•		239
TCA 0314	14110	**Threaded C-Profile 1 9/16" wide**											•		239
TCA 1182	22428	**C-Profile 1 9/16" wide**											•		239
SAS330 TRIMS															
TCA 0862	299794	**SAS330 Full Tile Closure Detail**											•		240
TCA 0637	256239	**SAS330 Full Tile Closure Detail**											•		240
TCA 1136	14136	**SAS330 Full Metal Tile to Vertical Plasterboard Perimeter Trim, 9/16" Shadow Gap**											•		240
SAS FLOATING EDGE TRIMS															
TCA 0861	299189	**Floating Edge detail - Closure**											•		241
TCA 0860	288652	**Snap-In Edge detail - Cut/Full Tile Trim**											•		241
TRU-HM-100	288449	**Snap-In Edge detail - Plasterboard Trim**											•		241
TCA 1300	288655	**Snap-In Edge detail - SAS130**											•		242
TCA 1301	288656	**Snap-In Edge detail - SAS330**											•		242
BLIND BOX TRIMS															
TCA 0312	14103	**3 15/16" Blind Box Channel Trim**											•		243
TCA 0317	22427	**3 15/16" Blind Box Angle Trim**											•		243
TCA 1147	14139	**3 7/8" Blind Box Plasterboard Trim**											•		243
TCA 0863	288448	**3 15/16" x4 5/16" Snap-In Blind Box**											•		244
GRAVITY BATON TRIM															
TCA 0507	371489	**"Z" Shape Profile for Hook On Tiles**													248

Trims | Channel

TCA 0108*

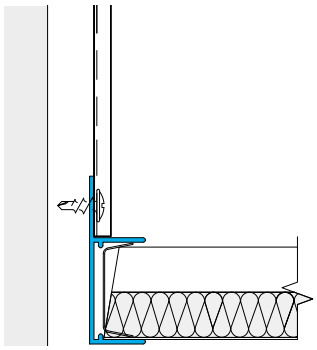
Size **13/16"Channel Trim**
Item No **10541**
Length **9'10"**
Accessories **TCP90, TCP180, Perimeter Wedge**

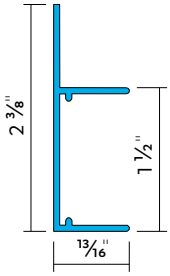




TCA 0110*

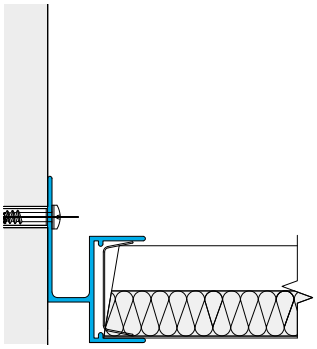
Size **13/16" Extended Leg Channel Trim**
Item No **10543**
Length **9'10"**
Accessories **TCP90, TCP180, Perimeter Wedge**

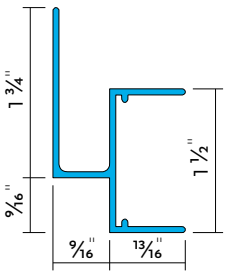




TCA 0124*

Size **9/16" Shadow Gap, 13/16" Channel Trim**
Item No **10546**
Length **9'10"**
Accessories **TCP90, TCP180, Perimeter Wedge**



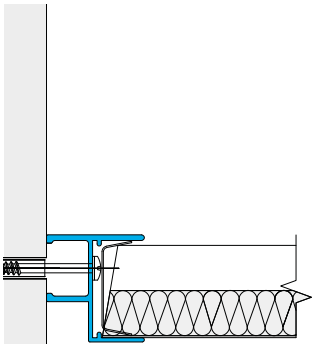


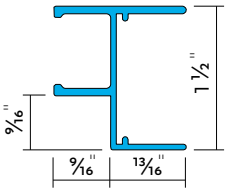
*Can also be manufactured as radiused trim for column rings.

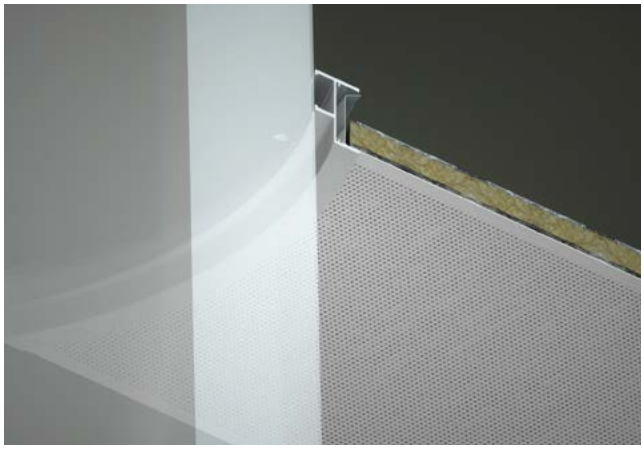
Trims | Channel

FAB 0124

Size **9/16" Shadow Gap, 13/16" Channel Trim Fabricated**
Item No **N/A**
Length **9'10"**
Accessories **TCP90, TCP180, Perimeter Wedge**

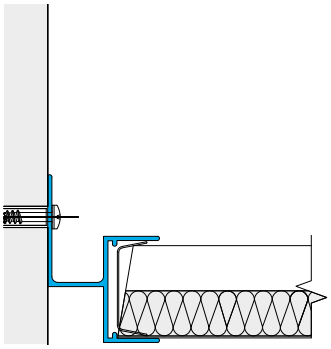


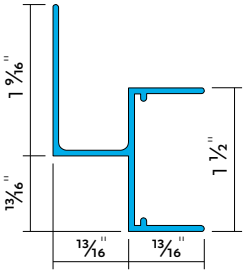




TCA 0128*

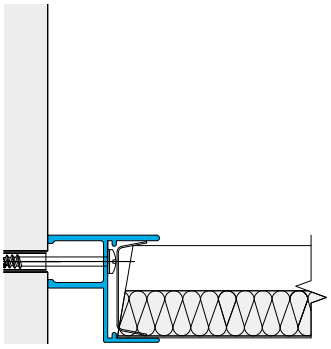
Size **13/16"Shadow Gap, 13/16" Channel Trim**
Item No **10548**
Length **9'10"**
Accessories **TCP90, TCP180, Perimeter Wedge**

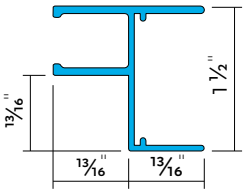


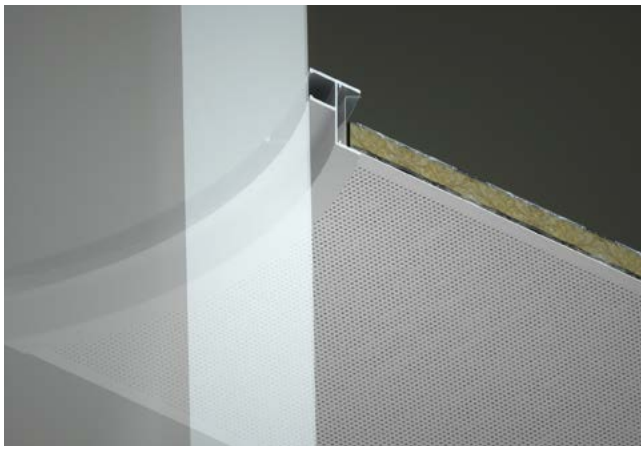


FAB 0128

Size**13/16" Shadow Gap, 13/16" Channel Trim**
Item No **N/A**
Length **9'10"**
Accessories **TCP90, TCP180, Perimeter Wedge**





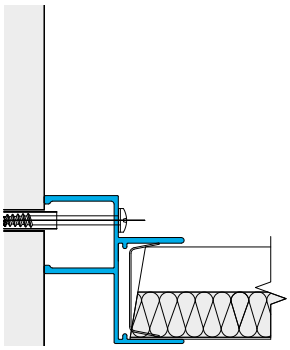


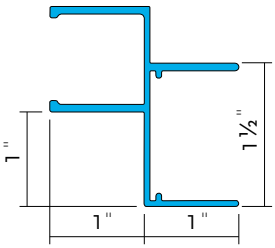
*Can also be manufactured as radiused trim for column rings.

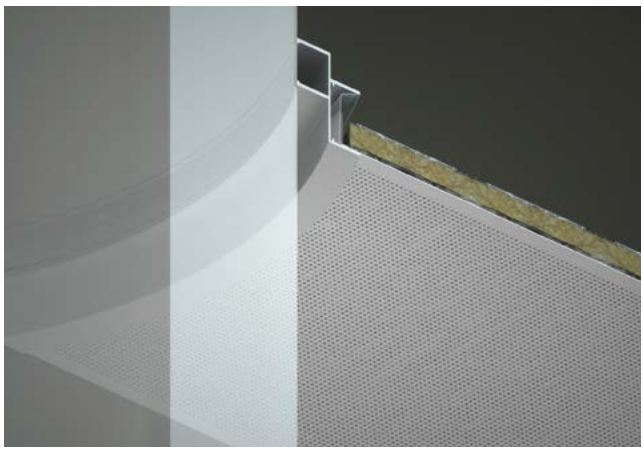
Trims | Channel

FAB 0133

Size **1" Shadow Gap, 13/16" Channel Trim Fabricated**
Item No **N/A**
Length **9'10"**
Accessories **TCP90, TCP180, Perimeter Wedge**

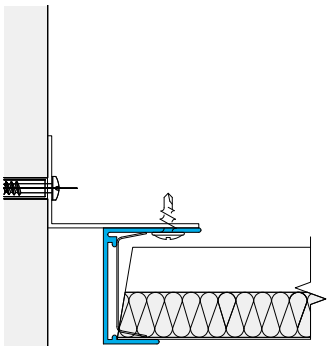


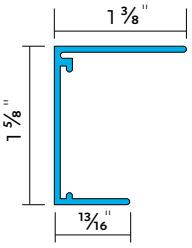


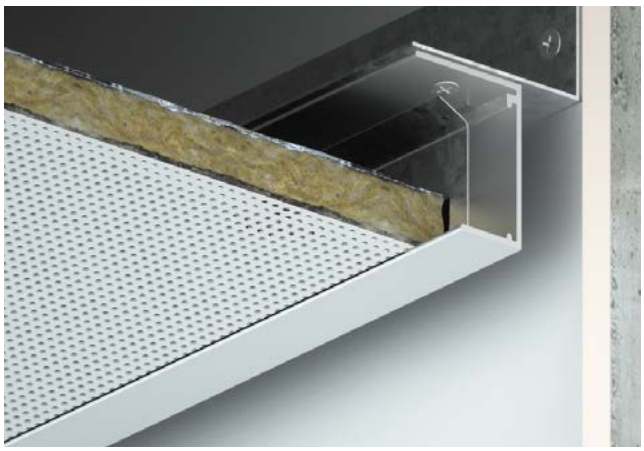


TCA 0109

Size **13/16" Extended Top Leg Channel Trim**
Item No **10542**
Length **9'10"**
Accessories **TCP90, TCP180, Perimeter Wedge (266788)**



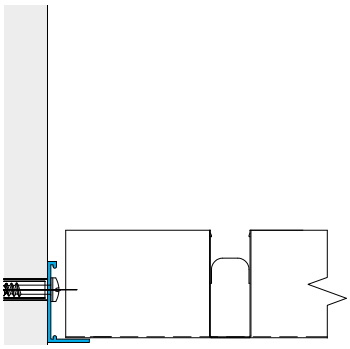


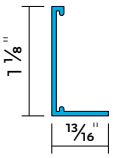


Trims | Angle

TCA 0101*

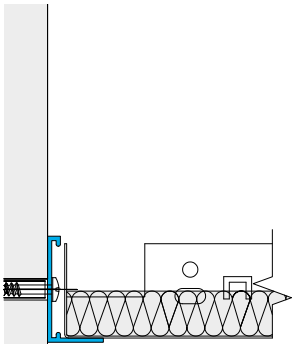
Size **9/16" Perimeter Angle Trim (Trucell)**
Item No **10538**
Length **9'10"**
Accessories **TCP90s, TCP180s**

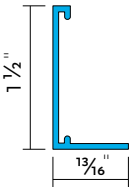




TCA 0105*

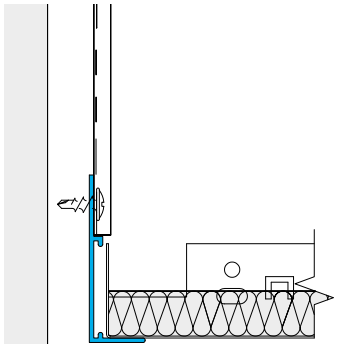
Size **13/16" Perimeter Angle Trim**
Item No **10539**
Length **9'10"**
Accessories **TCP90, TCP180, TCP360**

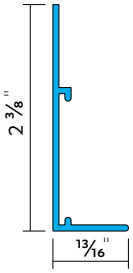




TCA 0107

Size **13/16" Extended Leg Perimeter Angle Trim**
Item No **10540**
Length **9'10"**
Accessories **TCP90, TCP180, TCP360**



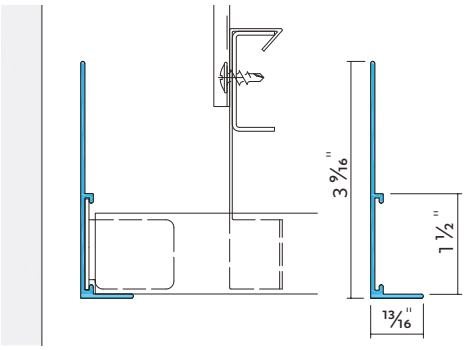


*Can also be manufactured as radiused trim for column rings.

Trims | Angle

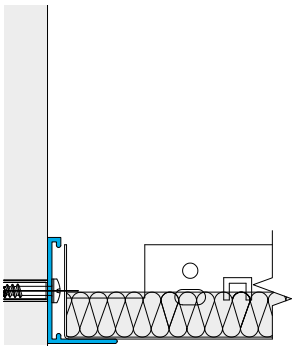
TCA 0864

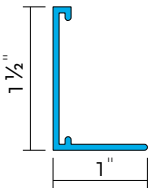
Size **3 9/16" Extended Leg Closure Angle**
Item No **334209**
Length **9'10"**
Accessories **TCP90, TCP180, TCP 90s (to be used only with linear trims)**



TCA 0113

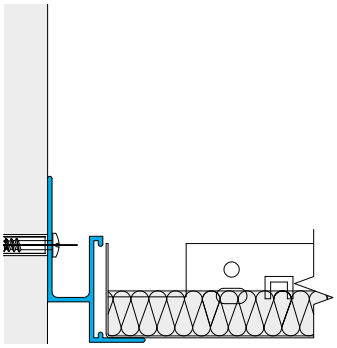
Size **1" Perimeter Angle Trim**
Item No **10544**
Length **9'10"**
Accessories **TCP90, TCP180, TCP360**

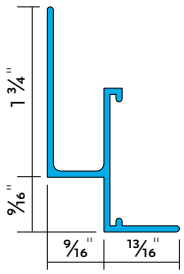




TCA 0123*

Size **9/16" Shadow Gap, 13/16" Angle Trim**
Item No **10545**
Length **9'10"**
Accessories **TCP90, TCP180, TCP360**



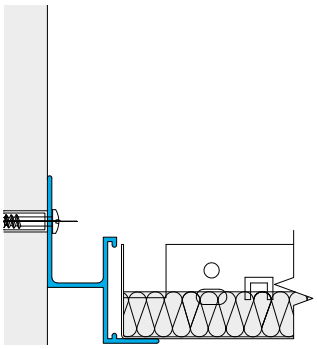


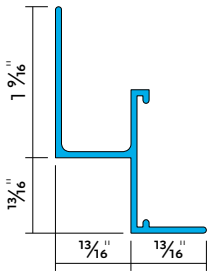
*Can also be manufactured as radiused trim for column rings.

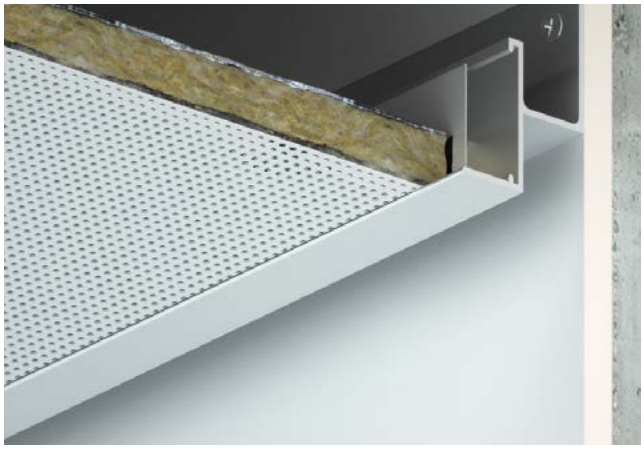
Trims | Angle

TCA 0127*

Size **13/16" Shadow Gap, 13/16" Angle Trim**
Item No **10547**
Length **9'10"**
Accessories **TCP90, TCP180, TCP360**





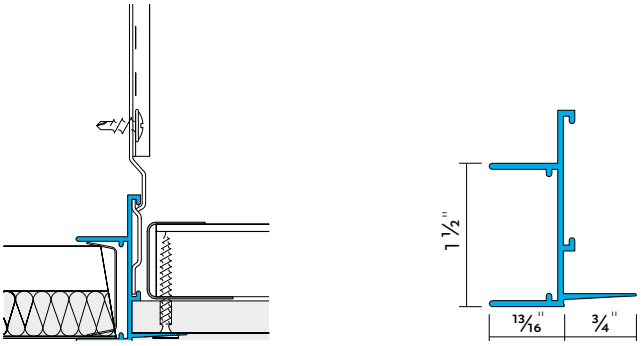


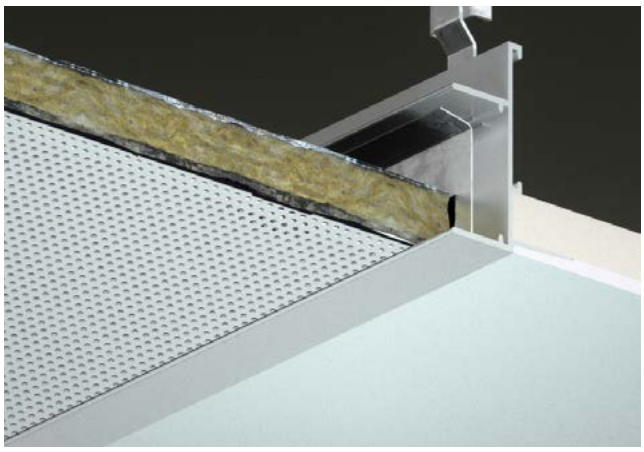
*Can also be manufactured as radiused trim for column rings.

Trims | Plasterboard

TRU MJ 150

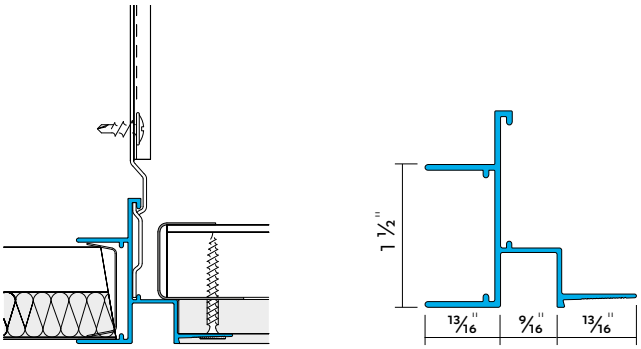
Feathered Cut Metal Tile to Plasterboard Trim
Item No **10586**
Length **9'10"**
Accessories **TCB01, TCB08, TCP90, TCP180, TCP360, Perimeter Wedge**

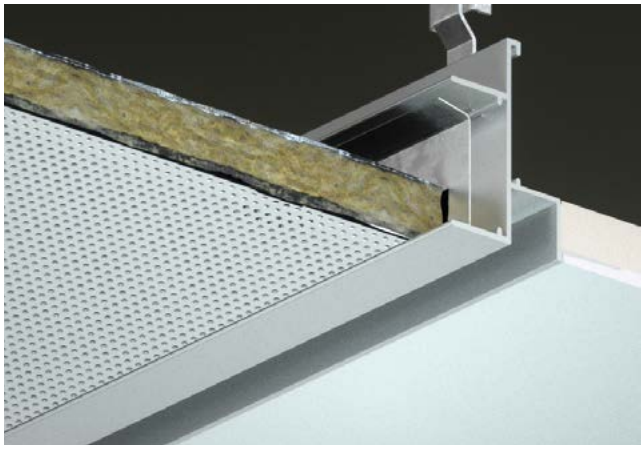




TRU SJ 150

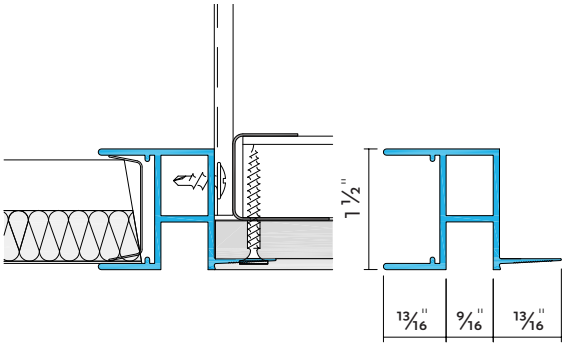
Feathered Cut Metal Tile to Plasterboard, 9/16" Shadow Gap Trim
Item No **10580**
Length **9'10"**
Accessories **TCB01, TCB08, TCP90, TCP180, TCP360, Perimeter Wedge**

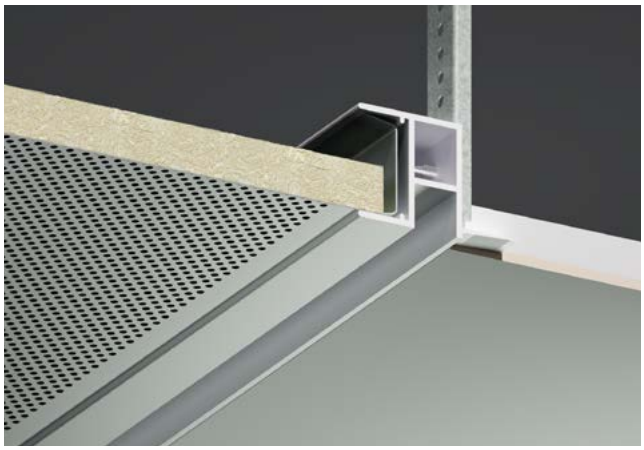




FAB SJ 150

Feathered Cut Metal Tile to Plasterboard, 9/16" Shadow Gap Trim Fabricated
Item No **N/A**
Length **-**
Accessories **TCB01, TCB08, TCP90, TCP180, TCP360, Perimeter Wedge**

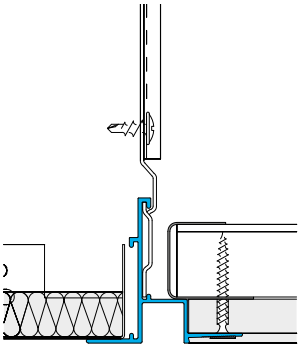


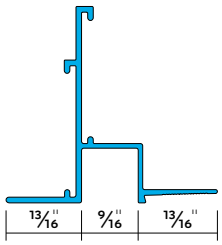


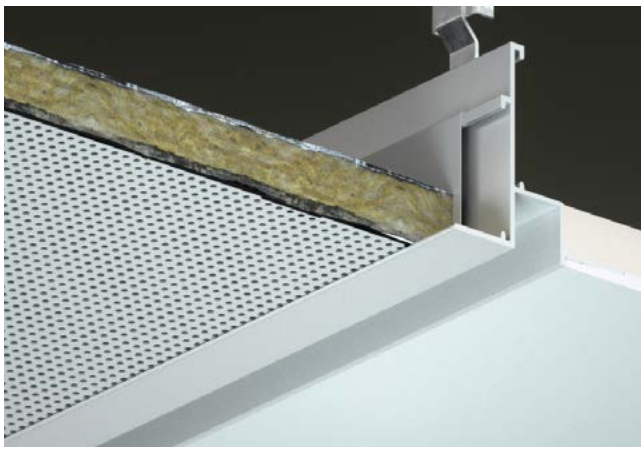
Trims | Plasterboard

TRU SH 150

Feathered Full Tile to Plasterboard, 9/16" Shadow Gap Trim
Item No **14224**
Length **9'10"**
Accessories **TCB01, TCB08, TCP90, TCP180, TCP360**

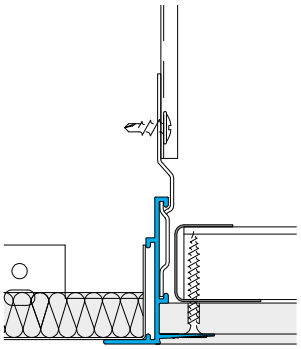


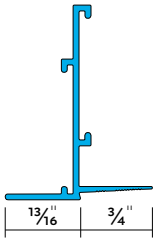


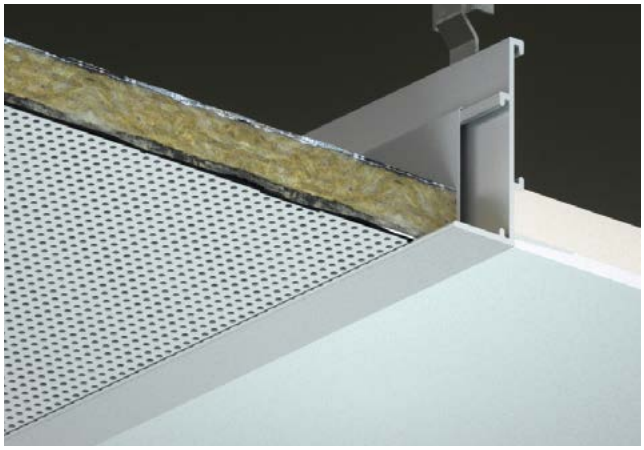


TRU KB 150

Feathered Full Metal Tile to Plasterboard Trim
Item No **274106**
Length **9'10"**
Accessories **TCB01, TCB08, TCP90, TCP180, TCP360**

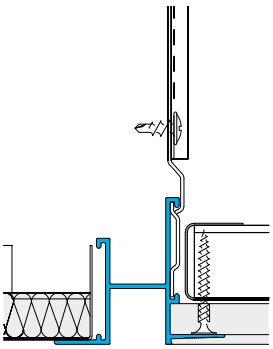


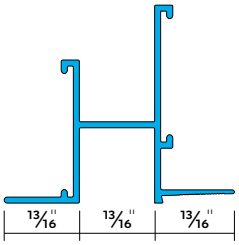


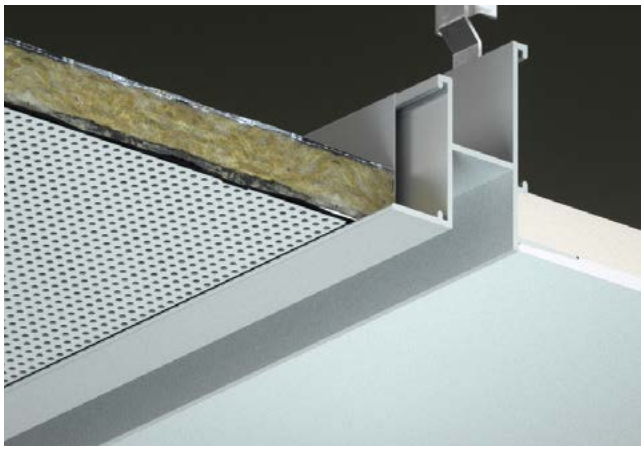


TCA 0144

Full Metal Tile to Plasterboard, 13/16" Shadow Gap Trim
Item No **14075**
Length **9'10"**
Accessories **TCB01, TCB08, TCP90, TCP180, TCP360**



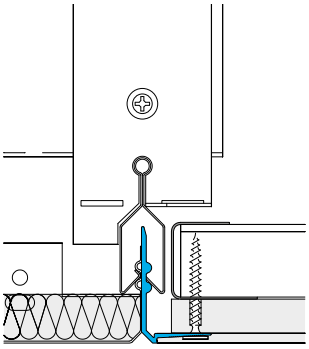


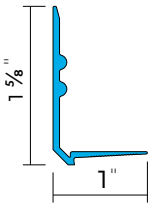


Trims | Plasterboard

TRU SS 150

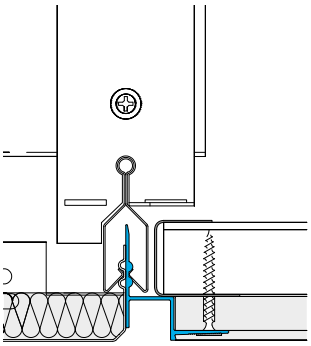
SAS150 Feathered Full Tile to Plasterboard Trim
Item No **10581**
Length **9'10"**
Accessories **N/A**

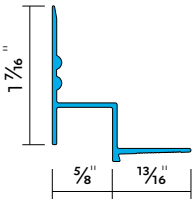


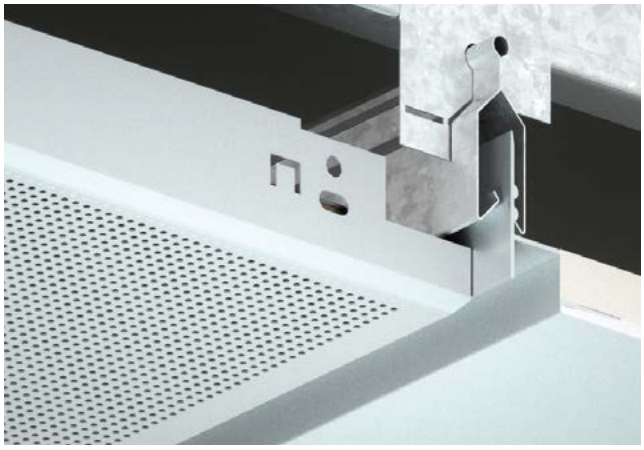


TRU SG 150

SAS150 Feathered Full Tile to Plasterboard, 9/16" Shadow Gap Trim
Item No **10582**
Length **9'10"**
Accessories **N/A**

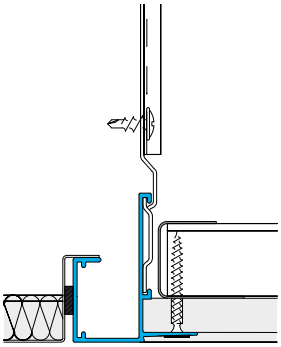


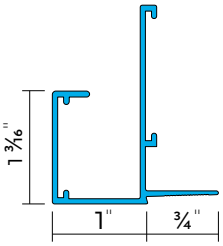


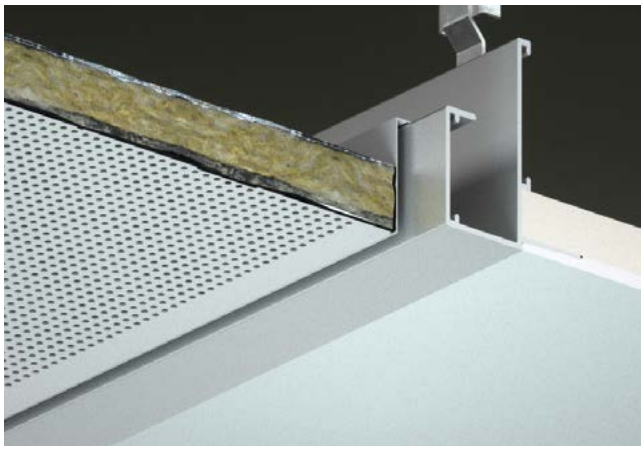


TRU TJ 330

SAS330 Feathered Full Tile to Plasterboard Trim
Item No **14223**
Length **9'10"**
Accessories **TCB01, TCB08, TCP90/90s, TCP180/180s, TCP360**



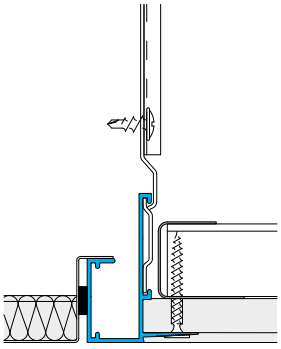


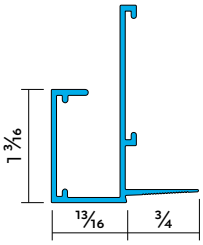


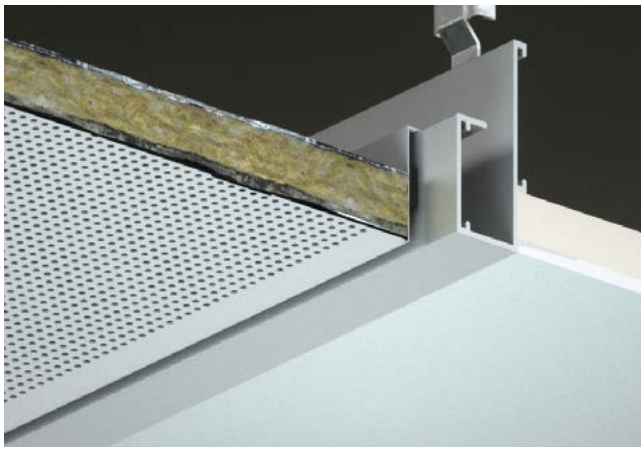
Trims | Plasterboard

TRU DW 330

SAS330 Feathered Full Tile to Plasterboard Trim
Item No **272083**
Length **9'10"**
Accessories **TCB01, TCB08, TCP90/90s, TCP180/180s, TCP360**

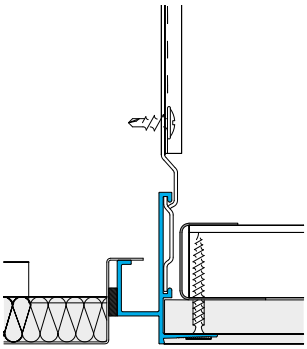


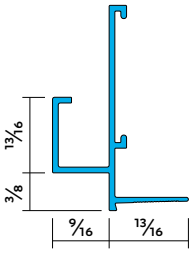


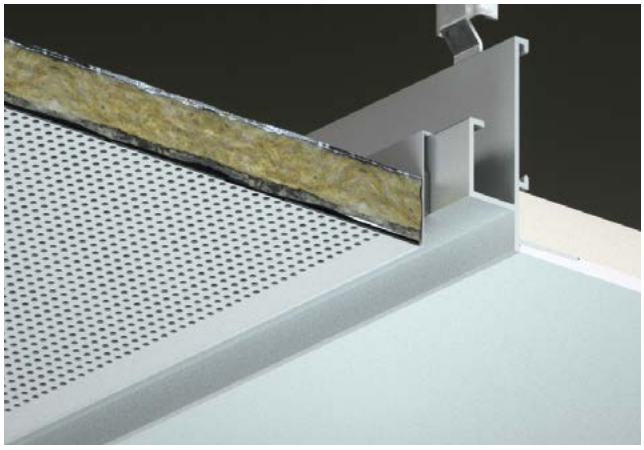


TRU PB 330

SAS330 Feathered Full Tile to Plasterboard, 9/16" Shadow Gap Trim
Item No **10588**
Length **9'10"**
Accessories **TCB01, TCB08, TCP90, TCP180, TCP360**

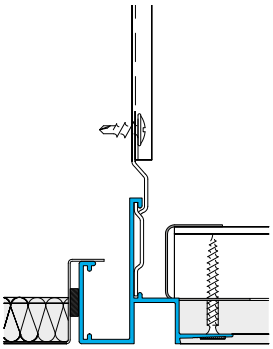


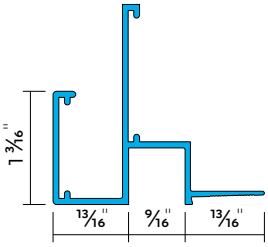


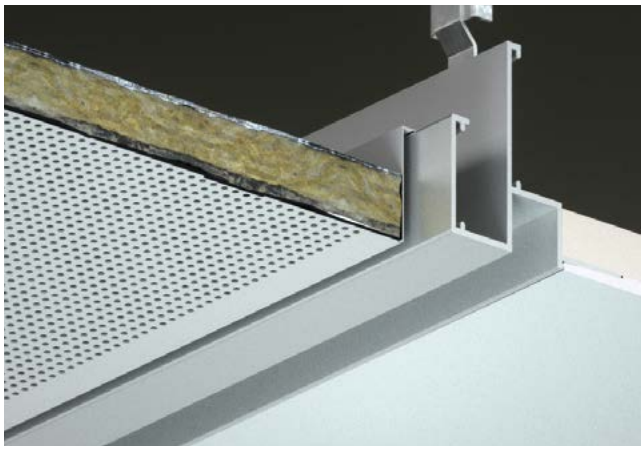


TRU LK 330

SAS330 Full Tile to Plasterboard, 9/16" Shadow Gap Trim
Item No **14232**
Length **9'10"**
Accessories **TCB01, TCB08, TCP90/90s, TCP180/180s, TCP360**



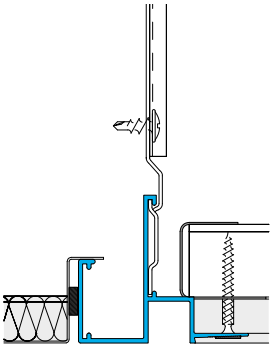


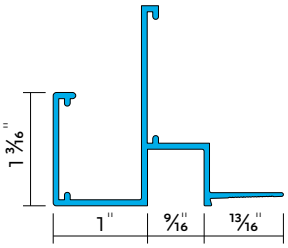


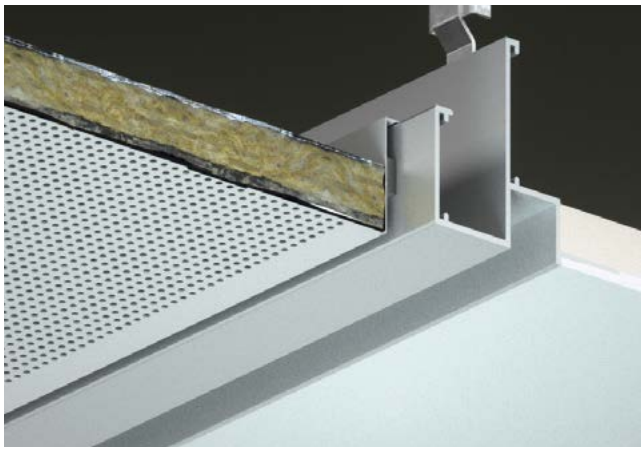
Trims | Plasterboard

TRU SJ 330

SAS330 Full Tile to Plasterboard, 9/16" Shadow Gap Trim
Item No **10587**
Length **9'10"**
Accessories **TCB01, TCB08, TCP90/90s, TCP180/180s, TCP360**

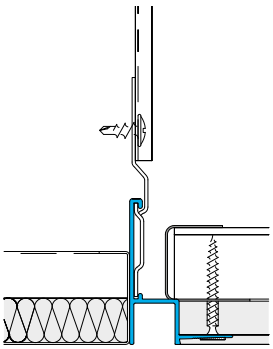


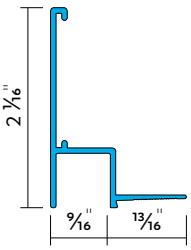




TRU SL 330

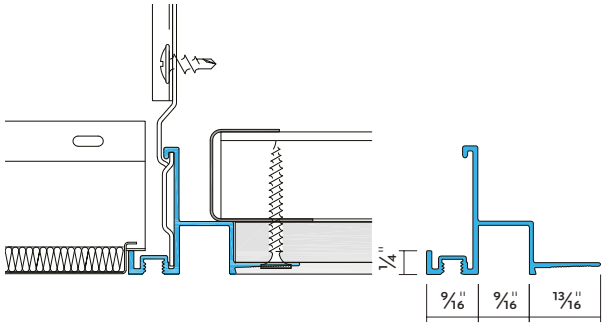
SAS330 Plasterboard Shadow Gap Closure Trim
Item No **187502**
Length **9'10"**
Accessories **TCP90, TCP180, TCP360**





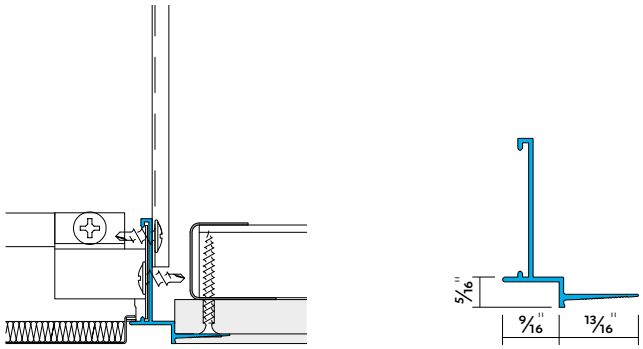
TRU SJ 1508

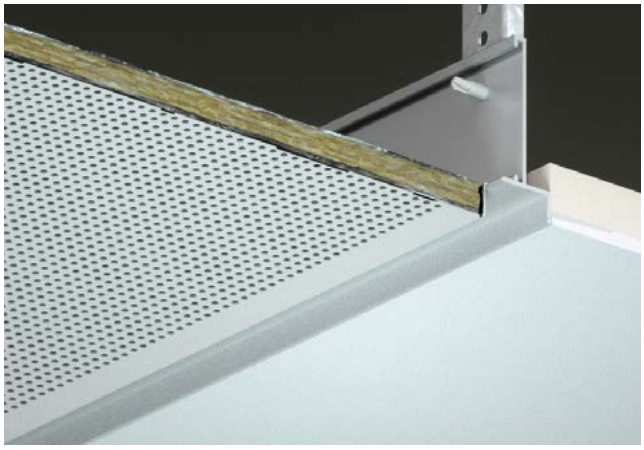
SAS130 Feathered Full Tile to Plasterboard 9/16" Shadow Gap Trim (Plain to Suit Q15/08)
Item No **222704**
Length **9'10"**
Accessories **TCB08, TCP90, TCP180, TCP 360**



TRU SJ T1508

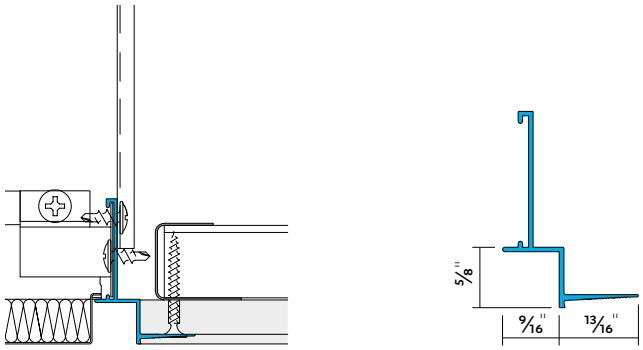
SAS130 Feathered Full Tile to Plasterboard Trim (T15)
Item No **22435**
Length **9'10"**
Accessories **TCB01, TCB08, TCP90, TCP180, TCP360, 21566**

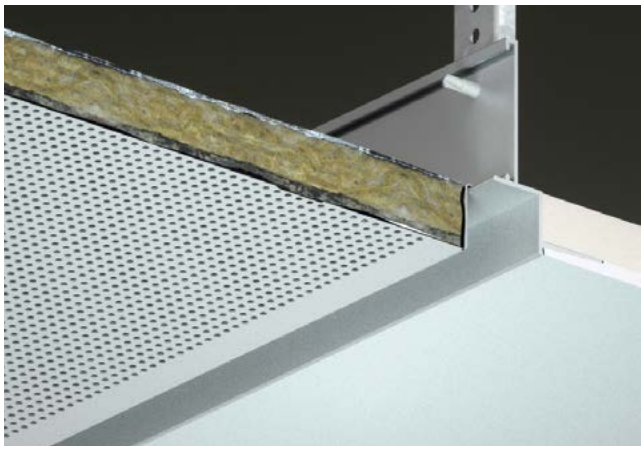




TRU SJ T1516

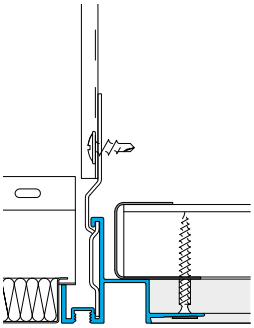
SAS130 Feathered Full Tile Plasterboard Trim (T15)
Item No **10591**
Length **9'10"**
Accessories **TCB01, TCB08, TCP90, TCP180, TCP360, 21566**

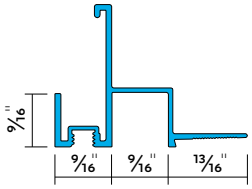


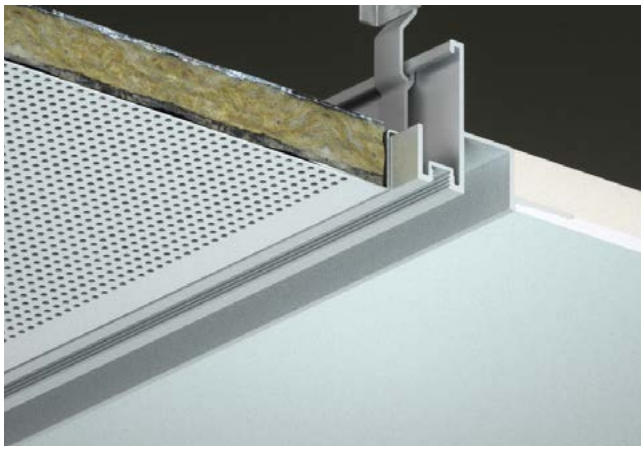


TRU SJ 1516

SAS130 Full Tile to Plasterboard 9/16" Shadow Gap Trim (Threaded to Suit Q15/16 & Q15/19)
Item No **10570**
Length **9'10"**
Accessories **TCB01, TCB08, TCP90, TCP180, TCP360**

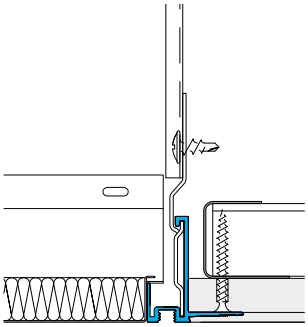


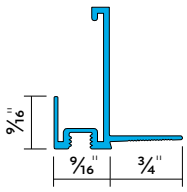




TRU TJ 1516

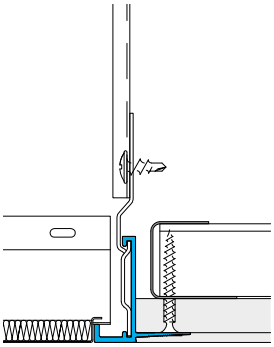
SAS130 Full Metal Tile to Plasterboard Trim (Threaded to Suit Q15/16 & Q15/19)
Item No **1023"**
Length **9'10"**
Accessories **TCB01, TCB08, TCP90, TCP180, TCP360**

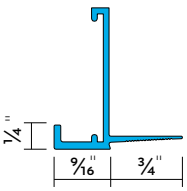


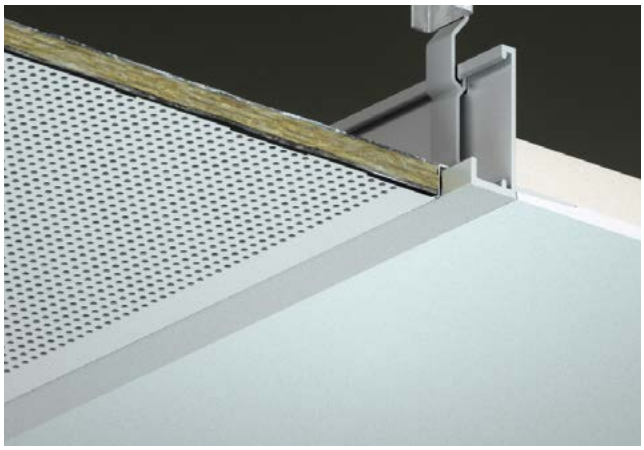


TRU TJ P1508

SAS130 Full Metal Tile to Plasterboard Trim (Plain to Suit P15/08)
Item No **22437**
Length **9'10"**
Accessories **TCB01, TCB08, TCP90, TCP180, TCP360**

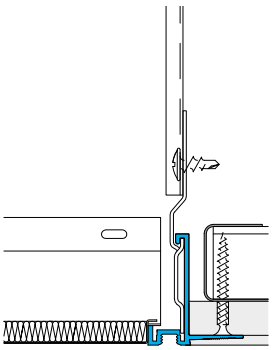


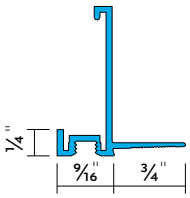


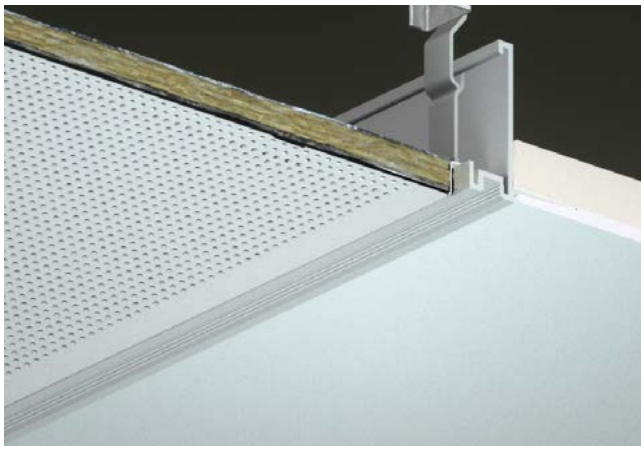


TRU TJ 1508

SAS130 Full Tile to Plasterboard Trim (Threaded to Suit Q15/08)
Item No **14201**
Length **9'10"**
Accessories **TCB01, TCB08, TCP90, TCP180, TCP360**

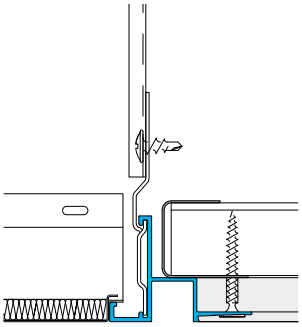


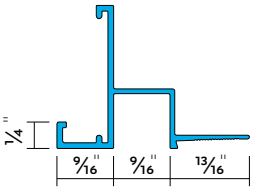


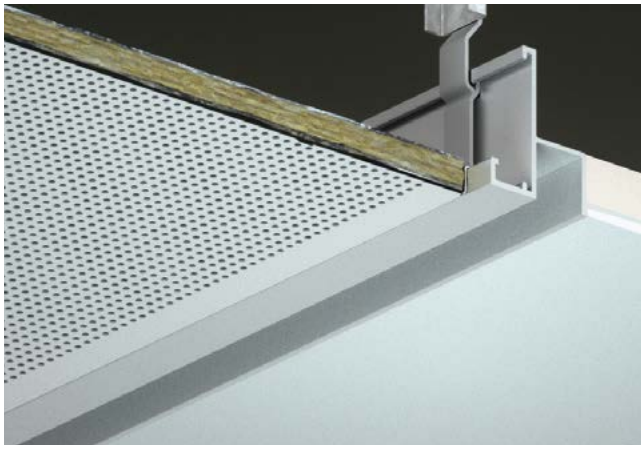


TRU SW 1508

SAS130 Full Metal Tile to Plasterboard 9/16" Shadow Gap Trim (Plain to Suit P15/08)
Item No **196059**
Length **9'10"**
Accessories **TCB01, TCB08, TCP90, TCP180, TCP360**

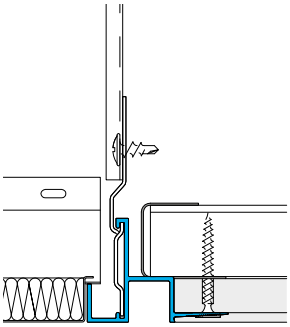


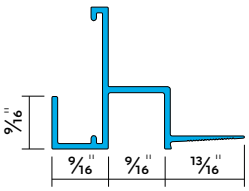




TRU SW 1516

SAS130 Feathered Full Tile to Plasterboard 9/16" Shadow Gap Trim (Plain to Suit P15/16)
Item No **10699**
Length **9'10"**
Accessories **TCB01, TCB08, TCP90, TCP180, TCP360**

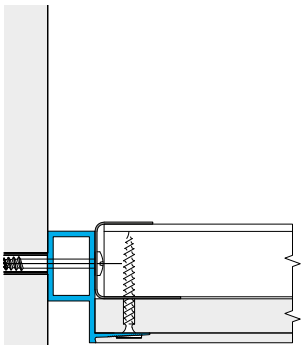


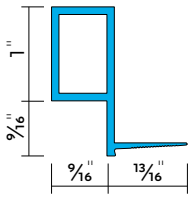


Trims | Plasterboard Edge

FAB ST 150*

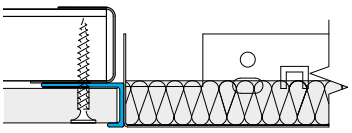
9/16" Shadow Gap Plasterboard Trim Fabricated
Item No **N/A**
Length **9'10"**
Accessories **N/A**

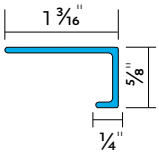




TCA 0152*

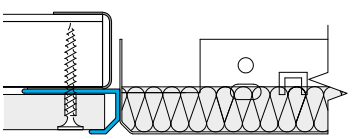
Plasterboard Perimeter Trim
Item No **10552**
Length **9'10"**
Accessories **N/A**

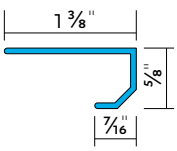




TCA 0153

Bevelled Plasterboard Perimeter Trim
Item No **10553**
Length **9'10"**
Accessories **N/A**



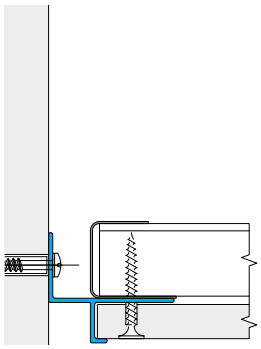


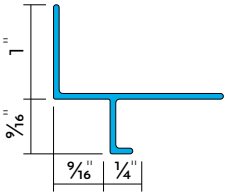
*Can also be manufactured as radiused trim for column rings.

Trims | Plasterboard Edge

TCA 0155*

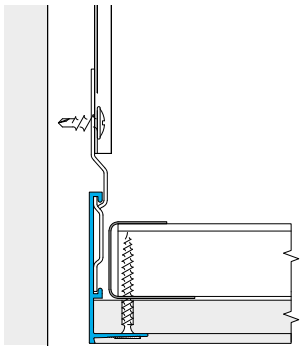
9/16" x 9/16" Shadow Gap Plasterboard Trim
Item No ***10555***
Length **9'10"**
Accessories **N/A**

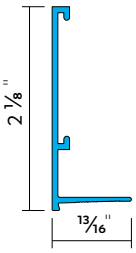




TRU PT 250

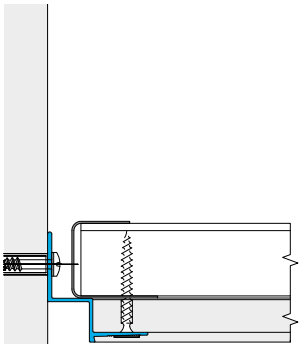
1" Feathered Extended Leg Plasterboard Trim
Item No **10585**
Length **9'10"**
Accessories **TCB01, TCB08, TCP90, TCP180, TCP360, Perimeter Wedge**

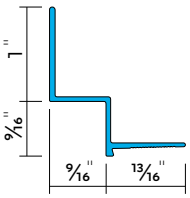




TRU ST 150

9/16" Shadow Gap Plasterboard Trim
Item No **10579**
Length **9'10"**
Accessories **N/A**



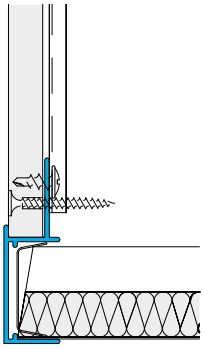


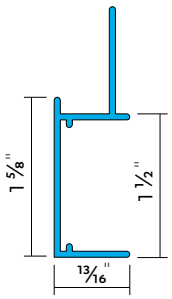
*Can also be manufactured as radiused trim for column rings.

Trims | Bulkhead

TCA 0169

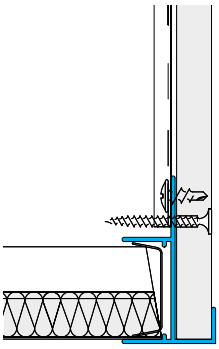
Cut Metal Tile to Vertical Plasterboard Bulkhead Trim
Item No **10697**
Length **9'10"**
Accessories **TCP90, TCP180, TCP360, Perimeter Wedge**

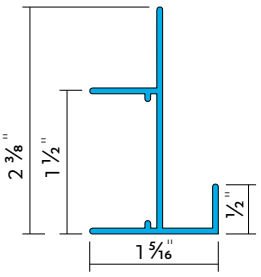


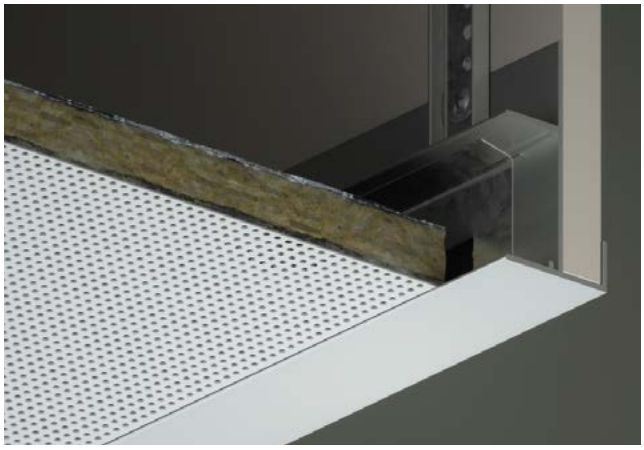


TCA 0173

Cut Metal Tile to Vertical Plasterboard Bulkhead
Item No **10557**
Length **9'10"**
Accessories **TCP90, TCP180, TCP360, Perimeter Wedge**

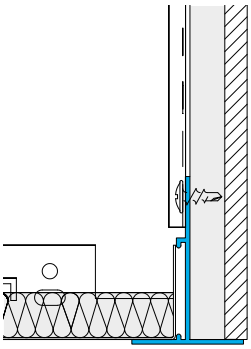


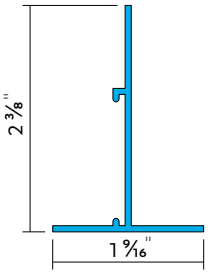


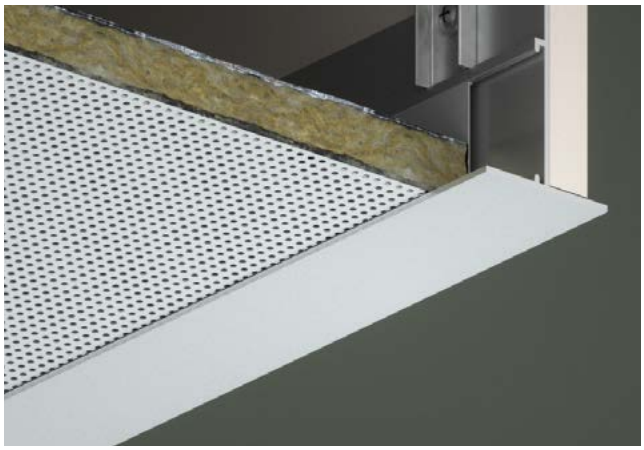


TCA 0219

Full Metal Tile to Vertical Plasterboard Trim
Item No **10564**
Length **9'10"**
Accessories **TCB01, TCB08, TCP90, TCP180, TCP360**



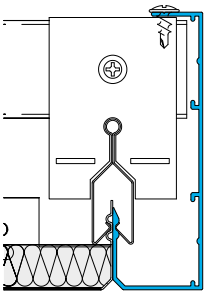


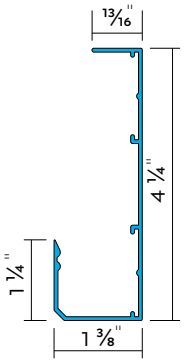


Trims | Bulkhead

TCA 1203

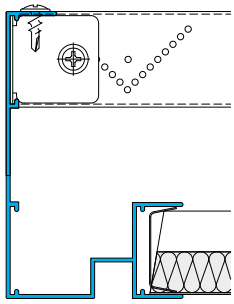
SAS150 Full Tile Closure Detail
Item No **59956**
Length **9'10"**
Accessories **TCP90, TCP180, TCP360**

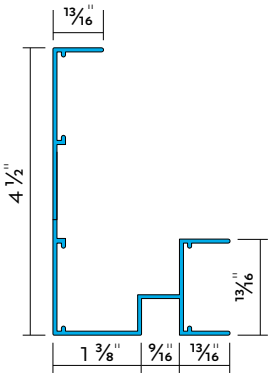


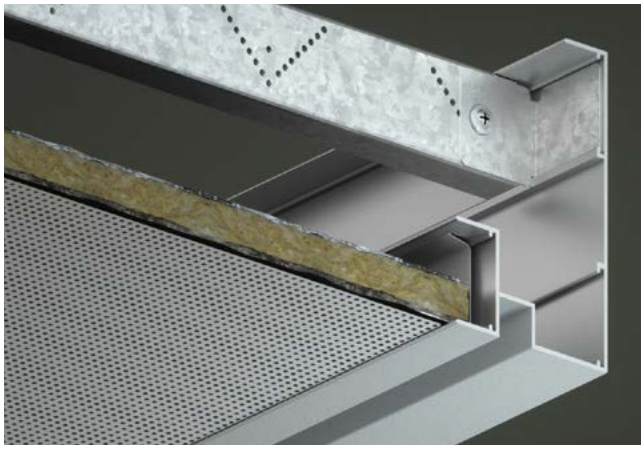


TCA 2111

9/16" Shadow Gap 13/16" Angle Trim
Item No **266551**
Length **9'10"**
Accessories **TCP90, TCP180, TCP360, Perimeter Wedge**

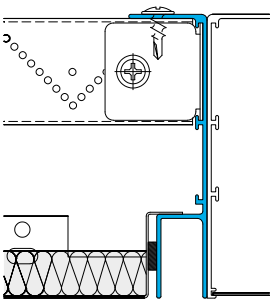


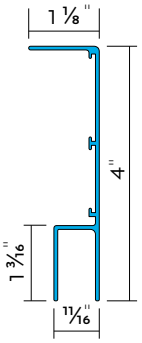


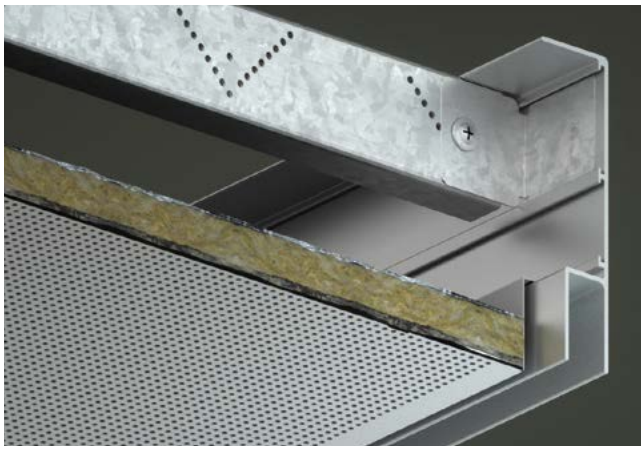


TRU CJ 330

SAS330 Shadow Gap Trim
Item No **192042**
Length **9'10"**
Accessories **TCB01, TCB08, TCP90, TCP180, TCP360**



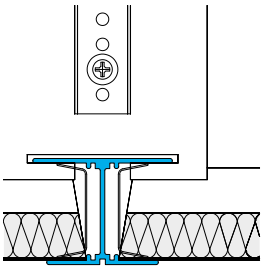


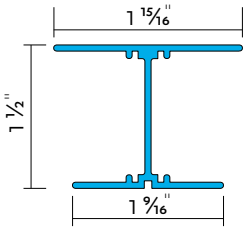


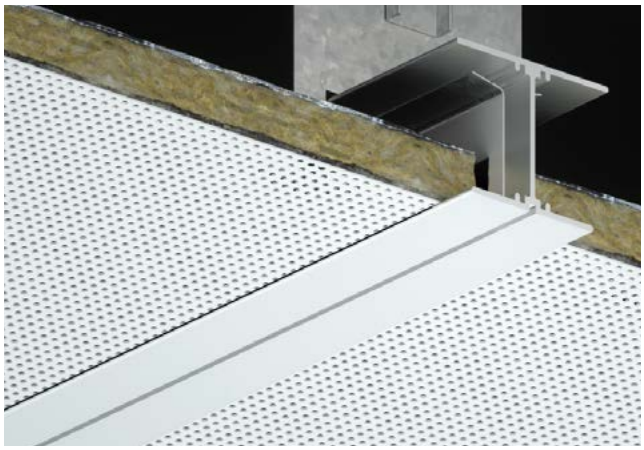
Trims | Mitre Junction

TCA 0215

Cut Metal Tile 1 9/16" Mitre Junction Trim
Item No **14091**
Length **9'10"**
Accessories **TCB12, TCP90, TCP180, TCP360, Perimeter Wedge**

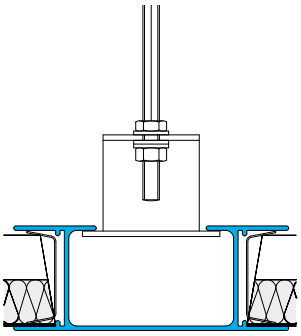


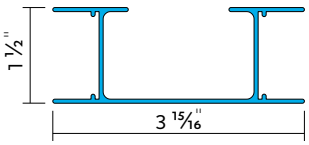


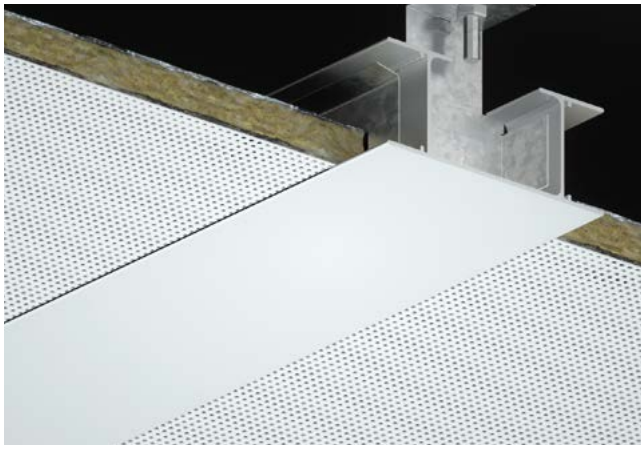


TCA 0310

Cut Metal Tile 3 15/16" Mitre Junction Trim
Item No **10565**
Length **9'10"**
Accessories **TCB60, TCP90, TCP180, TCP360, Perimeter Wedge, Suspension Bracket 22008**



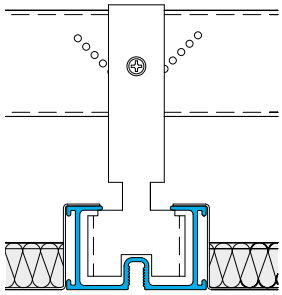


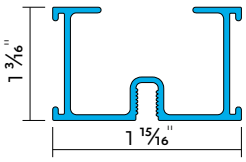


Trims | Linear

TCA 0313

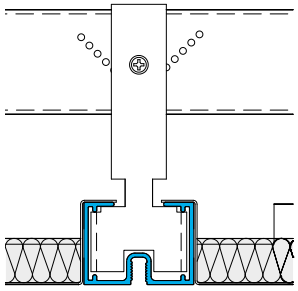
Threaded C-Profile 1 15/16" wide
Item No **14105**
Length **9'10"**
Accessories **TCP90s, TCP180s, Suspension Bracket 40282**

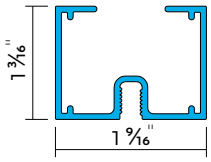


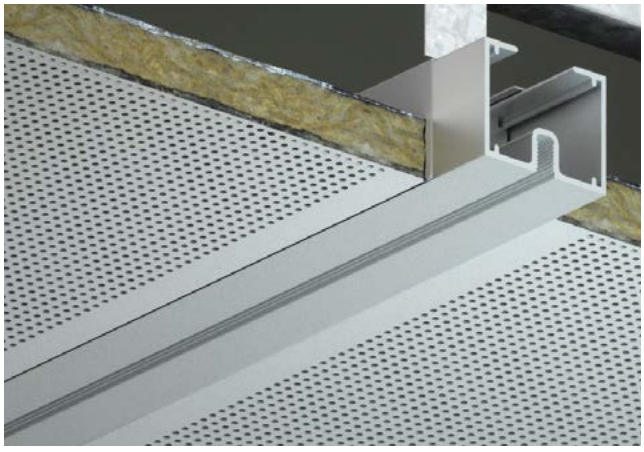


TCA 0314

Threaded C-Profile 1 9/16" wide
Item No **14110**
Length **9'10"**
Accessories **TCP90s, TCP180s, Suspension Bracket 40282**

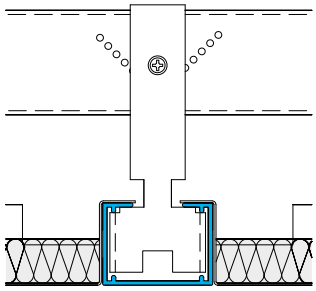


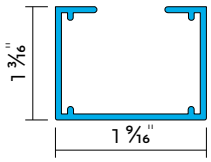




TCA 1182

C-Profile 1 9/16" wide
Item No **22428**
Length **9'10"**
Accessories **TCP90s, TCP180s, Suspension Bracket 40282**

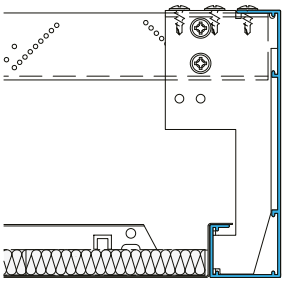


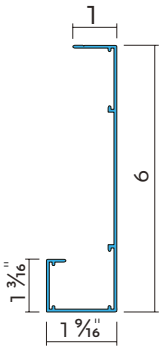


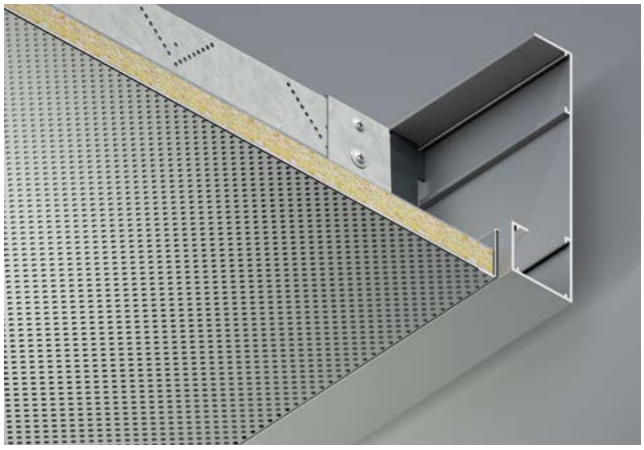
Trims | SAS**330**

TCA 0862

SAS330 Full Tile Closure Detail
Item No **299794**
Length **9'10"**
Accessories **TCP90, TCP90s, TCP180, TCP180s, TCP360, Suspension Bracket**

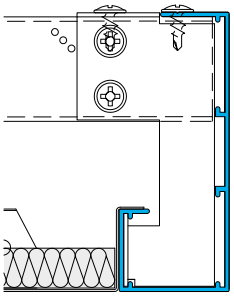


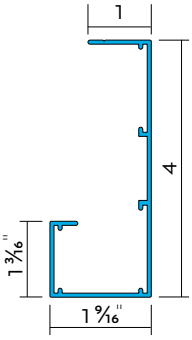


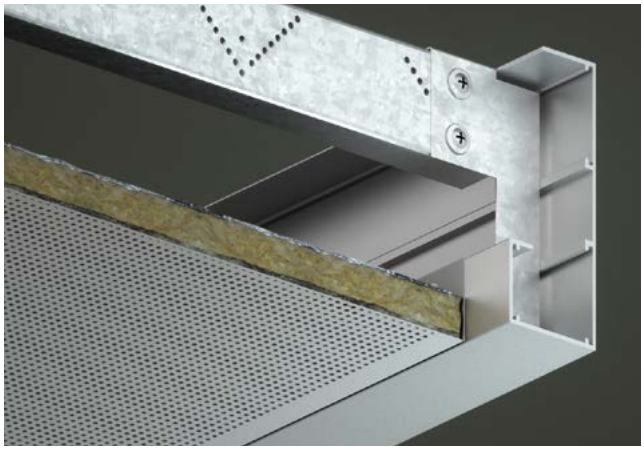


TCA 0637

SAS330 Full Tile Closure Detail
Item No **256239**
Length **9'10"**
Accessories **TCP90, TCP90s, TCP180, TCP180s, TCP360, Suspension Bracket 250083**

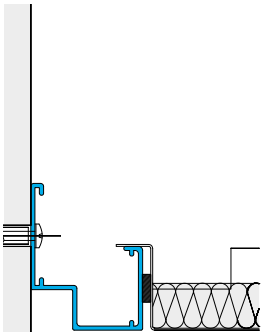


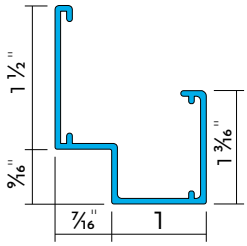




TCA 1136

SAS330 Full Tile to Vertical Plasterboard Perimeter Trim, 9/16" Shadow Gap
Item No **14136**
Length **9'10"**
Accessories **TCP90/90s, TCP180/180s, TCP360**

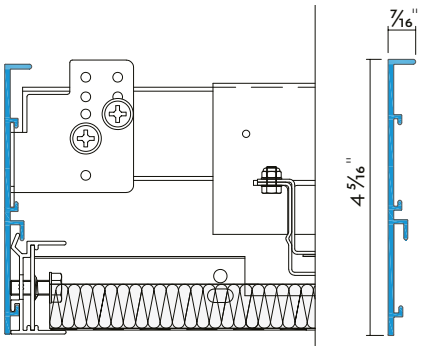


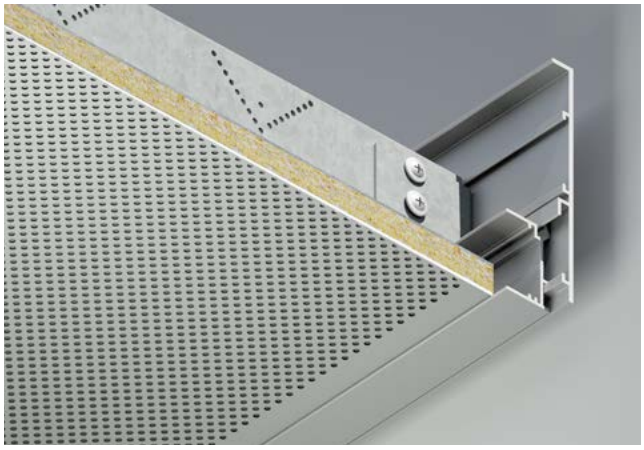


Trims | Floating Edge

TCA 0861

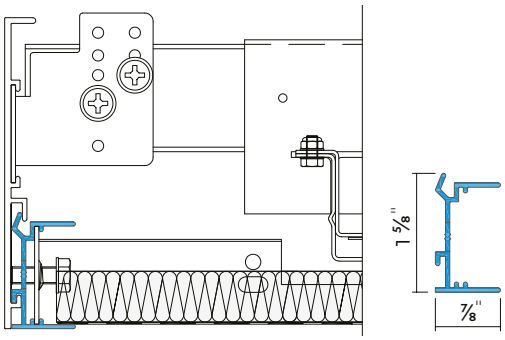
Floating Edge Detail - Closure
Item No **299189**
Length **9'10"**
Accessories **Dominos Bracket (299222), Snap In Extrusions, TCP 180, TCP 90**





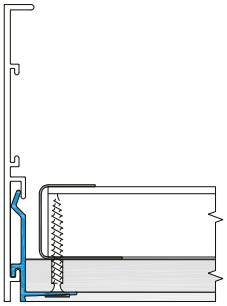
TCA 0860

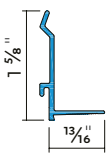
Snap-in Edge Detail - Cut/Full Tile Trim
Item No **288652**
Length **9'10"**
Accessories **TS 180, TS 90, TCP 180, TCP 90, Perimeter Edge**



TRU HM 100

Snap-In Edge Detail - Plasterboard Trim
Item No **288449**
Length **9'10"**
Accessories **TCP 180, TCP 90**

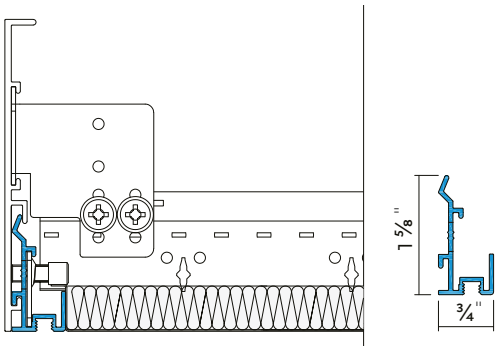




Trims | Floating Edge

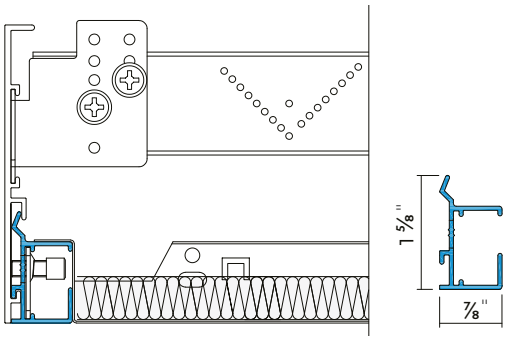
TCA 1300

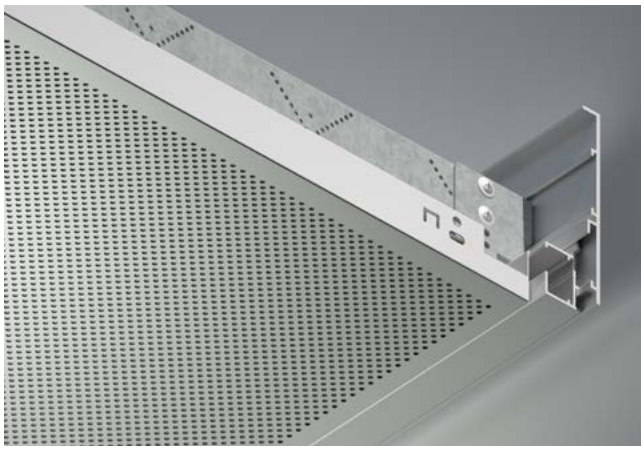
Snap-In Edge Detail SAS130
Item No **288655**
Length **9'10"**
Accessories **TS 180s, TS 90s, TCP 180, TCP 90**



TCA 1301

Snap-In Edge Detail SAS330
Item No **288656**
Length **9'10"**
Accessories **TS 180s, TS 90s, TCP 180, TCP 90**

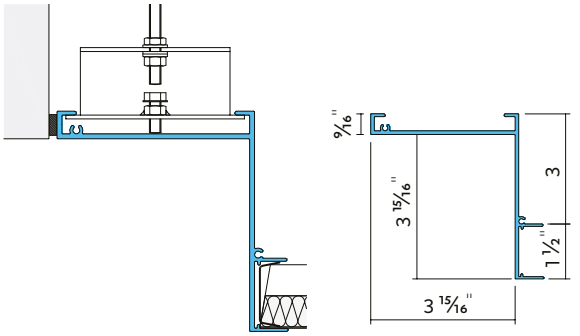




Trims | Blind box

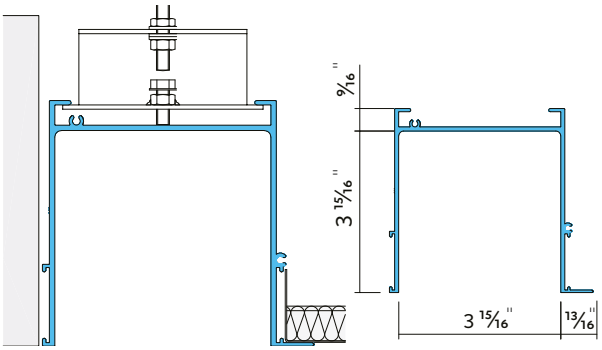
TCA 0312

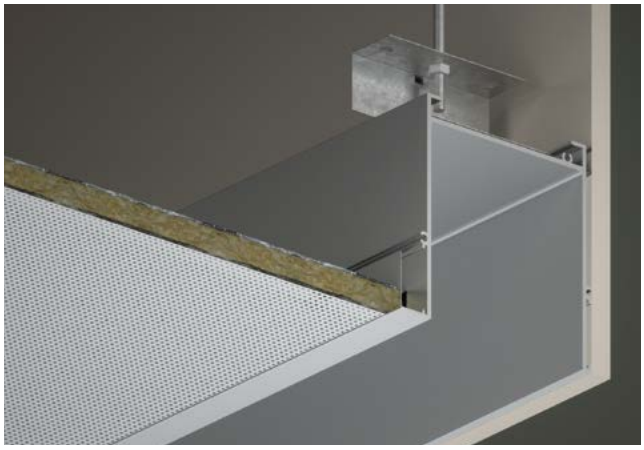
3 15/16" Blind Box Channel Trim
Item No **14103**
Length **9'10"**
Accessories **TCB50, TCP90, TCP180, TCP360, Perimeter Wedge, End Plate**



TCA 0317

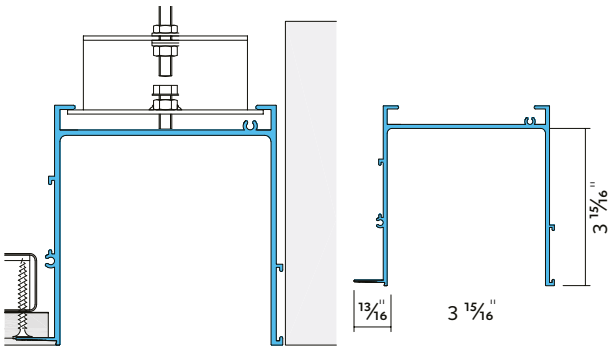
3 15/16" Blind Box Angle Trim
Item No **22427**
Length **9'10"**
Accessories **TCB50, TCP90, TCP180, TCP36, End Plate**

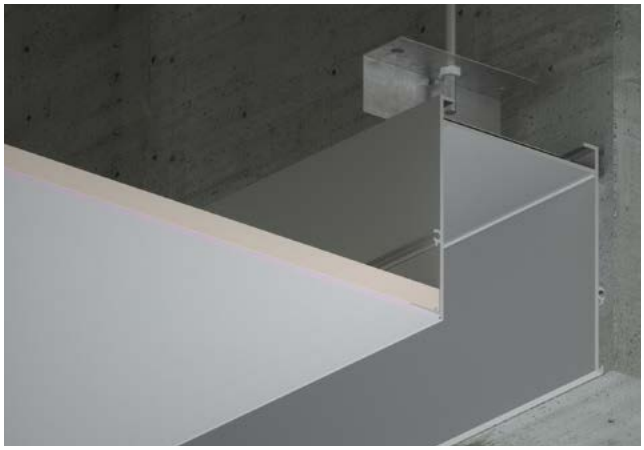




TCA 1147

3 15/16" Blind Box Plasterboard Trim
Item No **14139**
Length **9'10"**
Accessories **TCB50, TCP90, TCP180, TCP360, End Plate**

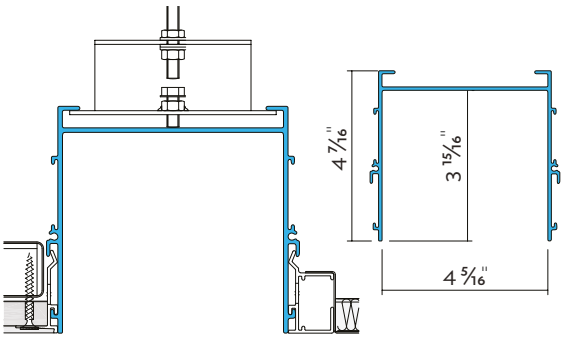


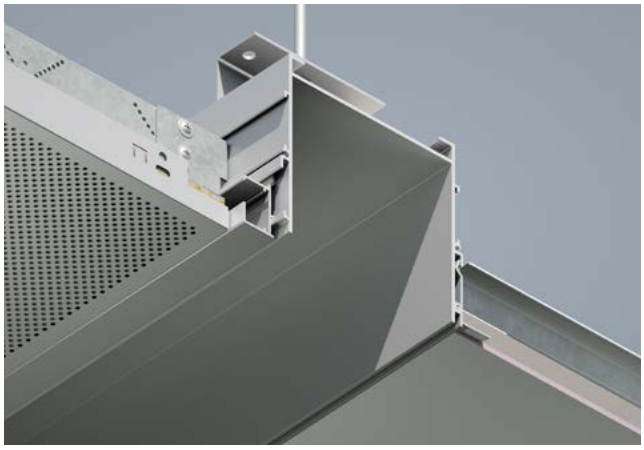


Trims | Blind box

TCA 0863

3 15/16" x 4 5/16" Snap-In Blind Box
Item No **288448**
Length **9'10"**
Accessories **TCB50, TCP90, TCP180, TCP360, Perimeter Wedge, End Plate**

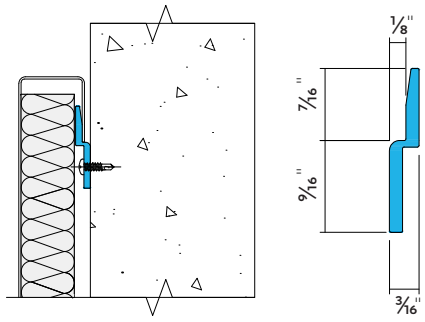




Trims | Gravity Baton

TCA 0507

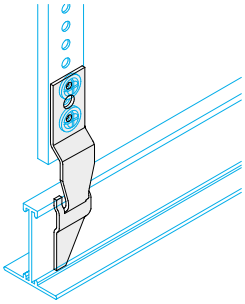
Size **"Z" Shape Profile for Hook On Tiles**
Item No **371489**
Length **9'10"**
Accessories **-**



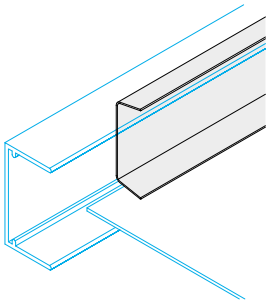
Trims | Accessories

TCB 08

Descriptor **Extrusion to Emac Hanger Bracket**
Item No **10530**

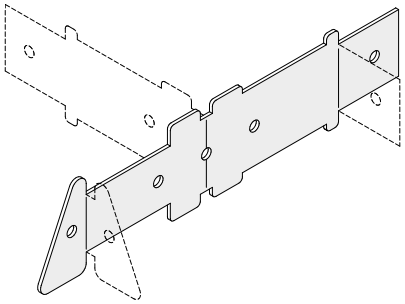


Descriptor **Perimeter Wedge**
Item No **10178**



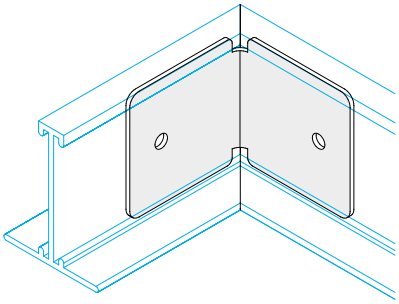
TCP 360

Descriptor **Multi Splice**
Item No **14046**



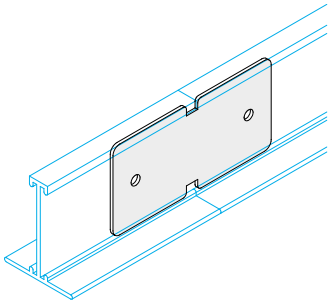
TCP 90

Descriptor **Corner Splice to suit 1 3/8" keyway**
Item No **10536**



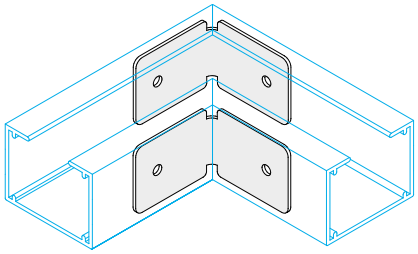
TCP 180

Descriptor **Straight Splice to suit 1 3/8" keyway**
Item No **10534**



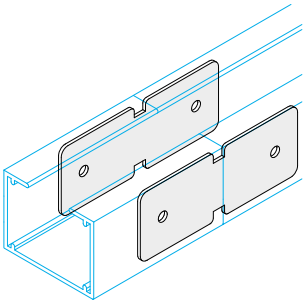
TCP 90s

Descriptor **Corner Splice to suit 1 1/16"**
Item No **14047**



TCP 180s

Descriptor **Straight Splice to suit 1 1/16" keyway**
Item No **14042**

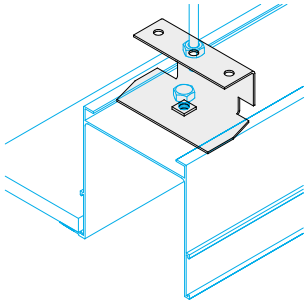


TCB 12

Descriptor **TCA 0215 Hanger Bracket**
Item No **10531**

TCB 50

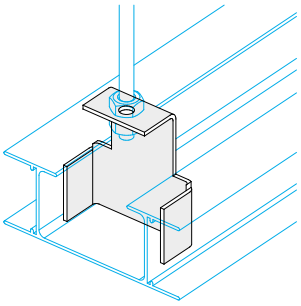
Descriptor **Blind Box Hanger to suit Threaded Rod**
Item No **22007**



Trims | Accessories

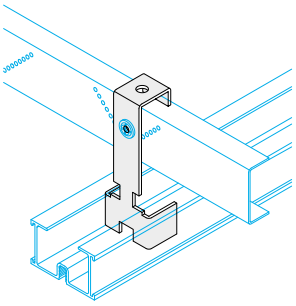
TCB 60

Descriptor **TCA 0310 Hanger Bracket to suit Threaded Rod**
Item No **22008**



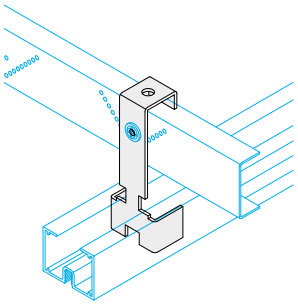
TCA 0313

Descriptor **C-Profile Extrusion Bracket for Emac Channel to suit**
Item No **40282**



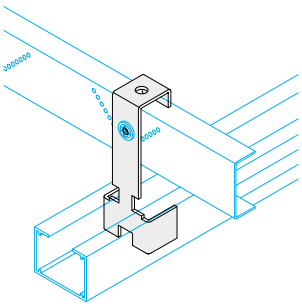
TCA 0314

Descriptor **C-Profile Extrusion Bracket for Emac Channel to suit**
Item No **40282**



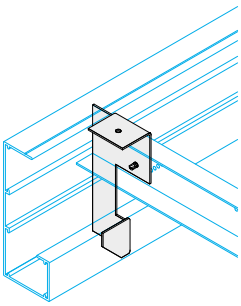
TCA 1182

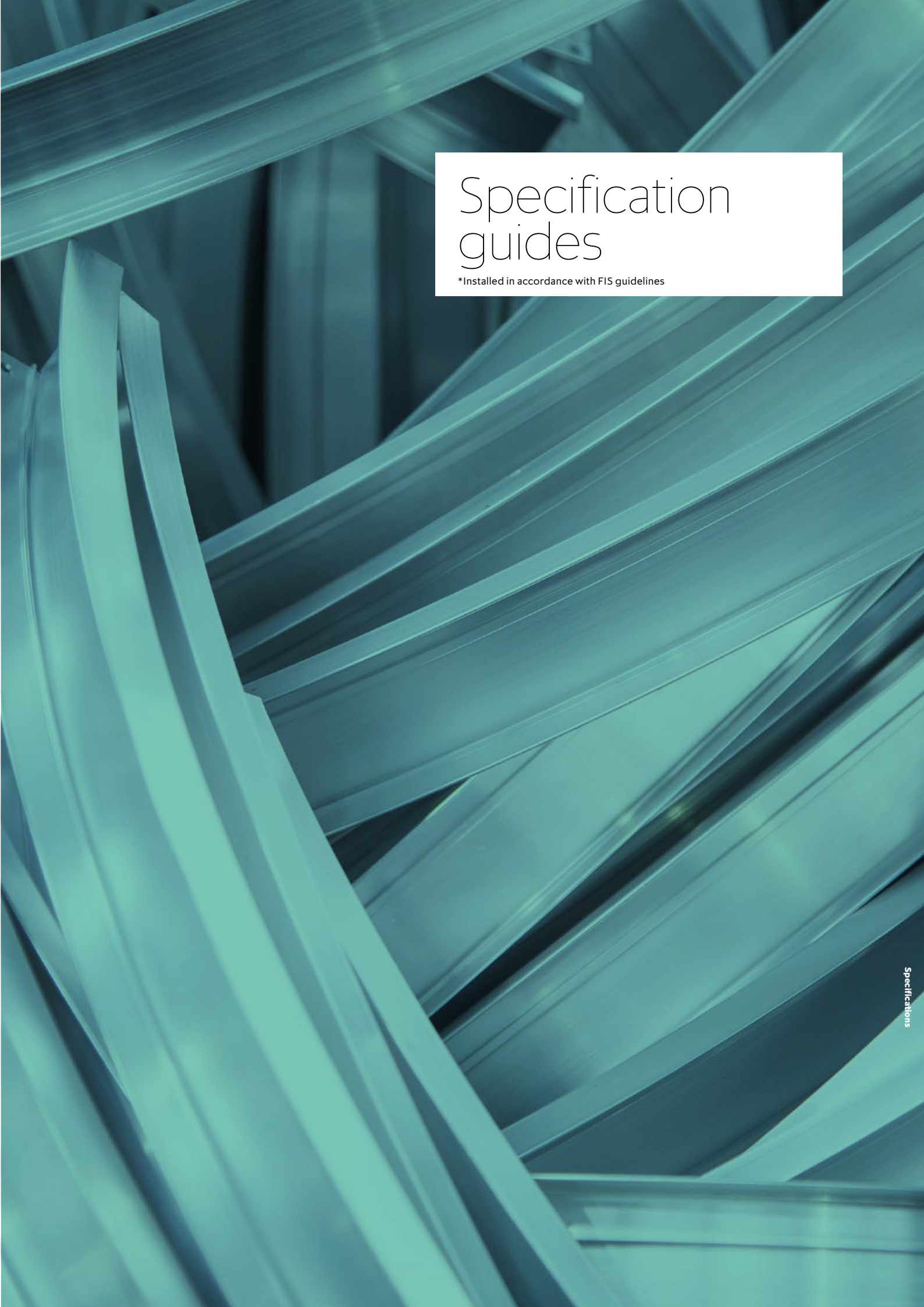
Descriptor **C-Profile Extrusion Bracket for Emac Channel to suit**
Item No **40282**



TCA 0637

Descriptor **J-Profile Extrusion Bracket for Emac Channel to suit**
Item No **250083**





Specification guides

*Installed in accordance with FIS guidelines

Specification guides

SAS120

1.8lbs/ft²
Based on standard 2 x 2' system and insulation

Joints

Bevel edge (standard) | Butt joint | Square or rectangular grids

System Depth
3 ¼"

Hangers
5' centres (1)
4' centres (2)

Primary Grid
5' centres (1)
4' centres (2)

Services
5.5lbs
13lbs

Note Loads in excess of 13lbs must be supported independently. Nothing must be inserted into the Spring Tee except SAS ceiling tiles.

Maximum load applied to the ceiling tile is **5.5lbs** including spreader yokes / SAS pattresses. Loads greater than **5.5lbs** and less than **13lbs** must be supported by an SAS pattresses.

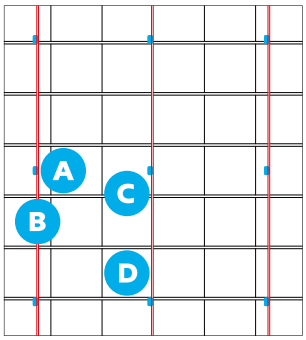
Access
Downward
Access tool required

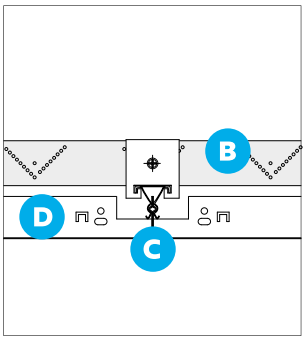
Standard Sizes (ft)

2' x 2'
2' x 4'
2'6" x 2'6"

Acoustics
Please refer to the ceiling tile acoustic performance table on page 17.

Setting Out



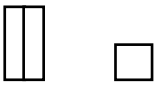


A Hangers
B emac Primary channels
C Spring Tees
D Tiles

SAS130

1.5lbs/ft²
Based on standard 2 x 2' system and insulation

Joints



Flush or tegular | Square grids

System Depth
1 ½" - 2 ⁱ⁄₁₆"

Hangers
4' centres (1)
Additional hangers to cross tees (2)

Grid
Widths **⁹⁄₁₆" + ¹⁵⁄₁₆"**
Tile Depth **Tegular ⁵⁄₁₆", ⅝" + ¾"**
Plain or with continuous 1/4" thread form **Alugrid**

Services
6.6lbs
0.8lbs

Note Any services supported by the ceiling should not distort or twist the ceiling grid.

Lightweight* installations can support a maximum of **6.6lbs** evenly distributed load over **10ft²** a minimum of 3'4" apart.

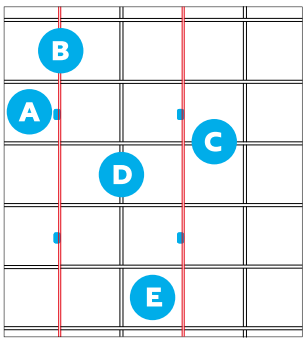
Access
Lift & Tint
Access tool required

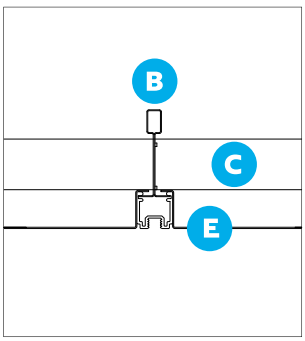
Standard Sizes (ft)

2' x 2'
2' x 4'
2'6" x 2'6"

Acoustics
Please refer to the ceiling tile acoustic performance table on page 17.

Setting Out





A Hangers
B Main Tee
C Cross Tee
D Noggin
E Tile

1 Lightweight installations refer to the ceiling tile and acoustic fleece or pad only. **2** Where the ceiling is expected to support services or upgraded acoustic inlays such as plasterboard or a steel backing plate the loaded installation and the supporting grid should be to a maximum of 3'4" apart for SAS130. Suspension centres should always be considered when applying additional loads. All information from pages 246 - 255 is for guide use only.

Specification guides

SAS**150**

1.8lbs/ft²
Based on standard 2' x 2' system and insulation

Joints

Bevel edge (standard) | Butt joint | Square or rectangular grids

System Depth
4 ⅛"

Hangers
5' centres (1)
4' centres (2)

Primary Grid
5' centres (1)
4' centres (2)

Services
5.5lbs
13lbs

Note Loads in excess of 13lbs must be supported independently. Nothing must be inserted into the Spring Tee except SAS ceiling tiles.

Maximum load applied to the ceiling tile is ***5.5lbs*** including spreader yokes / SAS pattresses. Loads greater than ***5.5lbs*** and less than **13lbs** must be supported by an SAS pattresses.

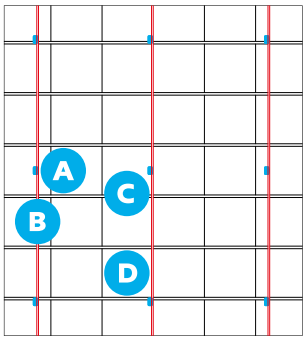
Access
Hinge Downward
Access tool required

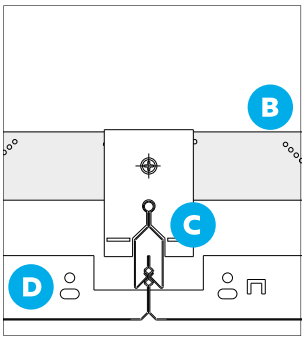
Standard Sizes (ft)

2' x 2'
2' x 4'
2'6" x 2'6"

Acoustics
Please refer to the ceiling tile acoustic performance table on page 17.

Setting Out



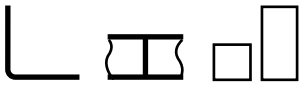


A Hangers
B emac Primary channels
C Omega bar
D Tiles

SAS**170**

2.1lbs/ft²
Based on standard 2' x 2' system and insulation

Joints



Square edge | Butt joint | Square or rectangular grids

System Depth
4 ⅛"

Hangers
4' centres (2)

Primary Grid
4' centres (2)

Services
6.6lbs
0.8lbs

Note Any services supported by the ceiling should not distort or twist the ceiling grid.

Lightweight* installations can support a maximum of **6.6lbs** evenly distributed load over **10ft²** a minimum of 3'4" apart.

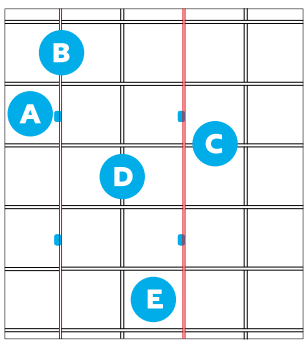
Access
Hinge Downward
Access tool required

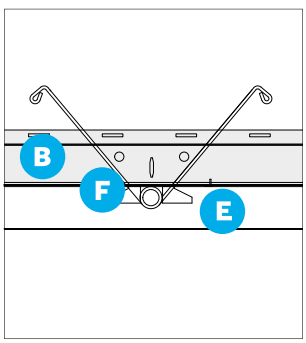
Standard Sizes (ft)

2' x 2'
2' x 4'

Acoustics
Please refer to the ceiling tile acoustic performance table on page 17.

Setting Out





A Hangers
B Main Tee
C Cross Tee
D Noggin
E Tile
F Torison Spring

1 Lightweight installations refer to the ceiling tile and acoustic fleece or pad only. **2** Where the ceiling is expected to support services or upgraded acoustic inlays such as plasterboard or a steel backing plate the loaded installation and the supporting grid should be to the minimum dims shown. Suspension centres should always be considered when applying additional loads. All information from pages 246 - 255 is for guide use only.

Specification guides

SAS200

2.1lbs/ft²
Based on standard 2' x 2' system and insulation

Joints

Square edge | Butt joint or 1/8" recessed gaskets | Square or rectangular grids

System Depth
2" standard J-Bar / **4 ⅜"** construction depth

Primary Grid
5' centres (1)
4' centres (2)

Hangers
5' centres (1)
4' centres (2)

Services
7.7lbs
13lbs

Note Loads in excess of 13lbs must be supported independently.

Maximum load applied to the ceiling tile is **7.7lbs** including spreader yokes / pattresses. Loads greater than **7.7lbs** and less than **13lbs** must be supported by an SAS pattresses.

Access
Lift & Tilt

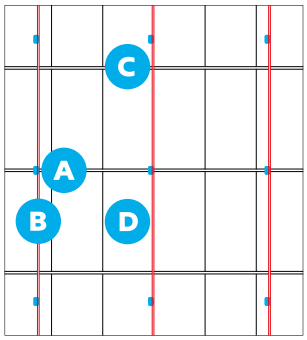
Maximum Sizes (ft)

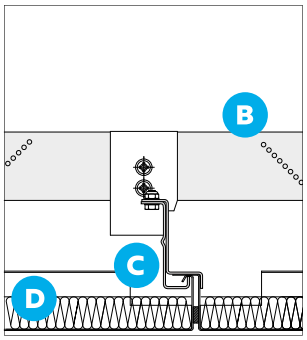
Length (ft)	Width (ft)
7'	2'

- Panels made to suit.
- SAS recommend a maximum panels size of 10ft² in area to reduce deflection.

Acoustics
Please refer to the ceiling tile acoustic performance table on page 17.

Setting Out





A Hangers
B emac Primary channels
C 2" J-Bar
D Tiles

SAS205

1.8lbs/ft²
Based on standard 2' x 2' system and insulation

Joints

Square edge | Butt joint or 1/8" recessed gaskets | Square or rectangular grids

System Depth
2 ⅜"

Primary Grid
Not required

Hangers
3' centres (1)
2' centres (2)

Services
5.5lbs

Note Loads in excess of 5.5lbs must be supported independently.

Maximum load applied to the ceiling tile is **5.5lbs** including spreader yokes / SAS pattresses.

Access
Lift & Swing Down

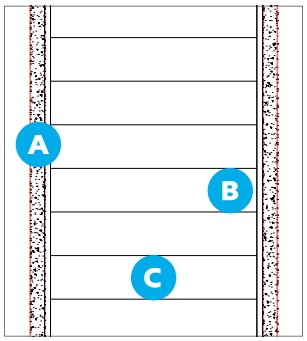
Maximum Sizes (ft)

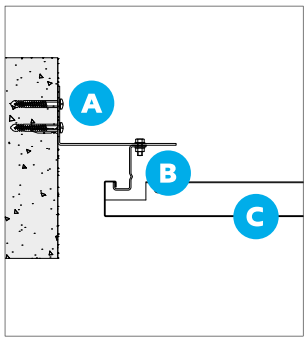
Length (ft)	Width (ft)
7'	2'

- Panels made to suit.
- SAS recommend a maximum panels size of 10ft² in area to reduce deflection.

Acoustics
Please refer to the ceiling tile acoustic performance table on page 17.

Setting Out





A Closure Angle Support
B J-Bar
C Panel

1 Lightweight installations refer to the ceiling tile and acoustic fleece or pad only. **2** Where the ceiling is expected to support services or upgraded acoustic inlays such as plasterboard or a steel backing plate the loaded installation and the supporting grid should be to the minimum dims shown. Suspension centres should always be considered when applying additional loads. All information from pages 246 - 255 is for guide use only.

Specification guides

SAS330

2.8-3.2lbs/ft²
Based on standard 2' x 2' system and insulation

Joints

Square edge | Butt joint or 1/8" recessed gaskets | Square or rectangular grids

System Depth
4"

Hangers
5' centres (1)
4' centres (2)

Primary Grid
5' centres (1)
4' centres (2)

Services
15.4lbs

Note Loads in excess of 15.4lbs must be supported independently.

Maximum load applied to the ceiling tile is **15.4lbs** including spreader yokes / SAS pattresses.

Access
Lift & Tilt

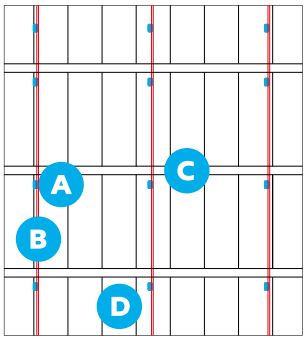
Maximum Sizes (ft)

Length (ft)	Width (ft)
10'	5'

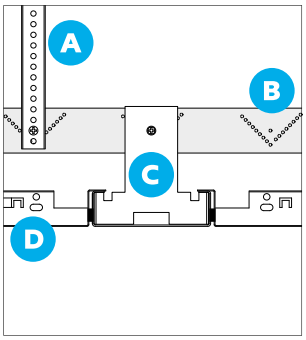
- Panels made to suit.
- SAS recommend a maximum panel size of 10ft². Greater sizes can be achieved but may require additional support: Linear Grid: up to 12.9ft² Tartan Grid: up to 15.06ft²

Acoustics
Please refer to the ceiling tile acoustic performance table on page 17.

Setting Out



A Hangers
B Channel
C C-Profile Suspension
D Tile



Various grid & infill panel options including swing down, coffered, touch latch mega-panels, etc.
≥ 4" wide open ends
> 4" wide closed ends
Maximum 1' width

SAS380

2.8lbs/ft²
Based on standard 2' x 2' system and insulation

Joints

Flush | Joint

System Depth
1 3⁄16 - 1 5⁄16"

Hangers
4' centres (1)

Primary Grid
4' centres (1)

Services
264.5lbs at Grid intersection
132.2lbs within 8" of hanger

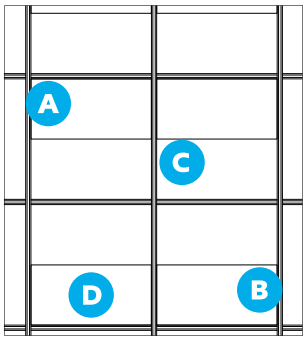
Access
Lift & Tilt

Maximum Sizes (ft)

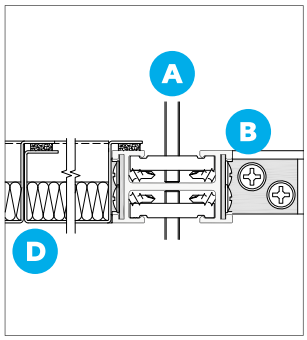
Length (ft)	Width (ft)
4'	4'

Acoustics
Please refer to the ceiling tile acoustic performance table on page 17.

Setting Out



A Hangers
B Aluminum extruded profile
C Aluminum extruded noggin
D Tiles



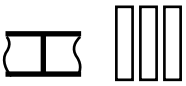
1 Lightweight installations refer to the ceiling tile and acoustic fleece or pad only. **2** Where the ceiling is expected to support services or upgraded acoustic inlays such as plasterboard or a steel backing plate the loaded installation and the supporting grid should be to the minimum dims shown. Suspension centres should always be considered when applying additional loads. All information from pages 246 - 255 is for guide use only.

Specification guides

SAS500 / SAS510

0.15lbs/ft²
Grid
3.5lbs/ft
1' 3 ¾" baffle
Based on standard
3' ⅜" x 1' 3 ¾"
x 1 ⁵⁄₁₆" wide

Joints



Closed ends or Butt joint | Linear or individual

System Depth
N/A

Hangers
5' centres (1)
Linear systems
2No. per baffle
Individual Baffles

Primary Grid
5' centres (1)

Services
N/A

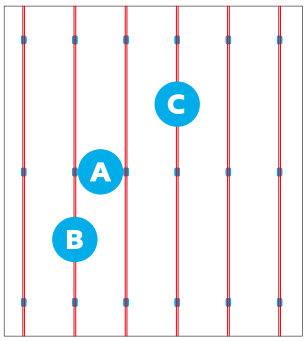
Access
N/A
Open system

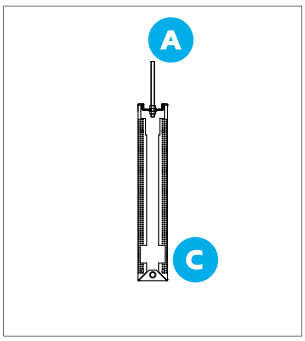
Maximum Sizes (ft)

Lengths (ft)	Depth (in)
4' / 5' / 6'	4" - 20"
10'	4" - 12"

Acoustics
Please refer to the ceiling tile acoustic performance table on page 17.

Setting Out





A Hangers
B Carriers (optional)
C Baffles

SAS600

1.33lbs/ft²
Based on standard
4 ' x 2' system and
insulation

Joints

Bevel edge (standard) | Butt joint | Square or rectangular grids

System Depth
2'

Hangers
5' centres (1)
4' centres (2)

Primary Grid
5' centres (1)
4' centres (2)

Services
15.4lbs

Note Loads in excess of 15.4lbs must be supported independently.

Maximum load applied to the ceiling tile is **15.4lbs** including spreader yokes / SAS pattresses.

Access
Lift & Swing Down
min. space needed in void

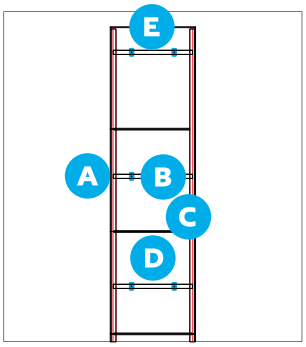
Maximum Sizes (ft)

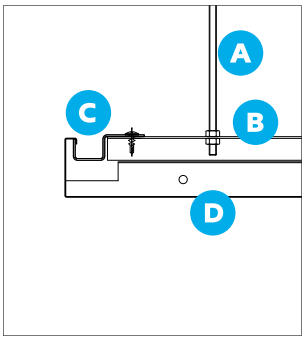
Length (ft)	Width (ft)
10'	5'

- Panels made to suit.
- SAS recommend a maximum panels size of 10ft² in area to reduce deflection.

Acoustics
Please refer to the ceiling tile acoustic performance table on page 17.

Setting Out





A Hangers
B Channel carriers
C Saucepan J-bars
D Panels

E End panel

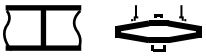
1 Lightweight installations refer to the ceiling tile and acoustic fleece or pad only. **2** Where the ceiling is expected to support services or upgraded acoustic inlays such as plasterboard or a steel backing plate the loaded installation and the supporting grid should be to the minimum dims shown. Suspension centres should always be considered when applying additional loads. All information from pages 246 - 255 is for guide use only.

Specification guides

SAS**610**

9.22lbs/item
Based on standard 8' 2 7⁄16" x 2' 7 ½" x 3 ⅛" system and insulation

Joints



System Depth
3 ⅛"

Hangers
1' 1 ¼" centres (1)
4' centres (2)

Primary Grid
N/A

Services
13lbs

Note Loads in excess of 13lbs must be supported independently.

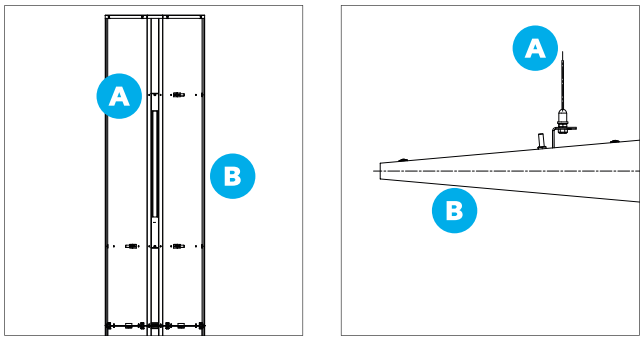
Access
N/A

Maximum Sizes (ft)

Length (ft)	Width (ft)
8'	2'

Acoustics
Please refer to the ceiling tile acoustic performance table on page 17.

Setting Out



A Hanger
B Deltawing

SAS**700**

0.15lbs/ft²
Grid
5lbs/ft
2 ⅜" profile
5.8lbs/ft
3 ⅛" profile

Joints

System Depth
3 13⁄16"
or 4 ⅝"

Hangers
5' centres (1)
Linear systems

Primary Grid
5' centres

Services
Supported independently.

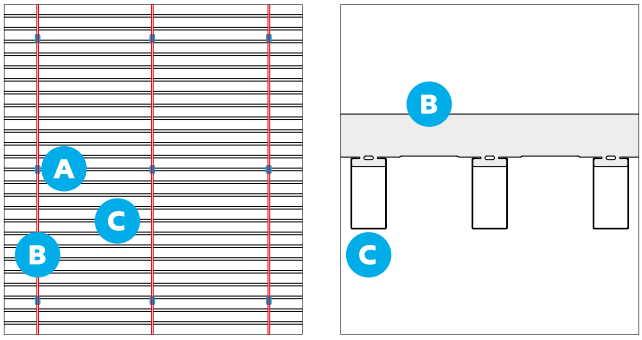
Access
Access Panels

Maximum Sizes (ft)

Length (ft)	Depth (in)
10'	2 ⅜" or 3 ¾"

Acoustics
Please refer to the ceiling tile acoustic performance table on page 17.

Setting Out



A Hangers
B Carriers
C Profiles

1 Lightweight installations refer to the ceiling tile and acoustic fleece or pad only. **2** Where the ceiling is expected to support services or upgraded acoustic inlays such as plasterboard or a steel backing plate the loaded installation and the supporting grid should be to the minimum dims shown. Suspension centres should always be considered when applying additional loads. All information from pages 246 - 255 is for guide use only.

Specification guides

SAS720

0.2lbs/ft²
Grid
10.1lbs/ft
4" profile

Joints

Spliced or butt joints

System Depth
4"

Hangers
4' centres (1)

Primary Grid
4' centres (1)

Services
SAS720 is a robust system able to take additional loads from services, providing their is space to do so.

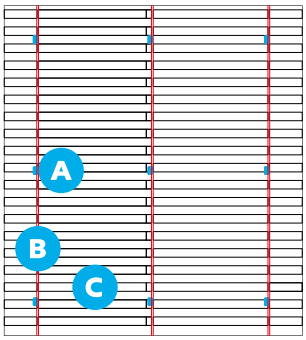
Access
Access Panels

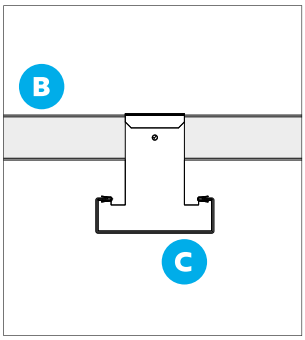
Maximum Sizes (ft)

Length (ft)	Width (in)
10'	2"-12"

Acoustics
Please refer to the ceiling tile acoustic performance table on page 17.

Setting Out





A Hangers
B Carriers
C Profiles

≥ 4" wide open ends
> 4" wide closed ends

SAS730

0.2lbs/ft²
Grid
2.9lbs/ft

Joints

Spliced or butt joints

System Depth
4" or 4⅜"
including sub-grid

Hangers
4' centres (1)

Primary Grid
4' centres (1)

Services
Supported independently.

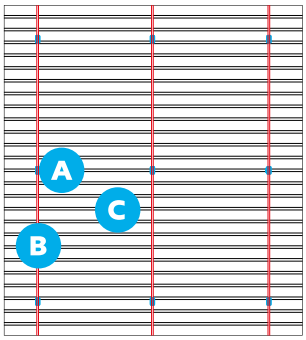
Access
Access Panels

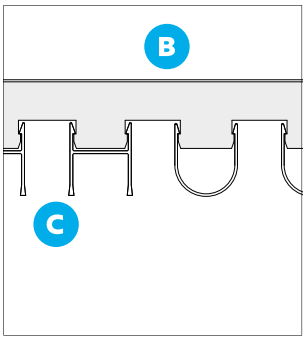
Maximum Sizes (ft)

Length (ft)	Width (ft)
10'	H profile 31
10'	U profile 31

Acoustics
Please refer to the ceiling tile acoustic performance table on page 17.

Setting Out





A Hangers
B Carriers
C Profiles

1 Lightweight installations refer to the ceiling tile and acoustic fleece or pad only. **2** Where the ceiling is expected to support services or upgraded acoustic inlays such as plasterboard or a steel backing plate the loaded installation and the supporting grid should be to the minimum dims shown. Suspension centres should always be considered when applying additional loads. All information from pages 246 - 255 is for guide use only.

Specification guides

SAS740

0.2lbs/ft² Grid
10.1lbs/ft 3 15/16" x 1 9/16" profile
13lbs/ft 6 1/2" x 1 33/16" profile
18.6lbs/ft 3 3/8" x 9/16" profile

Joints

Spliced
Butt joint

System Depth
Dependent on profile

Hangers
4' centres (1)

Primary Grid
4' centres (1)

Services
N/A

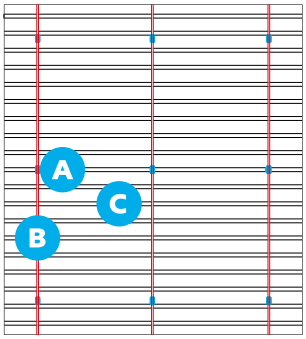
Access
Access Panels

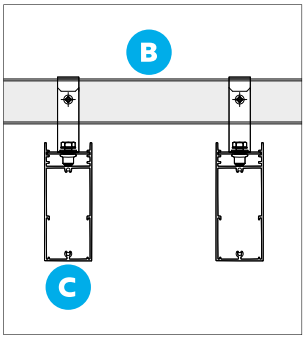
Standard Sizes (ft)

Length (ft)	Width (in)
10'	1 9/16" x 3 13/16"
10'	3 3/8" x 9/16"

Acoustics
Please refer to the ceiling tile acoustic performance table on page 17.

Setting Out





A Hangers
B Carriers
C Profiles

SAS750

5lbs/ft² Grid
3.6lbs/ft Ø1"
7.2lbs/ft Ø2" Steel
2" Aluminum

Joints

Spliced
Butt joint

System Depth
6 1/16" Dependent on system

Hangers
5' centres (1)

Primary Grid
4' centres (1)

Services
Supported independently.

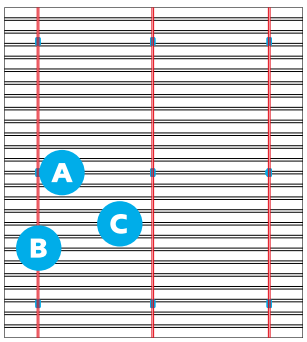
Access
Access Panels

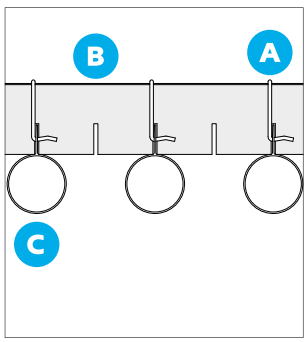
Standard Sizes (in)

Ø2"
Ø1"

Acoustics
Please refer to the ceiling tile acoustic performance table on page 17.

Setting Out





A Hangers
B Carriers
C Profiles

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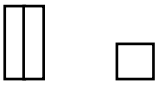
Specification guides

SAS800

0.6lbs/ft²
Based on standard 23 ⅝" x 23 ⅝" system and insulation

Joints



System Depth
1 ⁹⁄₁₆"

Hangers
5' centres

Grid

Widths (ft)	Depths (in)
⁹⁄₁₆" 23 ⅝" x 23 ⅝"	**1 ½"**

Services
6.6lbs

Note Any services supported by the ceiling should not distort or twist the ceiling grid.

Tile **6.6lbs** max. Distributed load over **4'** a minimum of 3' apart.

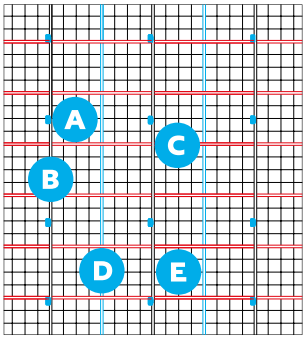
Access
Lift & Tilt

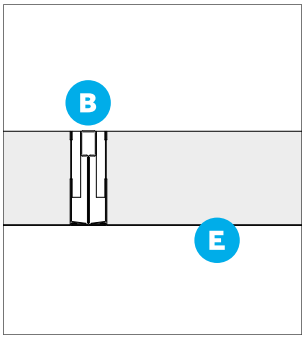
Standard Sizes (ft)
2' x 2'
Cell sizes (in)

1 ¹⁵⁄16" x 1 ¹⁵⁄₁₆"	4 ¾" x 4 ¾"
2 ¹⁵⁄₁₆" x 2 ¹⁵⁄₁₆"	5 ⅞" x 5 ⅞"
3 ⅜" x 3 ⅜"	7 ⅞" x 7 ⅞"
3 ³⁄₁₆" x 3 ³⁄₁₆"	

Acoustics
Please refer to the ceiling tile acoustic performance table on page 17.

Setting Out





A Hangers
B Main Tee
C Cross Tees
D Noggins
E Tiles

SAS810

0.6lbs/ft²
Based on standard 2' 10 ½" x 2' 5 ¹³⁄₁₆" system and insulation

Joints

System Depth
3 ⅛"

Hangers
5' centres

Grid

Widths (in)	Depths (in)
⁹⁄₁₆" 2'5 ¹³⁄₁₆" x 2'5 ¹³⁄₁₆"	**2 ⅜"**

Services
6.6lbs

Note Any services supported by the ceiling should not distort or twist the ceiling grid.

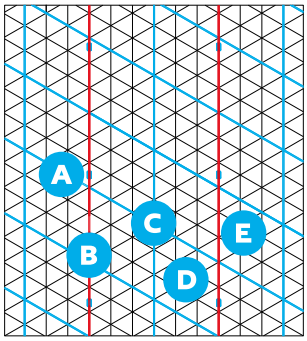
Tile **6.6lbs** max. Distributed load over **4'** a minimum of 3' apart.

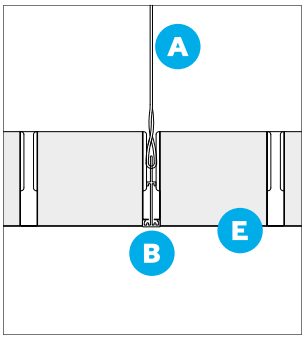
Access
Lift & Tilt

Standard Sizes (in)
2'10 ½" x 2' 5 ¹³⁄₁₆"
11 ½" x 11 ½" x 11 ½"

Acoustics
Please refer to the ceiling tile acoustic performance table on page 17.

Setting Out





A Hangers
B Main Tee
C Cross Tees
D Noggins
E Tiles

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Specification guides

SAS900

2.2lbs/ft²

Joints

Nodal System

System Depth
3 7⁄16"

Hangers
3' centres (1)
4' centres (2)

Primary Grid
2' centres (1)

Services
4.4lbs

Note loads over 4.4lbs should be supported independently

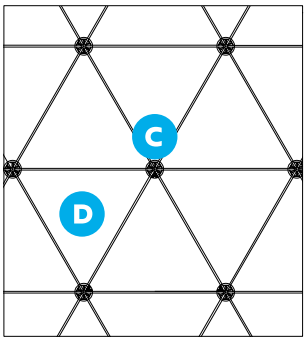
Access
Pull Down & Unhook

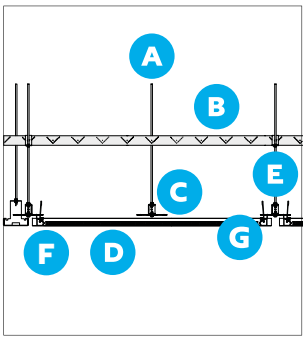
Maximum Sizes (in)

Length (in)	Width (in)
4' 3"	4' 3"

Acoustics
Please refer to the ceiling tile acoustic performance table on page 17.

Setting Out





A Hangers
B EMAC Primary Channels
C Node Plate
D Tiles
E Node Suspension Bracket
F Pivot Bracket
G Torsion Spring

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Integrated Service Module

SAS ISMs aesthetically encase an active or passive chilled beam within an architectural metal casing. Sometimes referred to as Multi-service Chilled Beams (MSCB), ISMs integrate most building services such as lights, sensors and smoke detectors.

Chilled Beams use water as an energy transfer medium, cooling interiors by the flow of chilled water through the system. The water supply and return temperatures for ISMs are typically between 14-17°C. This feature allows for free cooling, depending on the ability of the central plant.

Suitable for exposed concrete applications, ISMs are an energy efficient solution to provide excellent thermal comfort. Off-site prefabrication of units allows for exceptionally fast installation and relocation for future space flexibility. With no moving parts, maintenance and life cycle costs are less than traditional systems.

ISMs generate minimal air movement and noise, especially when compared to mechanical alternatives, improving thermal comfort and staff productivity.

System Overview

Design led cooling system

Energy efficient: high operating temperatures

Integration of services

Passive or active cooling

Off-site prefabrication, testing and commissioning available

Flexible in terms of future room layouts

No moving parts, resulting in low maintenance regimes

Compatible with ground-sourcing and free cooling technologies

Module Sizes
Various shapes, widths and lengths are available to suit most applications.

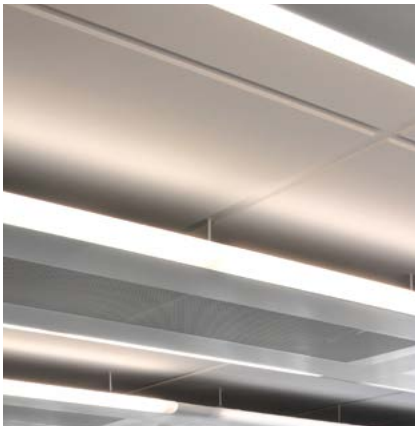
Access
Via hinge-down panels.

Finishes
SAS ISMs are available in all standard SAS finishes. Bespoke finishes are available on request.

Perforations
Passive and Active ISMs: 50% open area is recommended for optimum performance.

Service Integration
ISMs can be formed with apertures during manufacturing for integration with lights and other services.

Technical Support
Further information on the range of SAS ISMs can be found in the Room Comfort brochure. Alternatively, please contact our technical design team.



Architectural Metalwork

Metal ceiling systems often require a considered transition between horizontal and vertical planes. Architectural Metalwork creates this integration between planes in-keeping with the overall design intent. As examples, bulkheads, column casings and wall cladding can all provide design-led solutions to ceiling integration requirements.

Architectural metalwork can be purely aesthetic, used to incorporate M&E services, protect building elements or a combination. Products tend to be project specific, designed and manufactured to set criteria. SAS International has the design and manufacturing expertise to realise the most ambitious and challenging of these specifications. In all cases, SAS Architectural Metalwork provides an attractive, highly durable and easy to maintain solution.

SAS Architectural Metalwork solutions encompass a range of design-led integrating products including:

Air Handling Units	Service Gantries
Binnacles	Solar Shading
Bulkheads	Spandrel Panels
Column Casings	Wall Panelling including acoustic panels
Daylight Reflectors	Linear Grilles

Finishes

Architectural Metalwork can be manufactured in steel or aluminum and finished in either PPC or clear lacquers. Aluminum products can also be anodised.

PPC coatings offer all of the durability and longevity benefits associated with SAS metal ceiling systems. Any color from the BS or RAL systems can be achieved.

Metal sheet can be polished or brushed, offering a variety of textures to suit aesthetic preferences. Clear lacquers offer a highly robust, easily maintained coating while exposing the metal "grain" or sheen beneath.

Durability

Due to high humidity resistance, Architectural Metalwork products can be installed early during the programme. The clean surface is easily maintained and provides a robust finish that performs in demanding environments. In addition, wall panels and column casings can be specified to achieve specified levels of impact resistance. As with SAS metal ceilings an exceptional 25 year product life can be achieved.

Benefits of Offsite Fabrication

Architectural Metalwork is prefabricated offsite, reducing installation and build time onsite. SAS manufactured metal bulkheads and column casings can reduce onsite wastage by one third compared to traditional wet trades. Bulkheads can also be installed in a shorter period of time compared to traditional plasterboard and finishing. This can greatly reduce project lifetimes especially where limited engineering hours are available.

Terms and Conditions

This supply of goods contract, dated as per the date of the Order Acknowledgement (the "**Contract**"), is entered into by and between:

(1) **SAS International Inc**, a New York corporation having its principal place of business at The Yard, Suite 426, 246 5th Avenue, New York, NY 10001 (the "**Company**"); and

(2) the individual or entity specified as the customer in the Order Acknowledgement (the "Customer"), individually a "**Party**" and together, the "**Parties**".

In consideration of the mutual covenants, terms and conditions set forth herein, and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Parties agree as follows:

2. Basis of Contract

2.1. The Terms apply to the Contract to the exclusion of all other terms that the Customer may seek to impose, or which are implied by trade, custom, practice or course of dealing. No variation to the Terms and/or the Contract shall be binding unless agreed in writing between the Customer and the Company in accordance with Clause 14.3. The Customer waives any right it might otherwise have to rely on any term endorsed upon, delivered with or contained in any documents of the Customer which are inconsistent with the Terms.

2.2. The Customer shall provide to the Company any and all information which the Company reasonably requests in order to enable the Company to compile a Quotation. It is the Customer's responsibility to ensure that the information it provides to the Company is accurate, up to date and complete as this data shall form the basis on which the Company will prepare the Quotation. A Quotation shall not constitute an offer and shall only be valid (subject to any earlier revocation of the Quotation by the Company) for a period of 90 days from its date of issue unless otherwise expressly stated to the contrary by the Company on the face of the Quotation. Any request from the Customer to change any details relating to the supply of the Goods as set out within the Quotation shall result in either a revised Quotation being issued by the Company or the Company shall set out in writing in an email to the Customer the revised details and amendments to its Quotation, as a supplement to the Quotation.

2.3. An unsigned Order Acknowledgement constitutes an offer by the Company to supply the Goods for the Quotation in accordance with the Terms. The Customer acknowledges and agrees that it is responsible for and has ensured that the terms of the Order Acknowledgement and the Specification are complete, accurate and meet its requirements and that the Goods are fit for the Customer's purpose and the environment in which the Goods are to be utilized and/or installed (whether or not such information is made available to the Company). If the Customer identifies an issue within the Order Acknowledgement and/or Specification, it must promptly notify the Company and (subject always to Clause 7.4) the Company shall revise the documentation accordingly. Any and all guidance given by the Company and its representatives during the contracting process relating to the Goods is simply for the Customer's information purposes only. This guidance and information may not be relied upon by the Customer; it shall not form part of the Contract and it shall not detract or affect the obligation on the Customer to ensure that the Goods meet its requirements.

2.4. Subject to the validity period set out in Clause 2.1, the Order Acknowledgement shall only be deemed to be accepted by the Company and Customer as and when the Customer signs and returns the Order Acknowledgement to the Company, at which point the Contract comes into existence.

2.5. If there is any conflict between the documents which form the Contract, they shall take priority in the following order to the extent of the conflict: (i) the Order Acknowledgement; and (ii) the Terms.

2.6. No agent of the Company has any authority to bind the Company.

2.7. Drawings are produced for the sole purpose of giving an approximate idea of the Goods and are intended for use as product reference material by architects, engineers, other design professionals, contractors and other competent construction industry trade professionals who have an interest in the selection, specification and use of products supplied by the Company. Drawings are intended solely as technical support incidental to the sale of the Goods and are not intended to be a substitute for the design review and approval of licensed design professionals. The Drawings do not form part of the Contract, nor do they have any contractual force. Drawings including any intellectual property rights which may subsist in the same) shall remain the property of the Company. The Customer may only utilize, reproduce or disclose any such Drawings to a third party with the prior written consent of the Company and the Customer shall return the same to the Company on request.

2.8. None of the Company's employees, agents, contractors and/or other representatives are entitled to make any representations about the Goods unless those representations are subsequently confirmed in writing to the Customer. In entering into the Contract, the Customer confirms that it has not, and does not, rely on such a representation which has not been confirmed in writing by the Company.

2.9. The Company may make changes to the Terms from time to time and such changed Terms shall apply to any and all contracts entered into by the Parties after the date of the variation. The Customer is advised to keep the Terms under review.

3. The Goods

3.1. The Goods to be supplied shall be as specified in the Order Acknowledgment and shall, subject to the Terms, comply with the Specification in all material respects.

3.2. To the extent that the Goods are to be manufactured in accordance with a Specification supplied by the Customer and/or the Customer provides information, data and other materials to the Company in order to enable the performance of the Contract:

3.2.1. the Customer grants to the Company a non-exclusive royalty free license (with the right to grant sub-licenses) to use the Specification and any and all information, data and other materials provided by or on behalf of the Customer solely in order to perform the Contract; and

3.2.2. the Customer shall indemnify and keep indemnified the Company against all liabilities, costs, expenses, damages and losses (including any direct, indirect or consequential losses, loss of profit, loss of reputation and all interest, penalties and legal and other reasonable professional costs and expenses) suffered or incurred by the Company in connection with any claim made against the Company for actual or alleged infringement of a third party's intellectual property rights arising out of or in connection with the Company's use of the Specification and/or any other information, data and/or materials provided by or on behalf of the Customer. This Clause shall survive the termination or expiry of the Contract.

3.3. The Company reserves the right to amend the Specification (whether supplied by the Customer or the Company) and the Goods at any time, including if required by applicable statutory or regulatory requirements.

3.4. Details of the Goods to be delivered are set out in the Order Acknowledgement. Any changes requested by the Customer to the nature of the Goods; the quantity of the Goods, the timelines for delivery of the Goods and/or the delivery requirements shall be a variation to the Contract (to be carried out in accordance with Clause 14.3) and shall entitle the Company to revise its pricing (including as a result of changes in batch sizes), delivery lead times and any other terms of the Contract (such changes to be agreed as part of the relevant Contract variation).

3.5. Irrespective of the Specification, all Goods are manufactured to the manufacturing, paint and finish tolerances of the Company in force from time to time and the manufacture of the Goods within these tolerances shall not be a breach of the Contract.

3.6. The Company makes no representations or warranties concerning, and it shall be the Customer's obligation to ensure, that the Goods comply with local laws, regulations, and legal requirements, including without limitation, applicable customs requirements. The Customer shall pay all costs associated with ensuring the Goods comply with local laws, regulations, and other legal requirements, including, without limitation, customs requirements. If labelling, packaging, or other modifications are necessary for compliance with local customs or any other requirements, the Customer shall notify the Company as to such requirements with reasonable advance notice and shall pay all costs associated with such labeling, packaging or other modifications in advance of shipment; otherwise, it shall be presumed that the Goods and the Company's standard labeling and packaging will comply with local customs and other requirements.

4. Delivery

4.1. Unless otherwise expressly agreed by the Parties in writing, the Company shall select the method of shipment of and the carrier for the Goods. If the Company is to deliver the Goods to a location other than the Company's own premises, or a Company nominated third party warehouse provider, the Customer shall be responsible for providing to the Company, prior to the placement of an Order and so as to enable the Company to build such data into its Quotation, details of the relevant delivery site, its access restrictions and requirements and any specific packaging requirements for the Goods, to enable the Company to calculate the costs of the Goods and to set the delivery dates and times ("**Delivery Data**"). The Order Acknowledgement issued by the Company shall be based on the Delivery Data notified to it by the Customer prior to that point. If there is any change to the Delivery Data, the Customer must promptly inform the Company in accordance with Clause 4.2 below.

4.2. The Customer shall be responsible for the accuracy and completeness of the Delivery Data. If any of the Delivery Data proves to be incomplete, inaccurate and/or out of date:

4.2.1. prior to the Company issuing to the Customer an Order Acknowledgement, the Customer shall promptly notify the Company of the changed Delivery Data and the Company shall reflect the revised data in its pricing within the relevant Quotation and/or Order Acknowledgement or otherwise inform the Customer of the impact of the revised data on the proposed contract terms;

4.2.2. after the Company has issued its Order Acknowledgment, the Customer shall promptly inform the Company of the correct details and the Company shall be entitled to vary the price and contract terms as a consequence of the revised data in accordance with Clause 7.2;

4.2.3. the Company shall be entitled to charge the Customer for any additional costs and expenses which the Company incurs in delivering the Goods to the Customer as a result of the incomplete, inaccurate and/or out of date Delivery Data; and

4.2.4. the Company shall not be in breach of the Contract and/or have any liability to the Customer under or in respect of the Contract as a result of any failure on the part of the Company to deliver the Goods to the Customer in accordance with the terms of the Contract if such failure is as a result of the inaccurate, incomplete and/or out of date Delivery Data.

4.3. The Company shall ensure that each delivery of the Goods is accompanied by a delivery slip that shows the Contract number and date and the type and quantity of the delivered Goods.

4.4. All Goods shall be delivered to the Customer in boxes and/or pallets. Any Goods which are of a non-standard configuration shall be packed in non-returnable, fully enclosed palletized wooden boxes, suitable for vertical forklift truck stacking. The Company shall endeavor to meet any specific packaging requirements of the Customer which are notified to the Company as part of the Delivery Data.

4.5. The Company shall use reasonable endeavors to deliver the Goods to the Customer at the Delivery Location on or by the Delivery Date(s). All Delivery Dates specified in an Order Acknowledgement are approximate and non-binding. The Customer understands and agrees that the Company will use reasonable efforts to ship the Goods approximately on the Delivery Date. The Company shall notify the Customer of any anticipated delays but shall not be responsible for any delays in shipment beyond the Company's reasonable control. It is expressly understood that the Company may delay release of the Goods to the Customer or the Customer's agents until such time as payments due, have been received by the Company. All deliveries shall be made in normal daytime working hours. Time is not of the essence for delivery.

4.6. If the Delivery Location is the Company's premises or the Company's nominated third party warehouse provider:

4.6.1. the Company shall notify the Customer as and when the Goods are ready and/or will be ready for collection by the Customer;

4.6.2. the Customer shall agree a collection date and time with the Company, with all collections to be made within normal daytime working hours; and

4.6.3. if the Customer does not collect the Goods from the Delivery Location within 10 Business Days of the agreed date of collection and/or the Customer has not arranged a date for collection of the Goods within 10 Business Days of the date on which the Company notifies the Customer that the Goods are (or will be) ready for collection then Clause 4.9 shall apply.

4.7. Subject always to Clause 9.2, if the Company fails to deliver the Goods (whether on time or otherwise), its liability shall be limited to the reasonable costs and expenses incurred by the Customer in obtaining replacement goods of similar description and quality in the cheapest market available, less the price of the Goods.

4.8. The Company shall not be liable for any delay in the delivery of the Goods that is caused by a Force Majeure Event or the Customer's failure to provide the Delivery Data, to update the Delivery Data and/or to give any other instructions relevant to the supply of the Goods.

4.9. If the Customer fails to take delivery of the Goods within 10 Business Days of:

4.9.1. if the Company is delivering the Goods to a Delivery Location: the date of delivery set out in the Order Acknowledgement; or

4.9.2. if the Customer is collecting the Goods: the date on which the Company notifies the Customer that the Goods are ready for collection at the Delivery Location or the date on which the Parties agree that the Customer will collect the Goods, (collectively the "**Intended Delivery Date**") then, except where the failure or delay is caused by the Company's failure to comply with its obligations under the Contract:

4.9.3. delivery of the Goods shall be deemed to have taken place at 9am on the 10th Business Day after the Intended Delivery Date; and

4.9.4. the Company may, without prejudice to any other rights and/or remedies it may have:

(i) charge the Customer the Company's costs of storing and insuring the Goods for every day after the 10 Business Day period referred to above, including the transportation costs incurred in moving the affected Goods to a storage area and any additional costs incurred in delivering the Goods to the Customer; and

(ii) invoice the Customer for the Goods in accordance with Clause 7; and

(iii) if the Customer has not taken delivery of the Goods within 20 Business Days of the Intended Delivery Date, resell or otherwise dispose of the Goods (in whole or in part) and, after deducting reasonable storage, insurance and disposal costs, charge the Customer for any shortfall below the agreed price of the Goods (or account to the Customer for any excess over and above the price the Goods (to the extent that the Customer has paid for the same in full and cleared funds)).

4.10. The Company has the right to deliver the Goods in instalments and each instalment shall be paid for separately. Any delay in delivery or defect in an instalment shall not entitle the Customer to cancel any other instalment or relieve the Customer from its obligation to accept remaining deliveries.

4.11. Subject to Clause 4.9.3, delivery of the Goods is deemed complete as and when the Goods are delivered by or on behalf of the Company to the Delivery Location.

4.12. The Customer shall:

4.12.1. unless otherwise expressly agreed with the Company as part of the Contract, be responsible for the safe offloading of the Goods from the delivery vehicle (including the provision of equipment and labor);

4.12.2. check the Goods against the delivery note;

4.12.3. procure that one of its representatives signs the Company's proof of delivery note at the date and time of delivery to confirm receipt of the Goods. Whilst the Company will endeavor to procure that the proof of delivery is signed by the Customer's specific representative as notified to the Company, the Company may arrange for another individual at the Delivery Location to sign the proof of delivery. Any and all persons who sign the proof of delivery are deemed to be authorized to do so by and on behalf of the Customer; and

4.12.4. notify the Company of any shortages or damage to the Goods delivered within 72 hours of delivery (and in the case of damage, to the extent that the Customer can identify the damage without unpacking the Goods). The Company shall promptly investigate any reported shortages and/or damage to the Goods and the Customer shall allow the Company access to the Goods to investigate the reported issues at the Company's request. The Company shall replace any damaged Goods and/or make up any shortages as soon as reasonably practicable and this shall be the sole remedy of the Customer in respect of the same. All other issues relating to the Goods shall be addressed by way of the Warranty. If the Customer fails to provide notice of any shortages in accordance with this Clause 4.12.4 the Goods shall be deemed to confirm to the terms of an accepted order, and the Customer shall be deemed to have accepted the Goods.

5. Quality

5.1. The Company warrants that, on delivery of the Goods, and for a period of 12 months thereafter ("**Warranty Period**") the Goods shall:

5.1.1. conform in all material respects with the Specification; and

5.1.2. be free from material defects in material and workmanship.

Sections 5.1.1 and 5.1.2 shall, together, be referred to as the "**Warranty**".

5.2. Subject to Clause 5.3, provided that:

5.2.1. the Customer gives notice to the Company in writing during the Warranty Period within 7 days of discovery that some or all of the Goods do not comply with the Warranty; and

5.2.2. the Company is given a reasonable opportunity to examine the Goods and the Customer provides to the Company (on request) any and all information, data and other materials required by the Company in order to assess the warranty claim; and

5.2.3. the Customer (if asked to do so by the Company) returns such Goods to the Company (with the costs of the return to be borne by the Company if the Goods are subsequently found to be defective and in breach of the Warranty);

the Company shall, at its option, repair or replace the defective Goods or refund the price paid by the Customer for the defective Goods.

5.3. The Company shall not be liable for the failure of the Goods to comply with the Warranty if:

5.3.1. the Customer makes any further use of the Goods after giving notice in accordance with Clause 5.2;

5.3.2. the Customer has installed the Goods with knowledge of the defect;

5.3.3. the defect arises because the Customer failed to follow the Company's instructions as to the storage, commissioning, installation, use and/or maintenance of the Goods or (if there are none) good trade practice;

5.3.4. the defect arises as a result of the combination and/or use of the Goods with products which have not been approved by the Company, including any fixing brackets;

5.3.5. the defect arises as a result of the Company following any drawing, design, data, information or specification provide by the Customer;

5.3.6. the Customer alters or repairs the Goods without the prior written consent of the Company;

5.3.7. the defect arises as a result of fair wear and tear, willful damage, negligence, or abnormal storage and/or working conditions; and/or

5.3.8. the Goods differ from the Specification as a result of changes made to ensure that the Goods comply with applicable laws and regulatory requirements and/or as a result of the application of the manufacturing tolerances referred to in Clause 3.5.

5.4. Except as provided in this Clause 5, the Company shall have no liability to the Customer in respect of the Goods' failure to comply with the Warranty.

5.5. The foregoing Warranty is in lieu of all other warranties, express or implied by law, custom and/or trade practice, including but not limited to any warranties of merchantability, fitness of any particular purpose, or non-infringement, all of which are hereby expressly disclaimed to the fullest extent permitted by law.

5.6. The Warranty shall apply to any repaired and/or replaced Goods but only for the unexpired portion of the Warranty which was given by the Company in respect of the Goods initially supplied.

5.7. Any and all other terms and conditions which may be implied by law, custom and/or trade practice into the Contract are hereby excluded to the fullest extent permitted by law.

6. Title and Risk

6.1. Risk in the Goods shall pass to the Customer upon the Company's tender of the Goods at the Delivery Location.

6.2. Title in the Goods shall not pass to the Customer until the earlier of:

6.2.1. the Company receiving payment in full and in cleared funds for the Goods (including any interest and other sums payable by the Customer to the Company in respect of the Goods in question), in which case title shall pass at the time of payment;

6.2.2. the Customer resells the Goods, in which case title shall pass to the Customer at the point identified in Clause 6.4 below; and

6.2.3. the Company notifying the Customer in writing that it passes title in the Goods to the Customer.

6.3. Until title in the Goods passes to the Customer, the Customer shall:

6.3.1. store the Goods separately from all other goods held by the Customer so that they remain identifiable as the Company's property;

6.3.2. not remove, deface or obscure any identifying marks or packaging on or relating to the Goods;

6.3.3. maintain the Goods in satisfactory condition and keep them insured against all risks for their full price from the date of delivery;

6.3.4. immediately notify the Company if it becomes subject to any of the events listed in Clauses 8.1.2 to 8.1.5; and

6.3.5. give the Company such information relating to the Goods as the Company may require from time to time.

6.4. Subject to the provisions of this Clause 6, the Customer may resell or use the Goods in the ordinary course of its business before the Company receives payment for the same. However, if the Customer resells or uses the Goods before that point, it does so as principal and not as an agent of the Company and title in the Goods shall pass from the Company to the Customer immediately before the time at which the resale and/or use occurs.

6.5. The Company may at any time require the Customer to deliver up all Goods in its possession and/or under its control which have not been resold, irrevocably incorporated into another product and/or installed. If the Customer fails to do so promptly, the Company may enter the premises of the Customer or any third party where the Goods are stored to recover them (and the Customer shall procure the right of access for the Company to do the same).

7. Price and Payment

7.1. The price for the supply of the Goods is set out in the Order Acknowledgement, and subject to variation in accordance with these Terms.

7.2. Except as specified in the Order Acknowledgement, the price for the supply of the Goods does not include any transportation, crating, special packaging accommodations, insurance, tariffs or other governmental charges which the Company may be required to pay or collect under any existing or future law with respect of sale, transportation, delivery, storage, installation or use of any Goods sold by the Company. The price of the Goods is exclusive of all city, state and federal excise taxes, including without limitation, taxes on manufacture, sales, receipt gross income, occupation, use and similar taxes. Wherever applicable, any tax or taxes will be added to the invoice as a separate charge.

7.3. The Customer assumes all responsibility for payment of freight, and all costs associated therewith, which freight charges and other costs may not be reflected in the prices quoted by the Company. The Company may, at its option, prepay freight and seek reimbursement from the Customer. Unless requested in writing by the Customer, the Company will not insure the Goods against loss during transit. If the Company insures any Goods, the cost of insurance shall be the responsibility of the Customer.

7.4. The Company may increase the price for the supply of the Goods by giving notice to the Customer at any time before delivery to reflect:

7.4.1. any factor beyond the Company's control (including foreign exchange fluctuations, increases in taxes and duties and increase in labor and material costs);

7.4.2. any request by the Customer to change the delivery dates, quantities, type of Goods and/or the Specification for the Goods and, more generally, any provisions of the Order Acknowledgement. The Company will charge the Customer for any and all costs and expenses which the Company has incurred and/or will incur if a Customer cancels the whole or any part of a Contract; or

7.4.3. any delay caused by the instructions of the Customer and/or the failure of the Customer to give the Company accurate and/or adequate information or instructions, including the Delivery Data.

7.5. The Company may from time to time demand different terms of payment from those specified herein whenever it reasonably appears that the Customer's financial condition indicates such change is warranted, and may demand assurance of the Customer's ability to pay or otherwise perform the Customer's obligations. The Company may suspend performance whenever it reasonably appears that such ability is in question. Such demand shall be in writing and the Company may, upon making of such demand, suspend shipments and performance of its obligations under the Contract. If within the period stated in such demand, the Customer fails or refuses such different terms of payment, or fails or refuses to give adequate assurance of its ability to pay or otherwise perform its obligations, the Company may at the Company's option treat such failure or refusal as a repudiation of any portion of an accepted order that has not been fully performed and the Company shall have no further obligation with respect to such order. In all events, time shall be of the essence with regard to the Customer's payment obligations to the Company under the Contract.

7.6. The Company may invoice the Customer for the Goods at any time on or after the dispatch of the Goods for delivery (if delivered by the Company) or notification to the Customer that the Goods are ready for collection by the Customer.

7.7. The Customer shall pay the invoice in full and in cleared funds by the end of the month following the month in which the invoice was dated. The Customer shall make payment to the bank account nominated by the Company and in US dollars. Time for payment is of the essence. Payments will be applied by the Company to the oldest invoice outstanding.

7.8. If the Customer fails to make any payment when due to the Company, then the Customer shall pay interest on the overdue sum at the rate of 4% per annum above the base rate from time to time of the Company's bank. Such interest shall accrue on a daily basis from the due date until the actual date of payment of the overdue amount, whether before or after judgment.

7.9. The Customer shall pay all amounts due under the Contract in full and without set off, deduction, withholding or counterclaim (except for any deduction or withholding required by law). The Company may at any time, without limiting any other rights or remedies it may have, set off any amount owing to it by the Customer against any amount payable by the Company to the Customer.

7.10. To secure the Customer's prompt and complete payment and performance of any and all present and future indebtedness, obligations and liabilities of the Customer to the Company, the Customer hereby grants to the Company a first priority security interest, with priority over all other liens, claims and encumbrances, in all inventory of goods purchased under the Contract by the Customer from the Company, wherever located, and whether now existing or hereafter arising or acquired from time to time, and in all accessions thereto and replacements or modification thereof, as well as all proceeds (including insurance proceeds) of the foregoing. The Customer acknowledges that the security interest is a purchase money security interest under New York law. The Company may file a financing statement to perfect such security interest and the Customer shall execute such statement or other documentation necessary to perfect the Company's security interest in such Goods. The Customer also authorizes the Company to execute, on the Customer's behalf, such statements or other documentation necessary to perfect the Company's security interest in such Goods. The Company shall be entitled to all applicable rights and remedies of a secured party under applicable law.

8. Termination

8.1. Without prejudice to any other rights and remedies it may have, the Company may terminate a Contract with immediate effect by giving notice in writing to the Customer if:

8.1.1. the Customer commits a material breach of the Contract and (if such breach is remediable) fails to remedy that breach within fourteen (14) days of the Customer being notified in writing to do so;

8.1.2. the Customer takes (or a third party takes) any step or action in connection with its entering administration, provisional liquidation or composition or arrangement with its creditors (other than in relation to a solvent restructuring), being wound up (whether voluntarily or by order of the court, unless for the purpose of a solvent restructuring), having a receiver appointed to any of its assets or ceasing to carry on business; (if the Customer is an individual) is declared bankrupt or, if the step or action is taken in another jurisdiction, in connection with any analogous procedure in the relevant jurisdiction;

8.1.3. the Customer suspends, threatens to suspend, ceases or threatens to cease to carry on all or a substantial part of its business;

8.1.4. the Customer's financial position deteriorates to such an extent that in the Company's capability to adequately fulfil its obligations under the Contract has been placed in jeopardy; and/or

8.1.5. the Customer is unable to pay its debts when due and/or otherwise indicates that it may be unable to do so.

8.2. Without limiting any other rights and remedies it may have, the Company may suspend the provision of the Goods under the Contract or any other contract between the Customer and the Company if the Customer becomes subject to any of the events listed in Clauses 8.1.2 to 8.1.5, or the Company reasonably believes that the Customer is about to become subject to any of them.

8.3. Without limiting any other rights and remedies, the Company may terminate the Contract with immediate effect by giving written notice to the Customer if the Customer fails to pay any amount due under the Contract on or by the due date for payment.

8.4. The Company may, without any liability to the Customer as a result, terminate the Contract at any time prior to dispatch of the Goods by giving to the Customer at least 5 Business Days' notice in writing.

8.5. The Customer may terminate the Contract at any time prior to dispatch of the Goods by giving to the Company at least three (3) Business Days' notice in writing. In such cases:

8.5.1. the Customer shall reimburse the Company for any and all costs and expenses incurred by the Company in respect of the performance of the Contract up to the point of the termination of the Contract, including any and all costs and expenses for all materials purchased for the manufacture of the Goods and for all parts of the Goods which are fully or partially manufactured as at the date of termination; and

8.5.2. if the Customer fails to make payment of the costs and expenses referred to in Clause 8.5.1, the Company may deliver the Goods to the Customer and invoice the Customer for payment.

The Customer must note that the manufacture of the Goods may commence immediately upon the issue of the Order Acknowledgement and costs are paid from as early as that time in the performance of the Contract which shall be recoverable by the Company from the Customer under this Clause.

8.6. The Customer may, at the discretion (and with the agreement) of the Company, return any delivered Goods to the Company for re-sale, provided that:

8.6.1. the Customer pays to the Company 40% of the price for those Goods as a re-stocking charge for the returned Goods;

8.6.2. the Goods in question are fast moving items and current stock of the Company;

8.6.3. the Goods are returned to the Company at the Customer's cost; and

8.6.4. any cartons of Goods are full and unopened and the Goods are undamaged (and therefore suitable for resale).

8.7. On termination of the Contract, the Customer shall pay to the Company all of the Company's outstanding unpaid invoices and interest, as well as for any costs and expenses incurred by the Company prior to the date of the termination of the Contract in the performance of the Contract (up to the price under the Contract).

8.8. Termination of the Contract shall not affect any of the Parties' rights and remedies that have accrued as at termination. Any provision of the Contract that expressly or by implication is intended to come into force on or after termination shall remain in force and effect.

9. Liability

9.1. Nothing in the Terms shall limit or exclude the Company's liability for:

9.1.1. death or personal injury due to its negligence, or the negligence of its employees, agents or sub-contractors;

9.1.2. fraud or fraudulent misrepresentation; and/or

9.1.3. any matter in which it would be unlawful for the Company to exclude or restrict its liability.

9.2. Subject always to Clause 9.1:

9.2.1. the Company shall under no circumstances whatsoever be liable to the Customer, whether in contract, tort (including negligence), breach of statutory duty or otherwise, for any:

(i) loss of profits or revenues or diminution in value;

(ii) loss of business, loss of contracts and/or business opportunity;

(iii) loss of anticipated savings;

(iv) economic loss,

(v) damage to goodwill and/or reputation; and/or

(vi) any consequential, indirect, incidental, special, exemplary, punitive or enhanced damages,

arising under or in connection with the Contract,

9.2.2. the Company's total liability to the Customer in respect of all other losses arising under or in connection with the Contract, without limitation, in contract, tort (including negligence), breach of warranty, breach of statutory duty or otherwise shall in no event exceed the price of the Goods under the Contract. The Customer acknowledges that, except as expressly provided otherwise, the remedies provided under the Contract are exclusive and in lieu of all other remedies.

9.3. If the Company's performance of the Contract is prevented or delayed as a result of any act and/or omission of the Customer and/or its representatives, the Company shall have no liability for any breach of the Contract arising as a result and the Customer shall reimburse the Customer on demand for any and all costs and expenses which the Company incurs as a result of the Customer's and/or its representatives' actions and/or omissions.

10. Insurance Obligations

10.1. The Customer shall, for a period of 5 years from the Delivery Date, at its own expense, maintain and carry in full force and effect, commercial general liability (including product liability) in a sum no less than five $5 million with financial sound and reputable insurers, and upon the Company's request, shall provide the Company with a certificate of insurance evidencing the insurance coverage specified in this Clause. The certificate of insurance shall name the Company as an additional insured.

11. Custom Designed Goods

11.1. If any Goods are manufactured and/or sold, or any service performed, by the Company, pursuant to specifications or requirements of the Customer ("**Custom Designed Goods**"), unless specifically agreed in writing to the contrary, (a) the Customer agrees to defend, protect and save harmless the Company against all suits at law and equity and from all damages, claims and demands including attorney's fees and costs, for actual or alleged infringement of any United States or foreign patent, copyright, trademark, or any other intellectual property: and (b) the Customer agrees to indemnify and hold harmless the Company from and against all damages, claims, suits, actions, and demands including attorney's fees and costs which may be brought against the Company because of alleged or actual unfitness of such Custom Designed Goods in their later application and use.

11.2. The Customer acknowledges and agrees that it is exclusively liable for any drawings, designs and other specifications provided to the Company for the purpose of fabrication of the Goods and that the Company is under no obligation to correct or review any such drawings, design and other specifications for errors. The Customer warrants that it holds adequate professional indemnity insurance covering the Customer for any loss or damage resulting from any negligent acts, errors or omissions made in respect of such drawings, designs and specifications.

11. Custom Designed Goods

11.1. If any Goods are manufactured and/or sold, or any service performed, by the Company, pursuant to specifications or requirements of the Customer ("**Custom Designed Goods**"), unless specifically agreed in writing to the contrary, (a) the Customer agrees to defend, protect and save harmless the Company against all suits at law and equity and from all damages, claims and demands including attorney's fees and costs, for actual or alleged infringement of any United States or foreign patent, copyright, trademark, or any other intellectual property: and (b) the Customer agrees to indemnify and hold harmless the Company from and against all damages, claims, suits, actions, and demands including attorney's fees and costs which may be brought against the Company because of alleged or actual unfitness of such Custom Designed Goods in their later application and use.

11.2. The Customer acknowledges and agrees that it is exclusively liable for any drawings, designs and other specifications provided to the Company for the purpose of fabrication of the Goods and that the Company is under no obligation to correct or review any such drawings, design and other specifications for errors. The Customer warrants that it holds adequate professional indemnity insurance covering the Customer for any loss or damage resulting from any negligent acts, errors or omissions made in respect of such drawings, designs and specifications.

12. Force Majeure Event

The Company shall not be in breach of the Contract nor liable for any delay in performing (or failure to perform) any of its obligations under the Contract if such delay or failure is as a result of a Force Majeure Event. If the period of delay or non-performance continues for more than 90 days, either Party may terminate the Contract by giving 5 Business Days' notice in writing to the other Party. For the purposes of this Clause, a Force Majeure Event shall include delays caused by adverse weather conditions, traffic delays and/or breakdowns of any carrier transport.

13. Confidentiality.

13.1. The Customer undertakes that it shall not at any time disclose to any person any information concerning this Contract and the business, affairs, customers, clients or suppliers of the Company ("**Confidential Information**"), except as permitted by this Clause 13.

13.2. All specifications, Drawings, molds, dies, other tooling, models, , designs, technical information or data, written, oral or otherwise furnished by or on behalf of the Company, whether paid for by the Customer or not, and shall be returned (together with all copies) promptly upon the Company's request. Such information shall be treated as confidential, and shall not be used, reproduced or disclosed by the Customer.

13.3. The Customer may disclose Confidential Information to its employees, officers, representatives, subcontractors or advisers who need to know such information for the purposes of carrying out the Customer's obligations under the Contract. The Customer shall ensure that its employees, officers, representatives, subcontractors or advisers to whom it discloses the Company's confidential information comply with this Clause 13; and (ii) as may be required by law, a court of competent jurisdiction or any governmental or regulatory authority. The Customer shall only use the Company's confidential information to perform its obligations under the Contract.

13.4. The Customer's obligations of confidentiality with respect to each item of Confidential Information shall extend for a period of three (3) years from the date of the Company's acceptance of the last order to which the items of Confidential Information in question relates; provided, however, that the Customer's obligations of confidentiality with respect to items of information which rise to the level of a trade secret (as defined under applicable law) shall remain in full force and effect for so long as such information remains a trade secret under applicable law.

13.5. The Parties acknowledge that the rights of the Company hereunder are in addition to those rights that the Company may have under common law or applicable statutes for the protection of trade secrets.

14. General

14.1. **Assignment**. The Company may at any time assign, transfer, mortgage, charge, sub-contract or deal in any manner with all or any of its rights and obligations under the Contract. The Customer many not assign, transfer, mortgage, charge, sub-contract or otherwise deal in any manner with all or any of its rights and obligations under the Contract without the prior written consent of the Company.

14.2. **Entire Agreement**. The Contract constitutes the entire agreement between the Parties and supersedes and extinguishes all previous agreements, promises, assurances, warranties, representations and understandings between them, whether written or oral, relating to its subject matter. Each Party agrees that it shall have no remedies in respect of any statement, representation, assurance or warranty (whether made innocently or negligently) that is not set out in the Contract. Each Party agrees that it shall have no claim for innocent or negligent misrepresentation or negligent misstatement based on any statement in the Contract.

14.3. **Variation**. Subject to any clause to the contrary in the Terms, no variation of the Contract shall be effective unless it is in writing and signed by the Parties.

14.4. **Waiver**. No failure or delay by a Party to exercise any right or remedy provided under the Contract or by law shall constitute a waiver of that or any other right or remedy, nor shall it prevent or restrict the further exercise of that or any other right or remedy. No single or partial exercise of such right or remedy shall prevent or restrict the further exercise of that or any other right or remedy.

14.5. **Severance**. If any provision or part provision of the Contract is or becomes invalid, illegal or unenforceable, it shall be deemed modified to the minimum extent necessary to make it valid, legal and enforceable. If such modification is not possible, the relevant provision or part provision under this Clause shall not affect the validity and enforceability of the rest of the Contract.

14.6. **Notices**.

14.6.1. Any notice given to a Party under or in connection with the Contract shall be in writing and shall be delivered by hand or by pre-paid first-class post or other next working day delivery service, at its registered office (if any) or its principal place of business (in any other case) or such other address as that Party shall specify as a replacement address in writing in accordance with this Clause or sent by fax to its main fax number.

14.6.2. Any notice shall be deemed to have been received: (i) if delivered by hand, on signature of a delivery receipt or at the time the notice is left at the proper address if a Business Day; and (ii) if sent by pre-paid first-class post or other next working day delivery service, at 9.00 am on the second Business Day after posting or at the time recorded by the delivery service; and (iii) if sent by fax, at the time of transmission, or, if this time falls outside business hours in the place of receipt, when business hours resume. In this Clause, business hours means 9.00am to 5.00pm Monday to Friday on a day that is not a public holiday in the place of receipt.

14.6.3. This Clause does not apply to the service of any proceedings or other documents in any legal action or, where applicable, any other method of dispute resolution.

14.7. **Publicity**. The Customer grants to the Company a limited, non-exclusive, non-transferable, non-royalty bearing license to use the trademarks and logos of the Customer in connection with marketing and promoting the Company and the services provided by the Company, including using Customer's name as a reference.

14.8. **Third Party Rights**. No one other than a Party to the Contract (and their permitted assigns) shall have any right to enforce it.

14.9. **Governing Law**. The Contract, any dispute or claim (including non-contractual disputes or claims) arising out of or in connection with it or its subject matter or formation shall be governed and construed in accordance with the laws of the State of New York and of the United States of America without regard to principles of conflict of laws, and the Company. The United Nations Convention on the International Sale of Goods shall not apply to any transactions between the Company and the Customer.

14.10. **Dispute Resolution**. All disputes, controversies or claims arising out of or relating to this Contract shall be resolved by arbitration in accordance with the Commercial Arbitration Rules of the American Arbitration Association (the "**Rules**") by one or more arbitrators appointed in accordance with the Rules. The seat of arbitration shall be in New York County, New York and the arbitration shall be conducted in English. Any award or decision rendered in such arbitration shall be final and binding on the Parties, and judgement maybe entered thereon in any court of competent jurisdiction. Each Party shall pay any and all expenses incurred by such Party in connection with such arbitration proceeding, unless otherwise determined by the arbitrator, who shall have authority to award attorney's fees and costs of arbitration to the prevailing Party. To the fullest extent permitted by law, notwithstanding any arbitration rule or procedure, (a) no controversy or claim arising out of relating to the Contract shall be consolidated or joined with any other person's claim and no class action or representative arbitration shall be permitted under the Contract, and (b) if any class or representative action cannot be waived under applicable law, the parties agree that such action hall be arbitrated.