



Chilled Beam Architecture & Design

FRENGER[®]
systems



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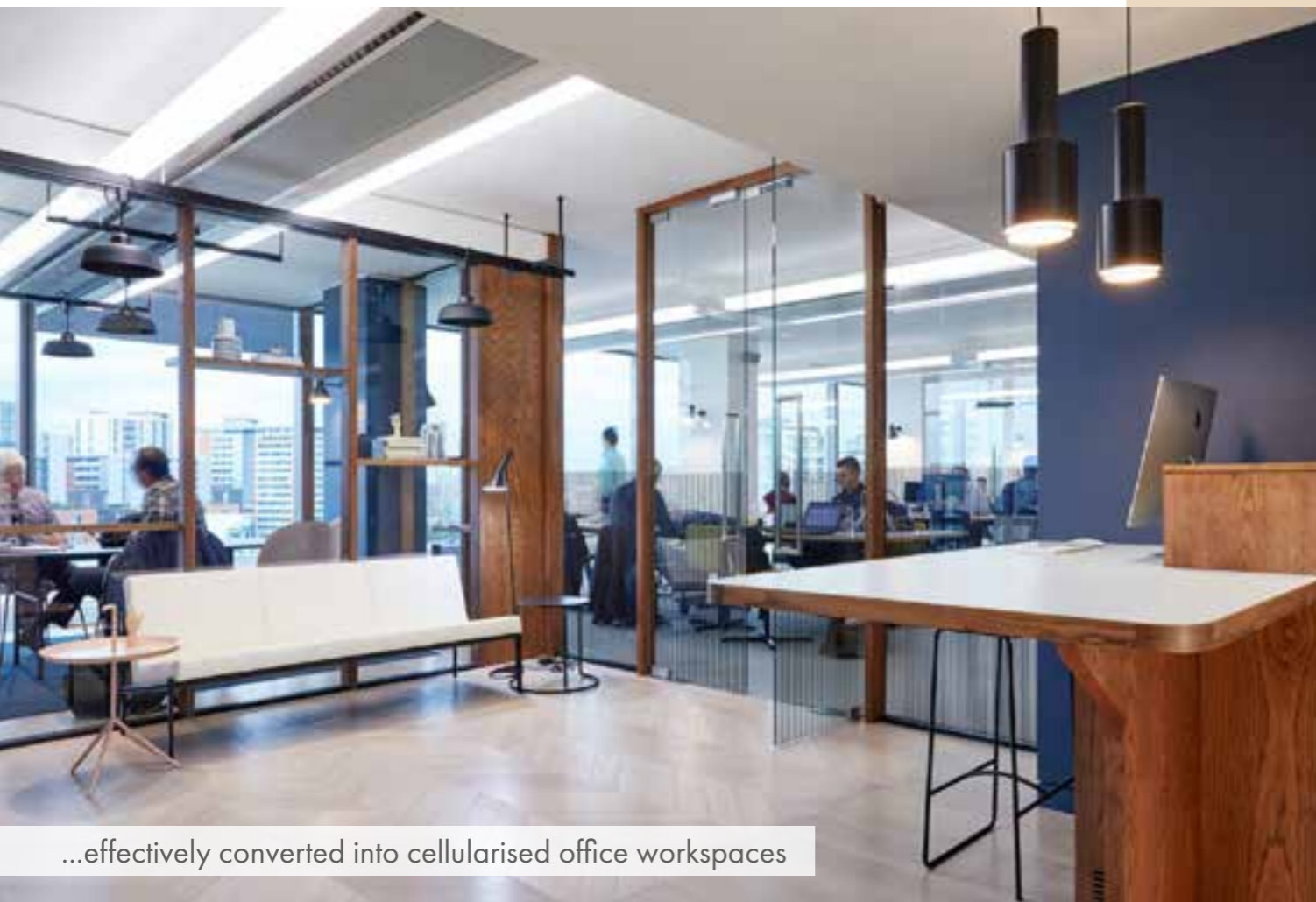
C o m m e r c i a l



Flexibility



Open plan office Multiservice Chilled Beams...



...effectively converted into cellularised office workspaces





C o m m e r c i a l



A c t i v e M u l t i s e r v i c e C h i l l e d B e a m s











C o m m e r c i a l



P a s s i v e M u l t i s e r v i c e C h i l l e d B e a m s







C o m m e r c i a l



Active Ceiling Integrated Chilled Beams













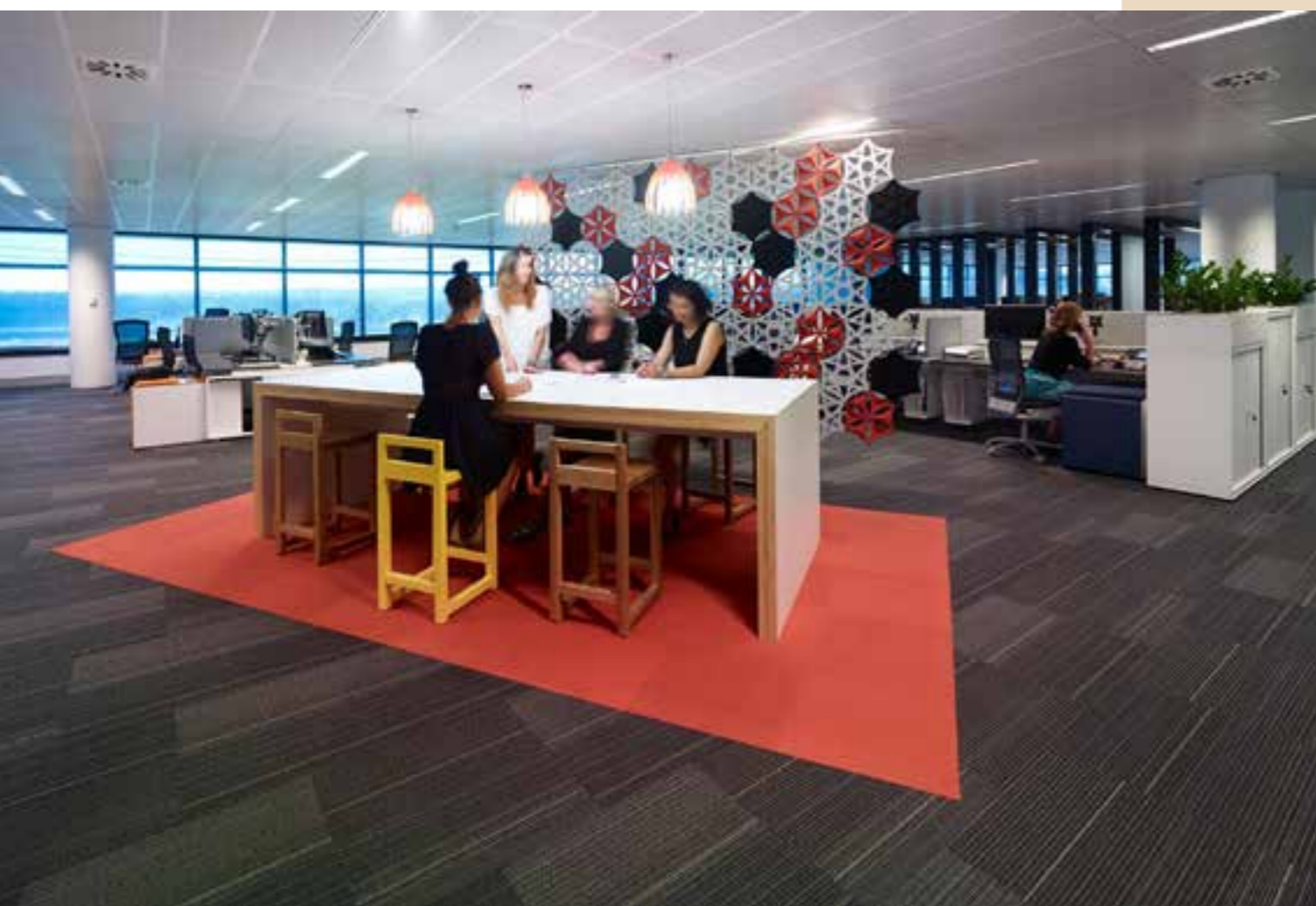
C o m m e r c i a l



P a s s i v e C e i l i n g I n t e g r a t e d C h i l l e d B e a m s



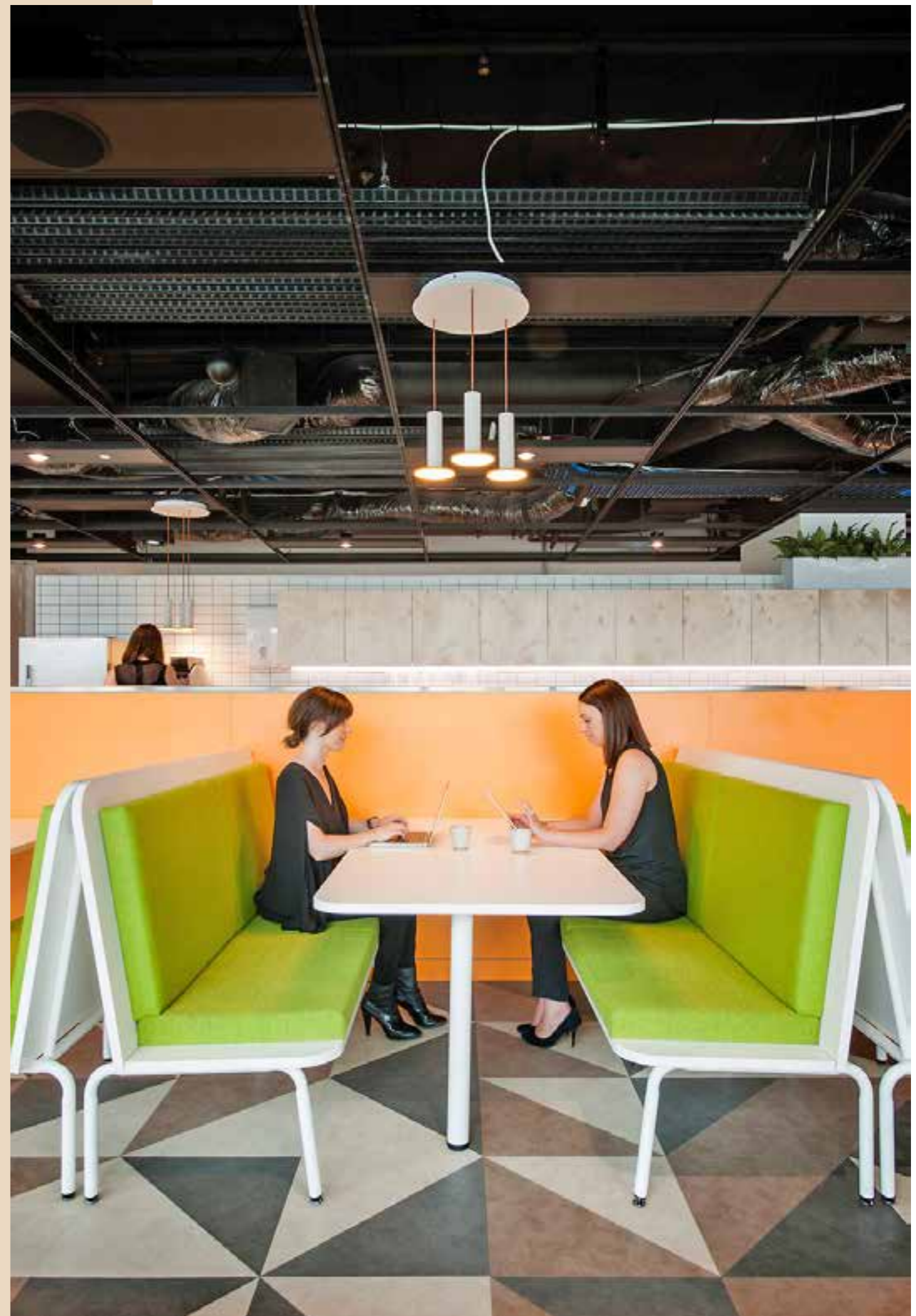












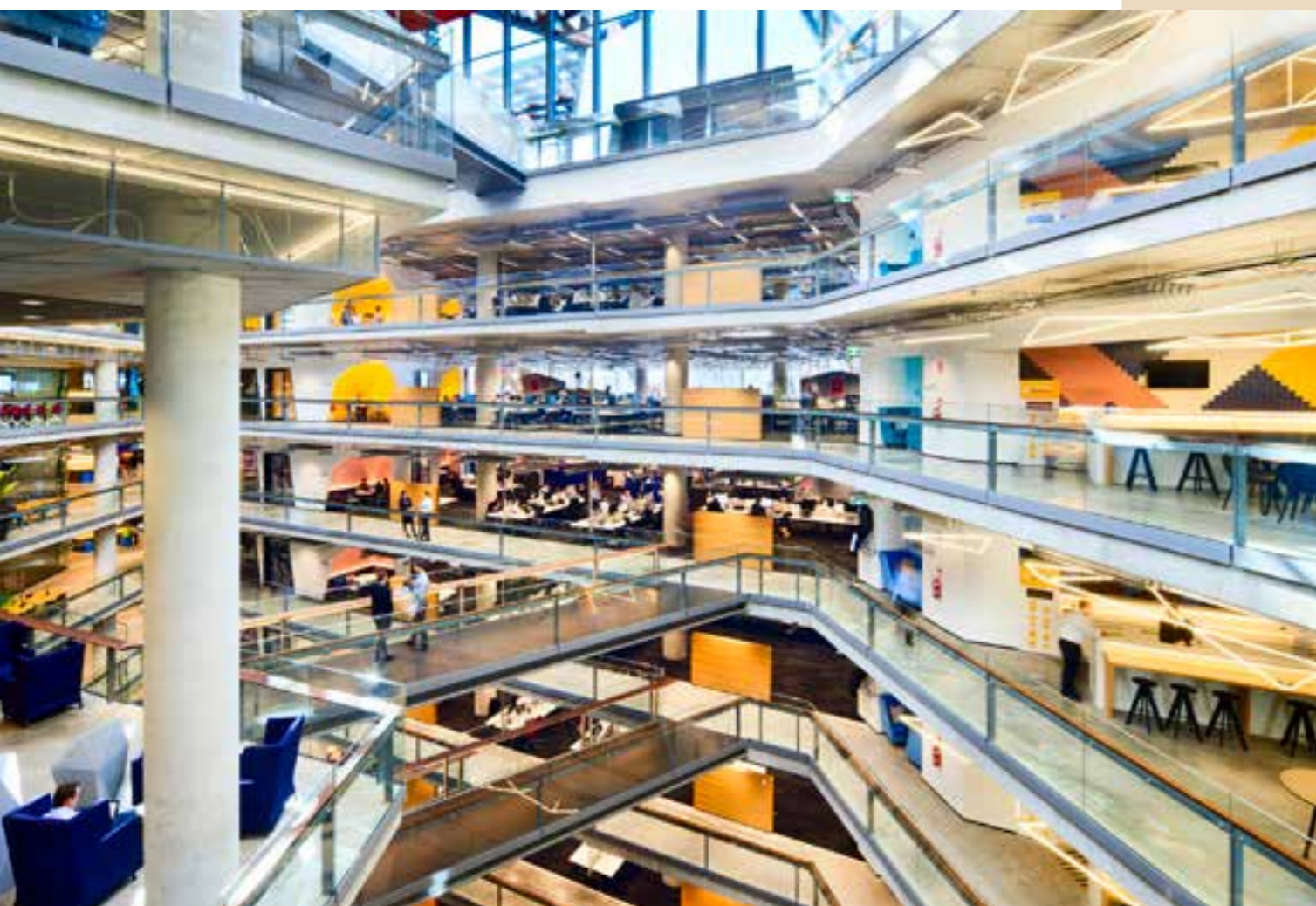


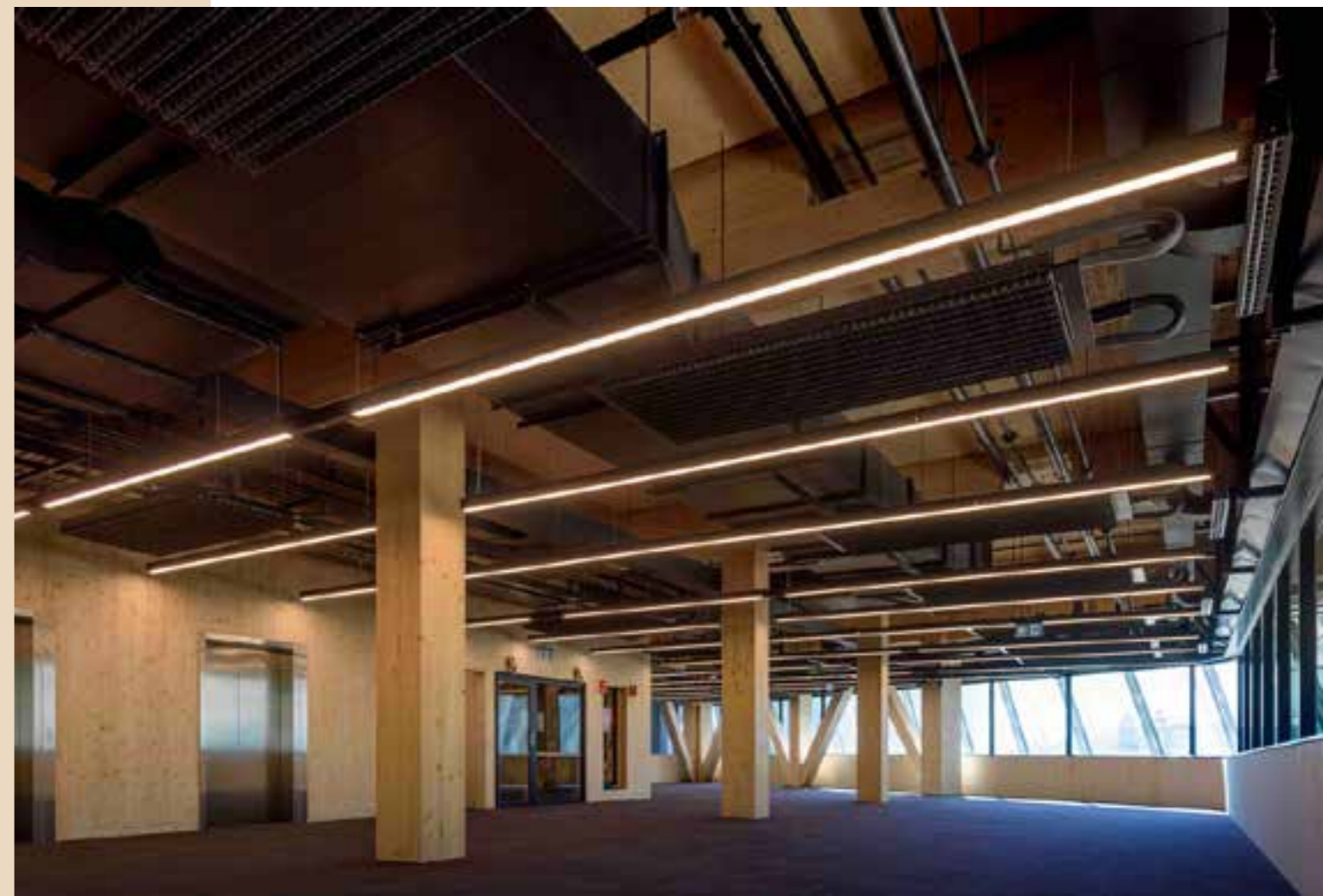
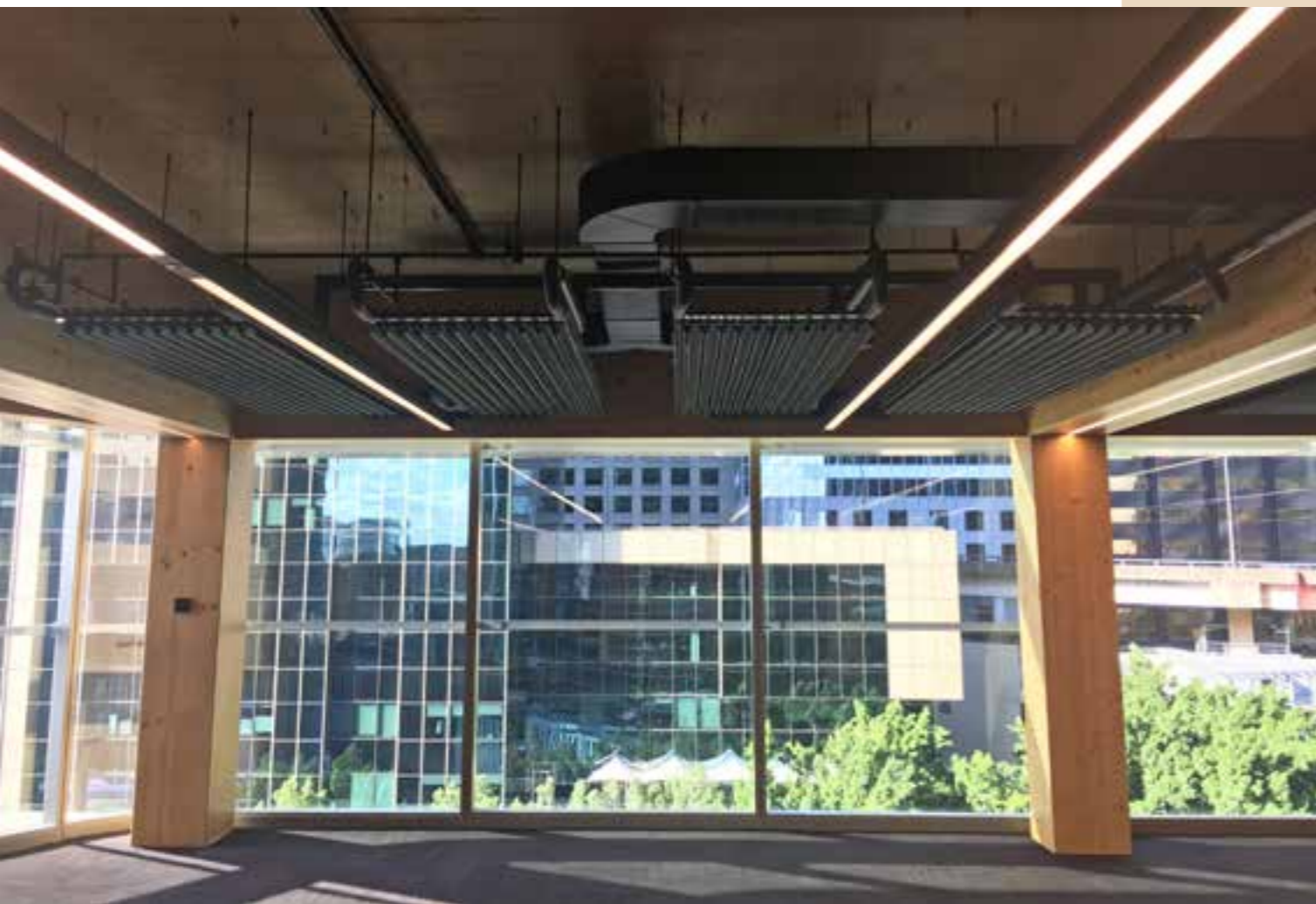
















H e a l t h c a r e











E d u c a t i o n a l









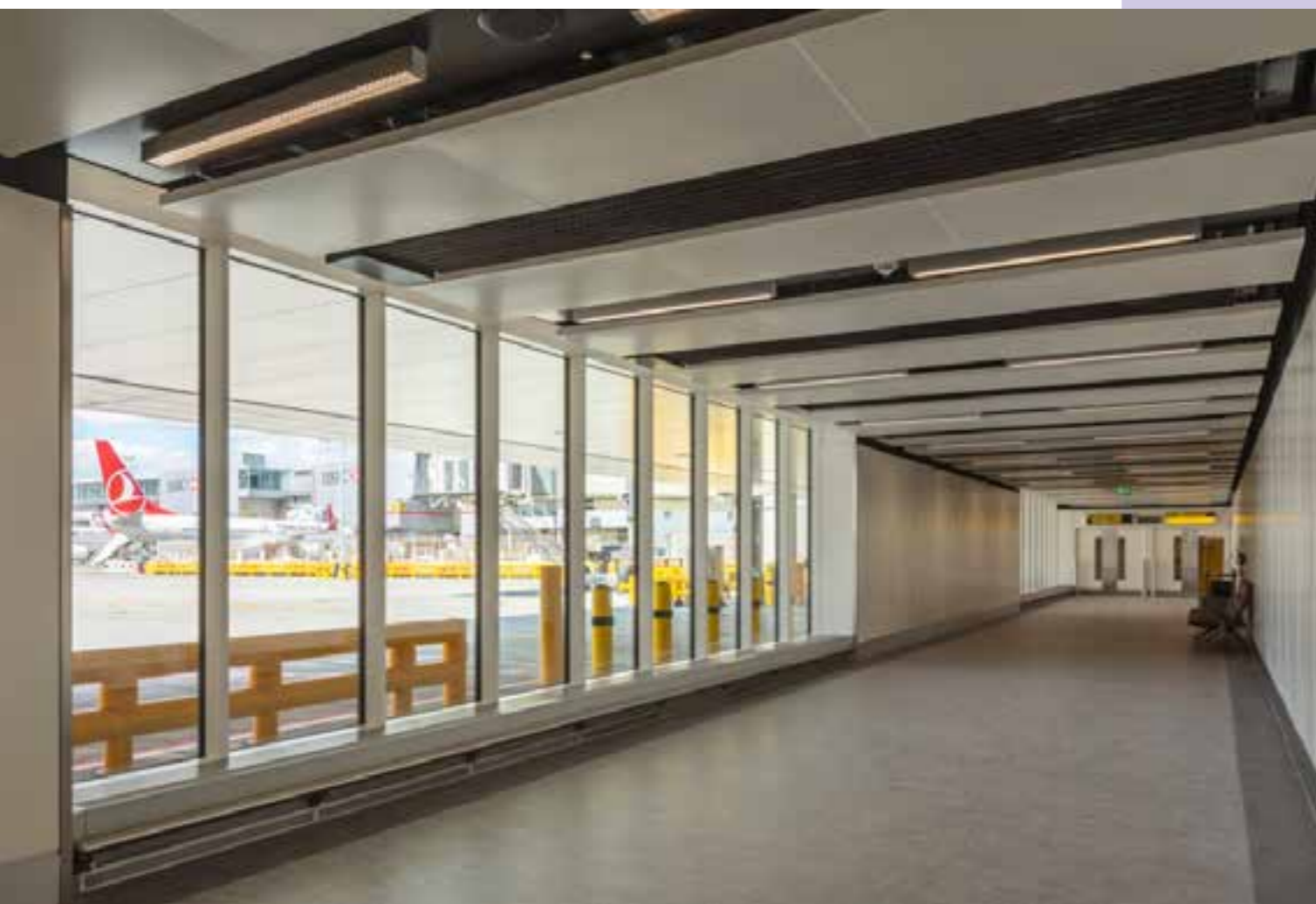


Multiservice Radiant Heating Panels



A i r p o r t s







P u b l i c S p a c e s







Hospitality





Options



Linear Asymmetric LED Solution with Micro-Linear-Multi-Layered Extruded Aluminium Diffuser



Linear LED Solution with Seamless Polycarbonate 'Bullnose' Diffuser



Symmetric Linear LED Solution with Micro-Linear-Multi-Layered Extruded Aluminium Diffuser



Symmetric Linear LED Solution with Miro Louvre and Hidden Extruded Polycarbonate Diffuser



Linear LED Solution with Seamless Polycarbonate 'Square Edged' Diffuser



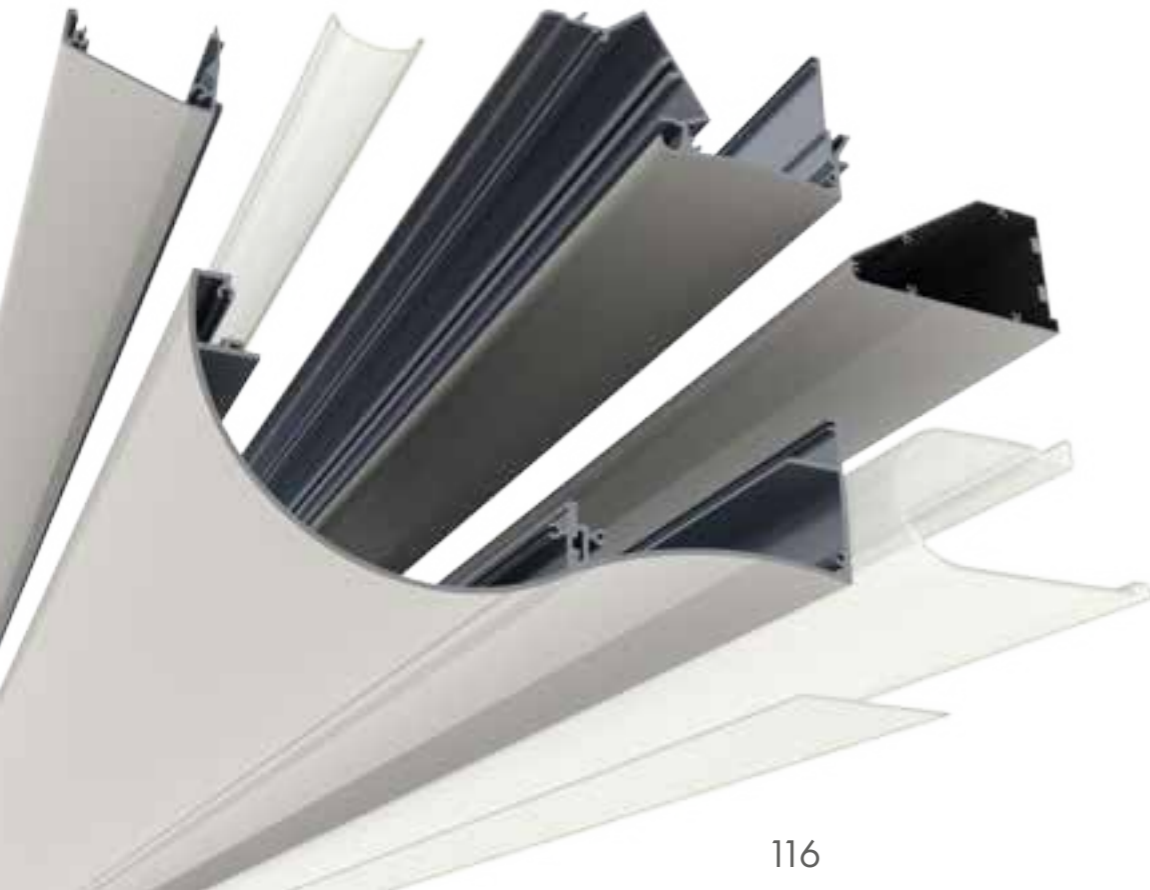
Symmetric LED Solution with Miro Louvre



Linear Asymmetric LED Solution with Micro-Linear-Multi-Layered Extruded Aluminium Diffuser



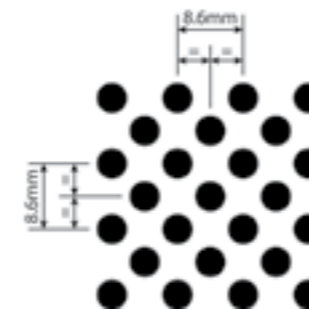
Asymmetric LED Solution with Miro Louvre



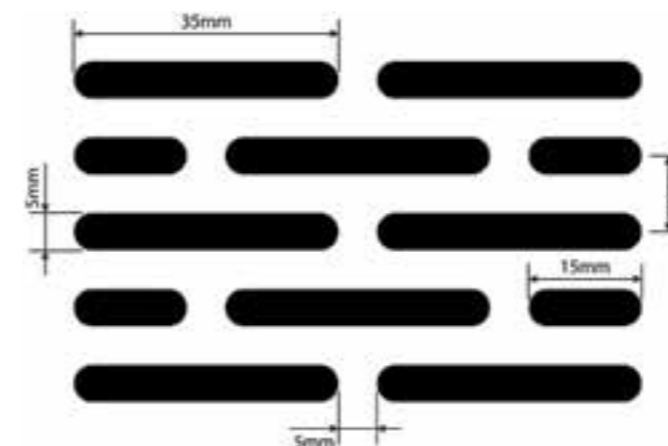
Multiservice Chilled Beams (MSCB's) offer an alternative to the monolithic ceilings that have become commonplace in office developments, providing attractive yet extremely functional building services installations. The appearance of each beam can be customised in terms of services incorporated, shape, dimensions, colour and perforation pattern to meet the client's particular preferences.

- Functions:
- Water Driven Cooling
 - Fresh Air Delivery
 - L.T.H.W Heating
 - Lighting LG7
 - Lighting Control PIR/Photocells
 - Sprinkler Pipes
 - Smoke Detectors
 - PA/VA Speakers
 - Control Valves
 - Acoustic Insulation

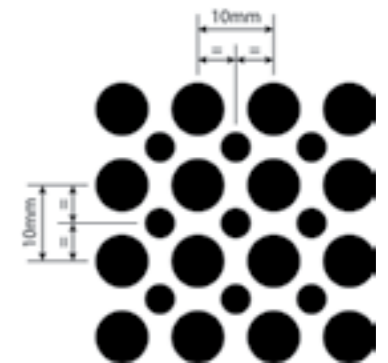
We have a wide range of extruded aluminium side profiles to facilitate various different types of luminaire. We also have a wide range of extruded polycarbonate (fire rated) side profiles which become the lighting optic. More variants of the various aspects of MSCB's are available upon request and any new design requirements can be accommodated.



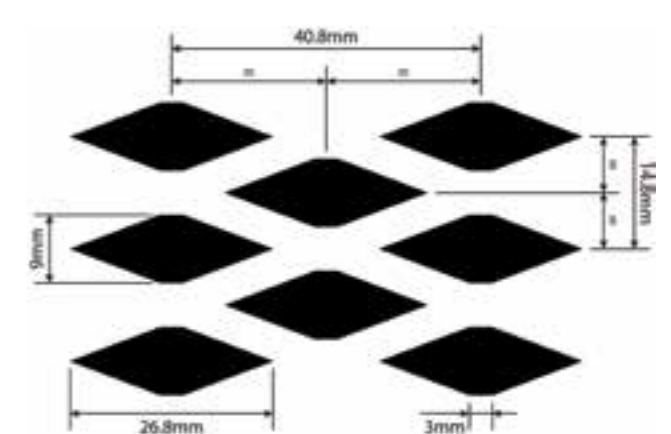
4D Perforation: 4mm Hole Diameter, 33% Open Area



5S Perforation: 35mm x 5mm Slots, 43% Open Area



7D Perforation: 7mm & 4mm Hole Diameter, 51% Open Area



Diamond Perforation: 45% Open Area

Company

Frenger’s Technical Facility and Head Office is predominantly based on the prestigious Pride Park, Derby in the United Kingdom. Frenger has a wealth of experience in the design, development and manufacture of heating and cooling systems dating back some 80 years.

Frenger employs professional project managers, designers, mechanical and electrical engineers; the company has a reputation for delivering complex projects on time, within budget and to specification. To meet architectural expectations Frenger employs in-house 3D computer generated modelling using various different software packages which include Solidworks, Revit and can even produce building fly through.

Frenger also model the heating, cooling and lighting performance using various specialist software, but also product actual project specific testing in the climatic test laboratories, photometric lighting laboratories and even measure the sound from the product in their acoustic testing laboratory.

Frenger has earned an enviable reputation as a dependable supply partner capable of developing effective space conditioning solutions for the most complex of projects. BIM models of most of our products are available.



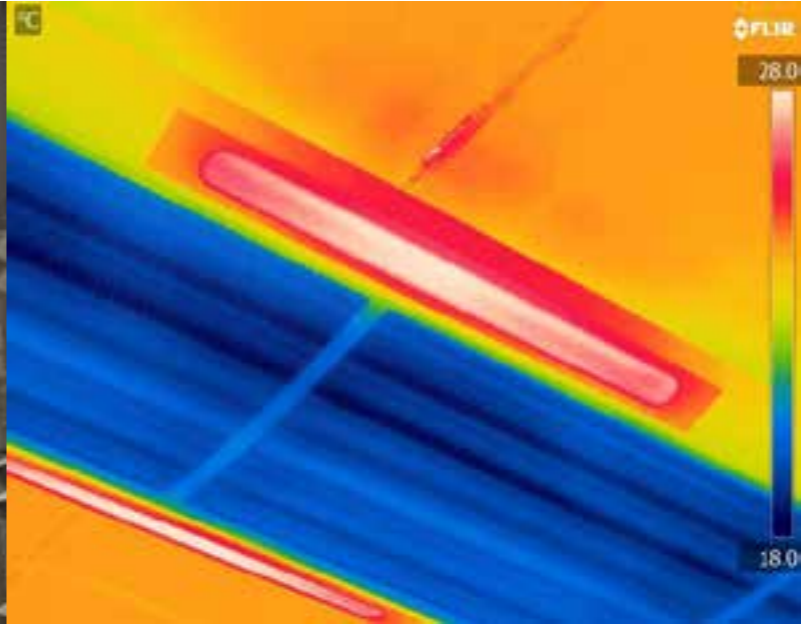
3No. Climatic Test Laboratories



2No. Photometric Laboratories



1 No. Acoustic Laboratory



In-House Technical Capabilities

Frenger Systems have **three state-of-the-art Climatic Testing Laboratories** at the technical facility situated at the prestigious Pride Park, Derby. Each Laboratory has internal dimensions of 6.3 x 5.7 x 3.2m high and includes a thermal wall so that both core and perimeter zones can be modelled. The test facilities are fixed in overall size and construction therefore simulation of a buildings specific thermal mass cannot be completed, it should, however be noted that a specific project can be simulated more accurately by recessing the floor and reducing the height as necessary.

Frenger also employ the use of cutting edge thermography technology with FLIR® thermal imaging cameras to help determine the best way to improve project specific installations, as well as to further the development of Frenger’s spatial conditioning technology.

The Frenger Systems technical facility at also has **two Photometric Test Laboratories** which are used to evaluate the performance of luminaires. To measure the performance, it is necessary to obtain values of light intensity distribution from the luminaire. These light intensity distributions are used to mathematically model the lighting distribution envelope of a particular luminaire. This distribution along with the luminaires efficacy allows for the generation of a digital distribution that is the basis of the usual industry standard electronic file format.

The **Acoustic Test Room at the Frenger Systems Technical Facility** is a hemi-anechoic chamber which utilises sound absorbing acoustic foam material in the shape of wedges to provide an echo free zone for acoustic measurement; the height of the acoustic foam wedges has a direct relationship with the maximum absorption frequency, hence Frenger had the wedges specifically designed to optimise the sound absorption at the peak frequency normally found with our active chilled beam products.

Design Capabilities

To allow Frenger to stay at the forefront of spatial conditioning technology, it employs the use of a wide variety of design software in-house. These range from 2D and 3D Computer Aided Design (CAD) packages to help with bespoke project design to computational fluid dynamics (CFD) and lighting calculation design programs to allow all aspects of the use of chilled beams to be developed and refined to the highest levels.

The level of expertise Frenger has acquired allows the chilled beams to be designed with the flexibility to suit any project. Using CAD software does not only allow for chilled beams to be sized and configured on a project to project basis, but also allows photo realistic 3D images to be rendered to simulate how the products will look when installed. Collaboration with the climatic testing department lets data obtained in the test labs be realised in a visual medium, making deciphering the data more intuitive.

Software such as Solidworks is used to simulate real-world scenarios, such as stress/strain and bending motions applied to parts of the chilled beams, this enables bespoke designs to be refined prior to testing and reduces the amount of iterations required to create the optimum product. The design software is also used to aid manufacturing and installation, with 2D and 3D representations used to improve accuracy and reduce human error.



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In accordance with our policy of continuous improvement, we reserve the right to amend any specification without prior notice.
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