



Technical Note

**North Kent Police Station, Thames Way, Northfleet,
Gravesend DA11 8BD**

Planning Application Technical Note

August 2024

Preface

Identification Photograph:			
Property Address:	Kent police, Thames Way, Northfleet, Gravesend, Kent DA11 8BD.		
Purpose of Report	To provide background to the technical justification for the need for an ASHP solution.		
Approximate GIFA:	11,565 sq. m.		
Approximate Age of Building	2007.		
Principal Forms of Construction	Steel framed with a profiled aluminium roof sheeting, a combination of masonry in some instance faced with polished precast concrete panels, steel cladding and aluminium framed curtain walling to the elevations. Constructed over piled foundations and ground beams, with a reinforced concrete ground floor slab and pre-cast concrete plank suspended upper floors.		
Existing Use of Building	Operational Police station, administration offices and custody suite.		
Lead Engineer	Adam Hamblin		
	DD: 07765221609	e-mail:	adam.hamblin@avisonyoung.com

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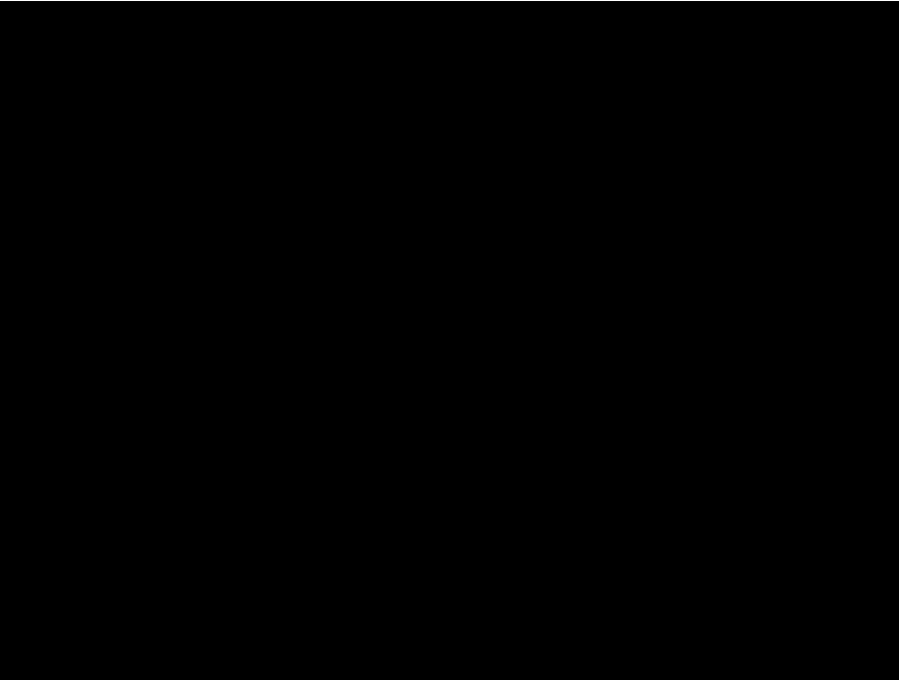
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1. Introduction

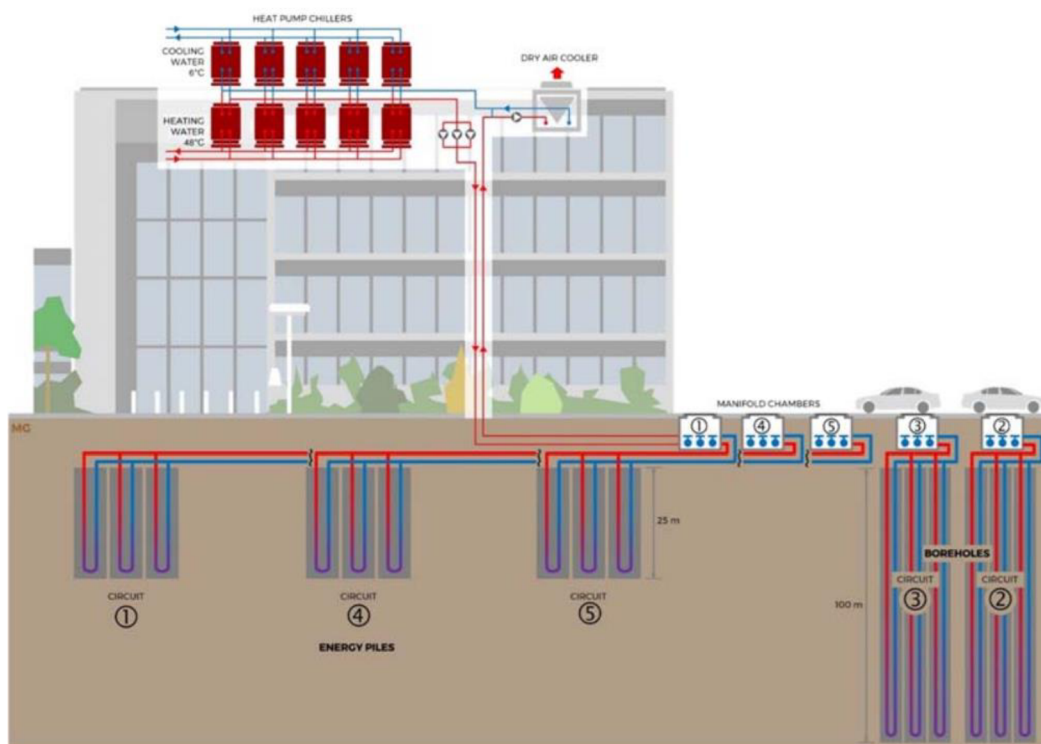
1.1 Avison Young have been asked to prepare a technical note to provide further information on how the decision was made for an ASHP solution.

1.2 The following report will look to detail the following:

- Description of the original heating and cooling system.
- Options for replacement.
- Proposed ASHP solution.

2. Original Heating & Cooling Solution

- 2.1 When North Kent Police Station was initially built in 2007 the heating and cooling was provided by a Ground Source Heat Pump (GSHP) solution.
- 2.2 The GSHP at North Kent Police Station is comprised of a closed loop ground source heat pump system.



- 2.3 The GSHCS is made up of a “collector” circuit, ground source heat pumps and a space heating/cooling circuit.
- 2.4 The “collector” circuit is used to extract heat or dump heat into the ground and includes a combination of 202No. energy piles, which are installed within the foundations of the structure, and 94No. 200m deep boreholes, which are installed below the car park.
- 2.5 Pipework is run from the collector circuits within the ground before entering the building and runs to serve the GSHP within the first-floor plant room.

- 2.6 After installation, from October 2008 onwards, there have been a number of leaks within the below ground pipework. The leaks have resulted in the need to isolate the below ground circuits and therefore the GSHP system is unable to provide sufficient heating and cooling to the site.
- 2.7 As the pipework is installed below the building as well as below the car park it is impractical to excavate the ground to replace the pipework. The number of leaks which have occurred over the years indicate the issues are systemic and part replacement of the below ground pipework is not practical as it is very likely other areas of the existing system will fail.
- 2.8 Due to the failure of the existing GSHP and the need for the police station to continue operations a temporary space heating and cooling solution has been implemented. A temporary diesel fired boiler, air cooled chiller and diesel generator have been installed on site while a permanent replacement solution is explored.

3. Options for Replacement

- 3.1 Due to evidence the existing GSHP is not suitable for repair and a replacement is required, various options were considered for a suitable replacement.
- 3.2 The following options were explored:
- Retain temporary plant as permanent solution.
 - Replacement of existing GSHP.
 - Install an ASHP solution.
 - Install a conventional boiler and chiller solution.
- 3.3 The option to utilise the temporary plant as a permanent solution was rejected due to high running cost and failure to meet environmental standards.
- 3.4 The option to replace & repair the existing GSHP was rejected due the existing GSHP system not providing the required heating or cooling output as the building energy piles which form part of the system are not repairable. The system does not provide an adequate level of resilience of N+1 as it does not have the ability to continue to function without interruption, and there is no guarantee that future leaks will not occur which would result in glycol entering the ground water which is classed as a pollutant and therefore poses an environmental hazard.
- 3.5 The option to install a conventional boiler and chiller solution was rejected due to limitations with the existing gas supply to site as well as on sustainability grounds. The gas boiler solution would provide a less efficient and more carbon intensive solution when compared to a heat pump solution.
- 3.6 Therefore, the most suitable solution was deemed to be an ASHP solution due to:
- An above ground solution will enable the units to be repaired and maintained for the full-service life of the plant.
 - An ASHP solution is considered as energy efficient as the original GSHP and is in keeping with the original sustainability intentions of the GSHP solution.

4. Proposed ASHP Solution

- 4.1 An ASHP works in a similar way to the existing GSHCS but instead of using the ground to extract or reject heat into, it uses the outside air. Therefore, the ASHP needs to be located externally.



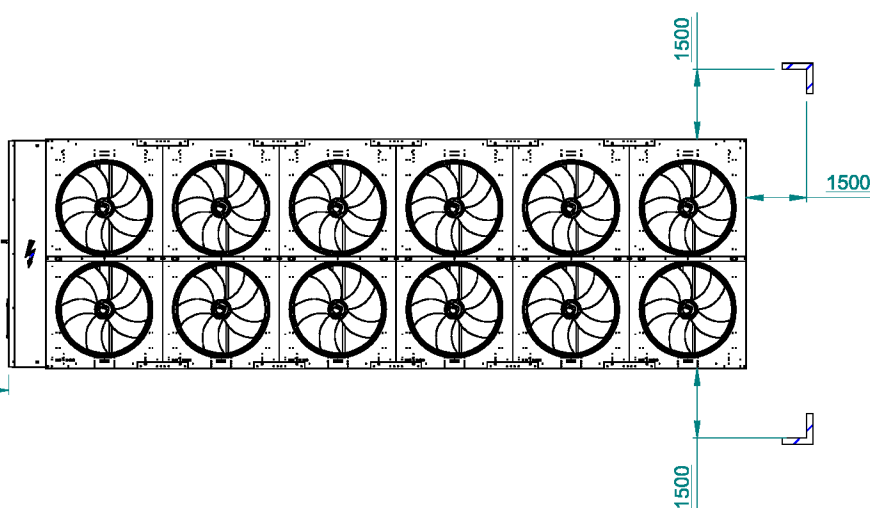
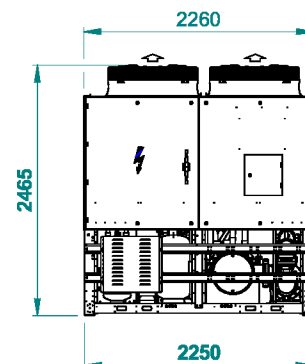
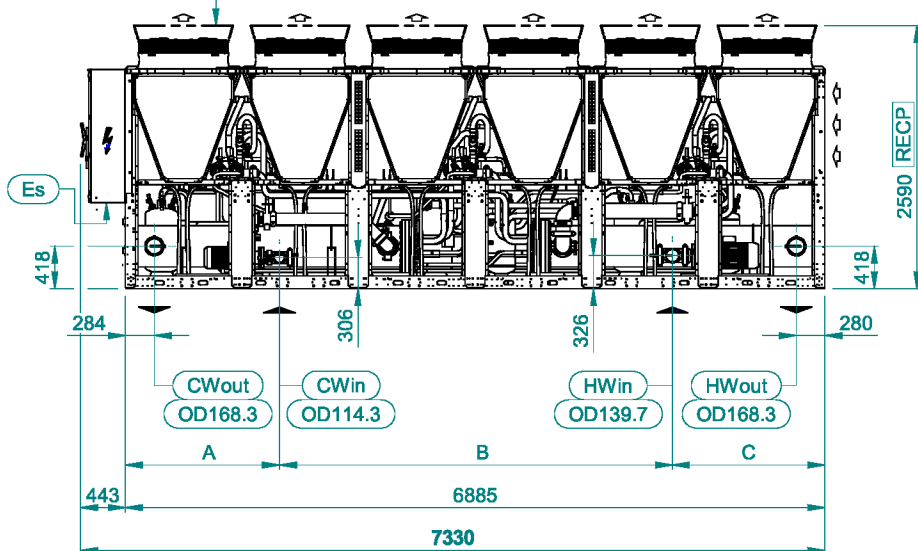
- 4.2 The air source heat pumps are used to take or reject heat from the air and transfer it over to the space heating and cooling circuit to be used within the building for space heating and cooling needs. This is referred to as an air-to-water heat pump.
- 4.3 4No. units have been proposed and are to operate as an N+1 system. This means that only 3No. of the units will run at any one time to meet the space heating and cooling requirements of the building. The 4th unit is installed to provide resilience in the event 1No. unit was to fail.
- 4.4 The units are proposed to sit on a purpose-built gantry to ensure minimal existing parking places are lost due to the installation of the units.
- 4.5 The gantry is proposed to have acoustic louvers surrounding the plant to reduce the noise level experienced by neighbouring properties.

Appendix A

Proposed ASHP Technical Drawings

SUPPLIED AS LOOSE PART

RECP



DIMENSION CONNECTION

SIZE	VERSION	A	B	C
51.6	1P/1R	1517	3868	1500
51.6	2P/2R	1537	3935	1413
60.6	1P/1R	1517	3868	1500
60.6	2P/2R	1537	3935	1413

SAP CODE OF OPTIONS

Rev.	Date	Draftman	Checked by	Revision description
C	19/06/2024	Finotto M.	Turri G.	Update condenser position SIZE 60.6
B	29/02/2024	Greguoldo A.	Crivellari D.	Update condenser position

Denomination

OMIC. SKY S4 R5 HE - OMIC. SKY S4 R5 SLN
51.6 - 60.6 1P/1R - 2P/2R

Code

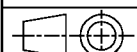
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Drawing

DDIM001538

Rev.

C



Scale
1:70

Date
04/04/2023

Draftsman
Fedrigo G.

Checked by
Turri G.

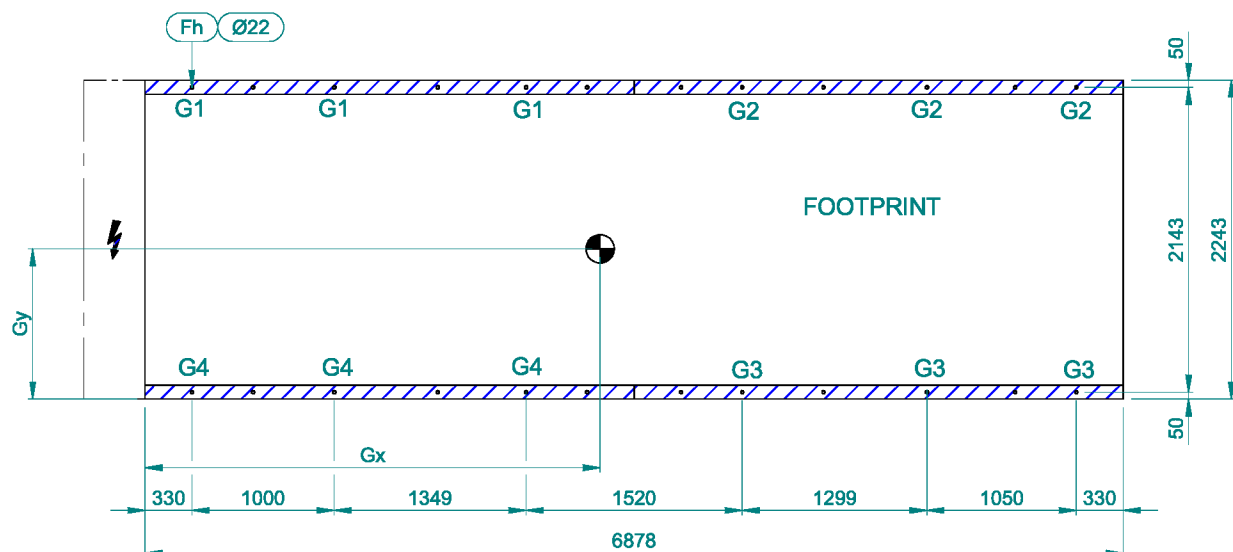
Sheet N. 1 di 2

Weight [kg]

/

BlueBox
by Swegon

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MODEL	WEIGHT (kg)	OPERATING WEIGHT (kg)	G1 (kg)	G2 (kg)	G3 (kg)	G4 (kg)	Gx	Gy
SKY S4 R5 HE 51.6 1P1R	7207	7608	714	581	557	684	3227	1144
SKY S4 R5 HE 51.6 1P1R_LN	7444	7845	755	607	559	694	3216	1166
SKY S4 R5 HE 51.6 2P2R	7537	7938	719	587	602	738	3230	1107
SKY S4 R5 HE 51.6 2P2R_LN	7774	8175	760	613	604	748	3219	1129
SKY S4 R5 HE 51.6 1P1R_SLN	7444	7845	755	607	559	694	3216	1166
SKY S4 R5 HE 51.6 2P2R_SLN	7774	8175	760	613	604	748	3219	1129
SKY S4 R5 HE 60.6 1P1R	7352	7731	735	591	558	693	3216	1153
SKY S4 R5 HE 60.6 1P1R_LN	7595	7974	776	618	560	704	3205	1174
SKY S4 R5 HE 60.6 2P2R	7664	8043	737	599	603	742	3225	1118
SKY S4 R5 HE 60.6 2P2R_LN	7904	8283	778	625	605	753	3214	1139
SKY S4 R5 HE 60.6 1P1R_SLN	7595	7974	776	618	560	704	3205	1174
SKY S4 R5 HE 60.6 2P2R_SLN	7904	8283	778	625	605	753	3214	1139

Rev.	Date	Draftman	Checked by	Revision description
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Denomination	Code	Drawing	Rev.
OMIC. SKY S4 R5 HE - OMIC. SKY S4 R5 SLN 51.6 - 60.6 1P/1R - 2P/2R	/	DDIM001538	C

	Scale 1:70	Date 04/04/2023	Draftsman Fedrigo G.	Checked by Turri G.	Sheet N. 2 di 2	
Replace draw. /			Replaced by draw. /		Weight [kg] /	

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Appendix B

Proposed Acoustic Louvre Details



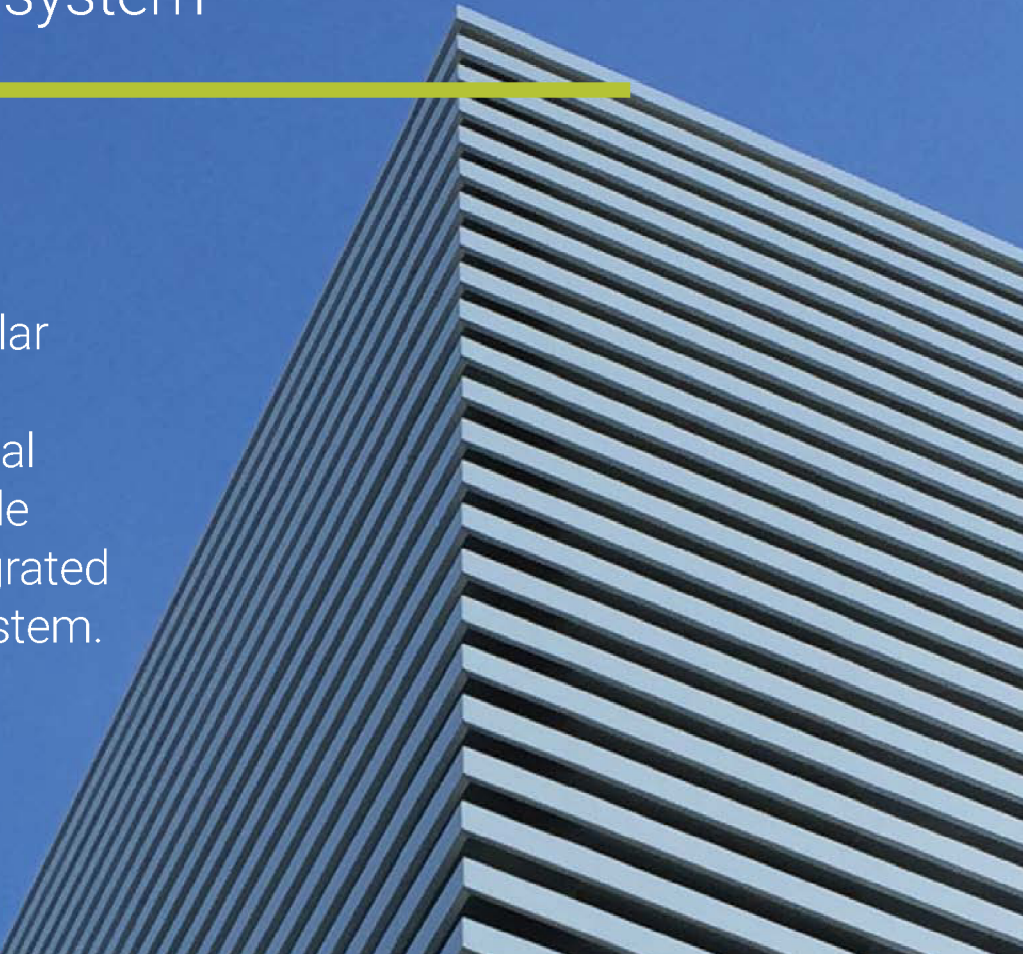
Continuous Line Acoustic Louvres



caice.co.uk

Our new & exclusive 'Continuous Line' Acoustic Louvre system

The unique and modular design maintains a 'continuous line' appeal that's easy to assemble with our optional integrated steel work support system.

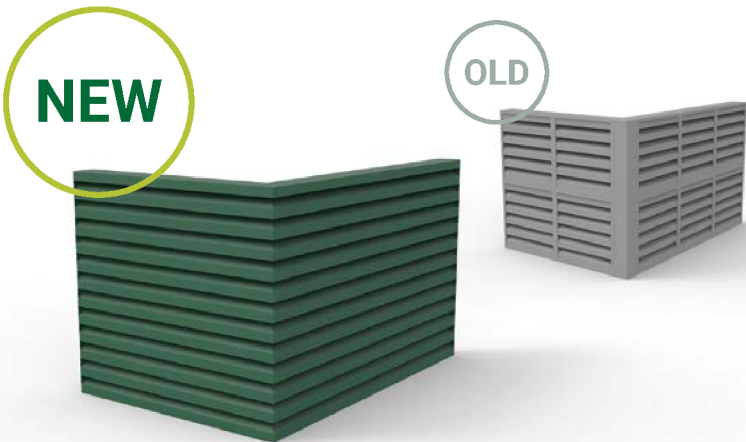


Visually attractive and versatile

With our Continuous Line Acoustic Louvres you can achieve a similar visual appearance to Continuous Line Weather Louvres. A range of sound reduction performance options are then available to suit your particular requirements including Attenuators mounted at the rear for even greater performance.

Being the largest company in the UK that manufactures Continuous Line Acoustic Louvres, Continuous Line Weather Louvres and Attenuators in-house we will recommend the best performing and most cost efficient solution for your project.

Contemporary looks, enhanced by improved performance. We are proud to be leading edge.



One multi-purpose system with many applications

Acoustic Louvre applications include: fresh air intakes and exhausts for ventilation systems, mechanical equipment screens or enclosures, natural ventilation and façade cladding, all providing a seamless look wherever they are used.

For a totally individual appearance, the Acoustic Louvres are fabricated from galvanised steel and can be finished in polyester powder paint to a wide range of RAL colours.

100%

Be 100% confident in the quality and performance of our products

You can be confident in our performance testing

We like to do things properly and our Acoustic Louvre range has therefore been rigorously tested to offer performance data that you can trust. Applicable standards are -

Sound Reduction BS EN ISO 10140-2: 2010 (SRL)
Insertion Loss and Pressure Loss BS EN ISO 7235: 2009 (LCP)
Rainwater Penetration BS EN ISO 13030: 2001 (BSRIA)
More details on these test standards are available upon request.

Class A rainwater penetration

Rainwater will penetrate into a building through standard Acoustic Louvres. So we have developed a unique rainwater rejection system that can be fitted to the rear of the Acoustic Louvres to achieve Class A rainwater penetration when tested at BSRIA (99% effective at 1m/s face velocity).

Built with designers and architects in mind

CASE STUDY

Infinity Here East Data Centre (previously the Olympic Media Centre)

East London

We designed, supplied and installed £2.69m worth of SS150 Acoustic Louvres and support steelwork as a façade to protect residential neighbours from plant noise emissions from this new data centre.

Full article available.

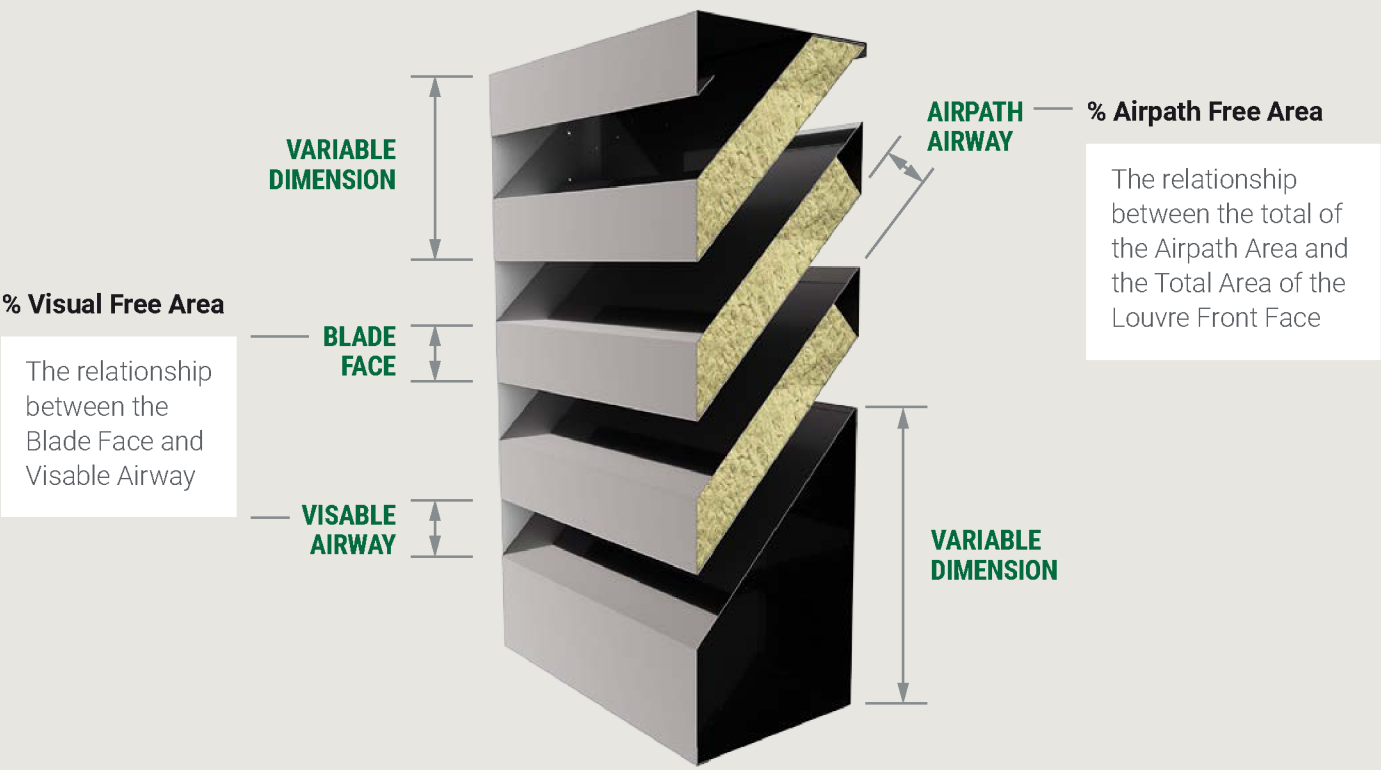


Supporting you every step of the way

We are always delighted to answer your questions and provide you with detailed specifications, acoustic design and pricing. If you have a complex project then we can develop products or design solutions to meet your specialist needs with our bespoke service.

Continuous investment in automated manufacturing

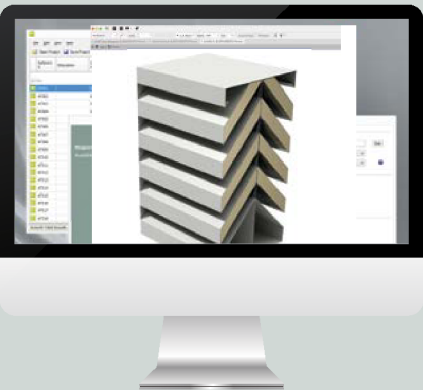
Advanced technology is central to our Production facilities in Dorset. From automated laser profiling and folding of sheet metal parts to high quality polyester powder painting for a durable and long lasting finish. We hate waste of all kinds and so continuously drive them out. Guaranteeing you the highest quality products, achieving your expectations and all delivered at the lowest possible cost.



BSRIA has confirmed that our method of calculating the % Free Area is in accordance with BS EN 13141-1:2019.

Beautifully designed

All our contracts are drawn by skilled technicians, using AutoDesk Inventor, building accurate 3D models of the products, so all elements fit perfectly with each other and your building.

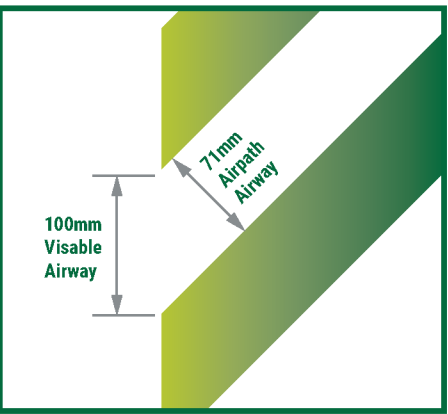


Free Area of Acoustic Louvres explained

Make sure you know the % Free Area has been calculated accurately for your Acoustic Louvre application so it complies with legislation for airflow, or your plant isn't starved of air. Otherwise you might specify an Acoustic Louvre with a higher, inaccurate % Free Area than larger, correctly sized and more expensive Acoustic Louvres.

BSI Standard; BS EN 13141-1:2019 section 5.4 free area states that the "Free area shall be calculated from the measurements in one plane of the air transfer device. The measurement plane shall be such that the total cross section area of the air flow passage(s) crossing the minimum.

Example of SS300



Accurate installation, on time and budget

Our highly trained project managers will work with you to ensure our products are installed on time and to budget, even for the most challenging of projects.

The unique modular design of our Acoustic Louvres makes installation faster, helping to save vital time on site.

We have even designed an innovative front fix bracket system for situations where the louvres can only be installed from the front.

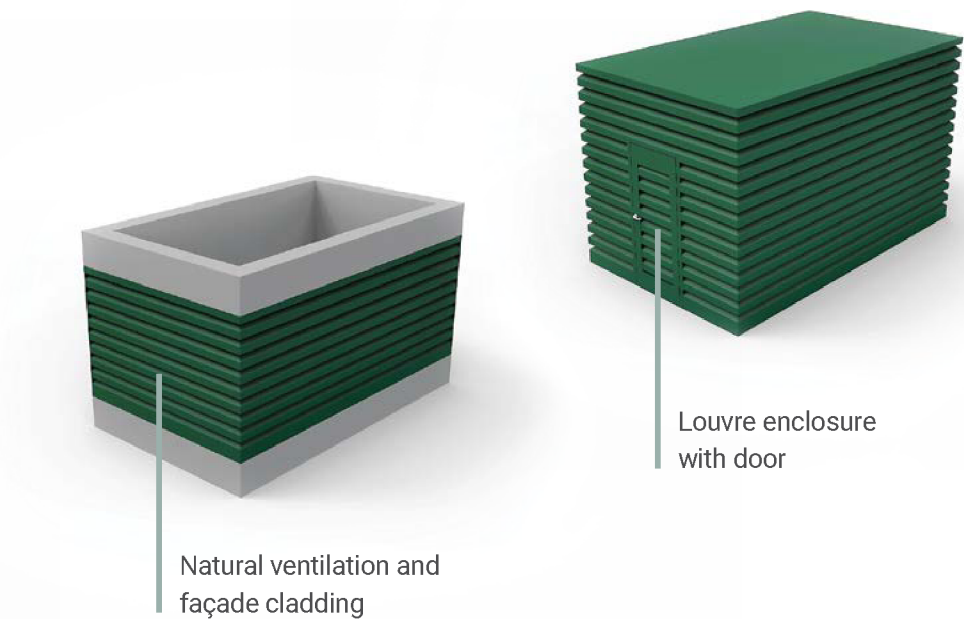
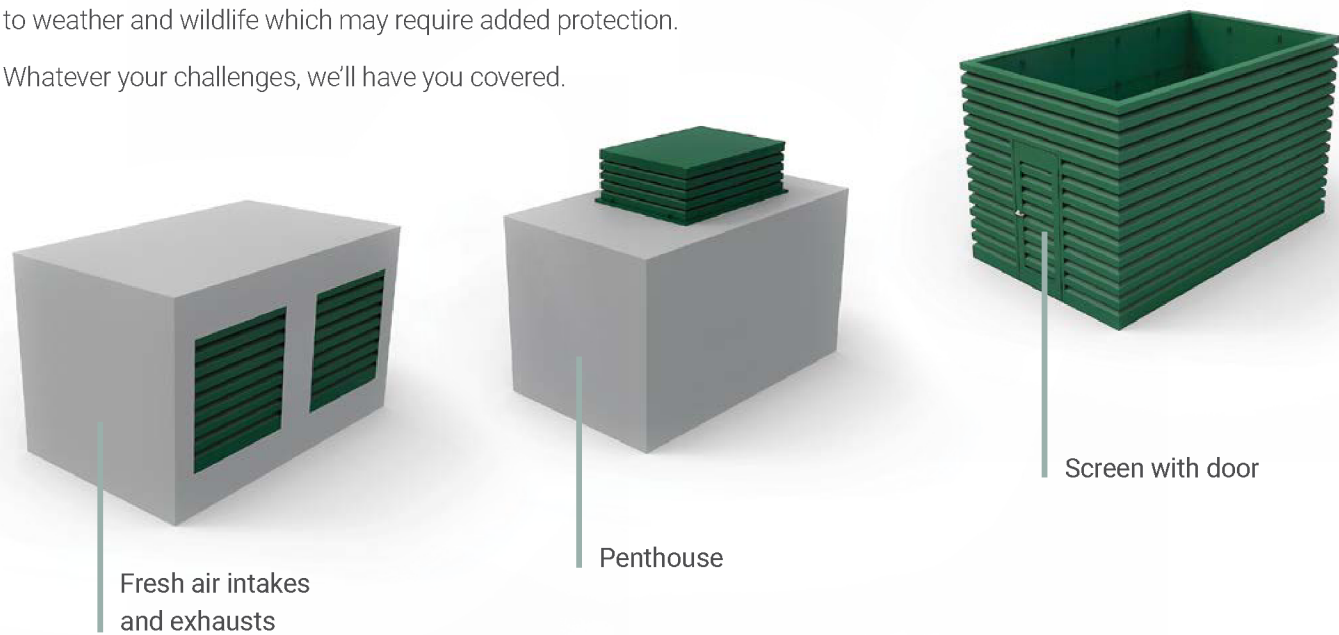


Acoustic Louvre applications

Our acousticians will recommend the best solution for your project based on your specific application and requirements. Whether natural or mechanical ventilation is required, what demand there is for sound reduction and if unsightly buildings or plant need 'hiding' from view.

The geographical location and height above sea level will also determine exposure to weather and wildlife which may require added protection.

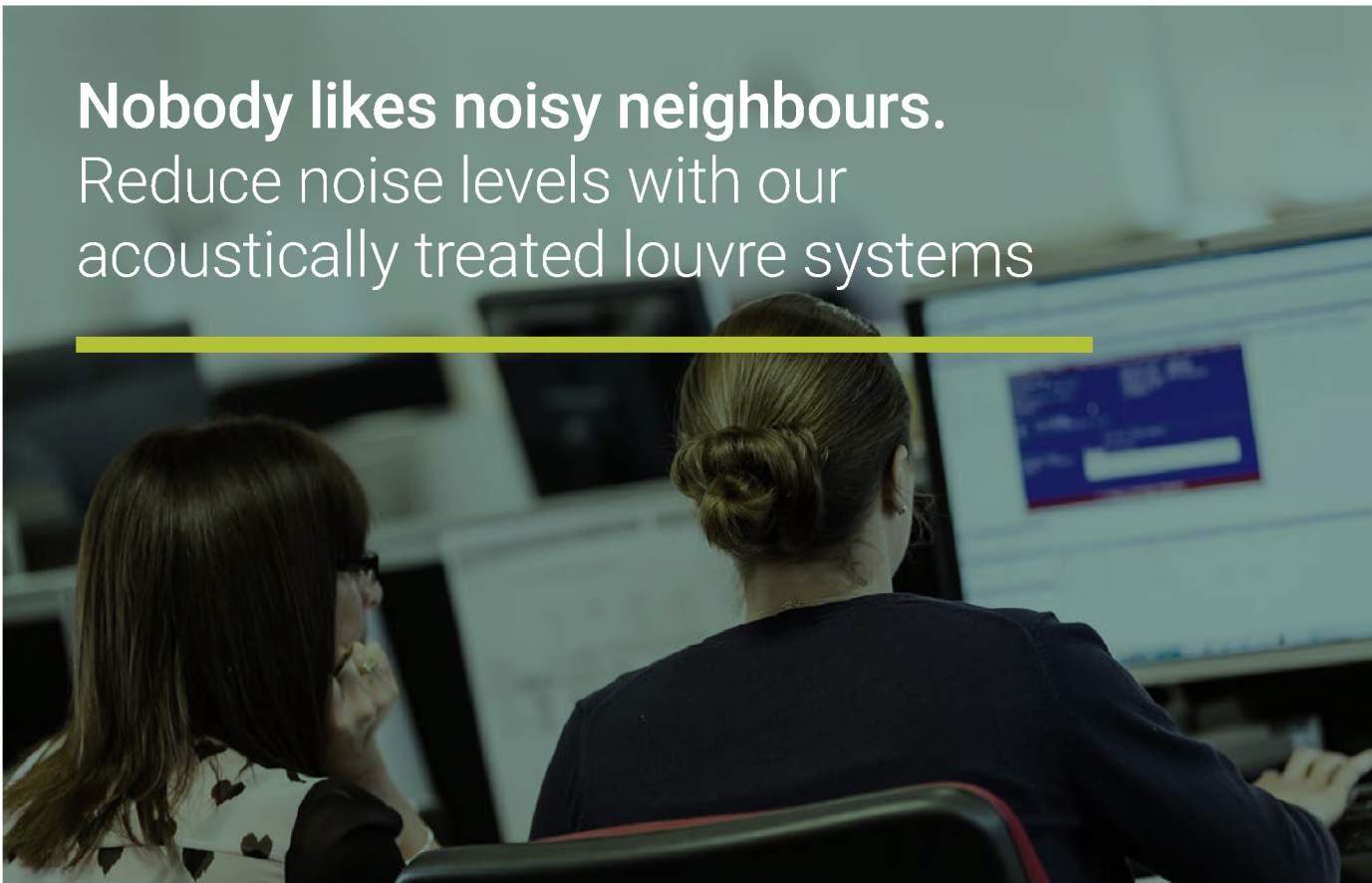
Whatever your challenges, we'll have you covered.



Acoustic Louvre doors

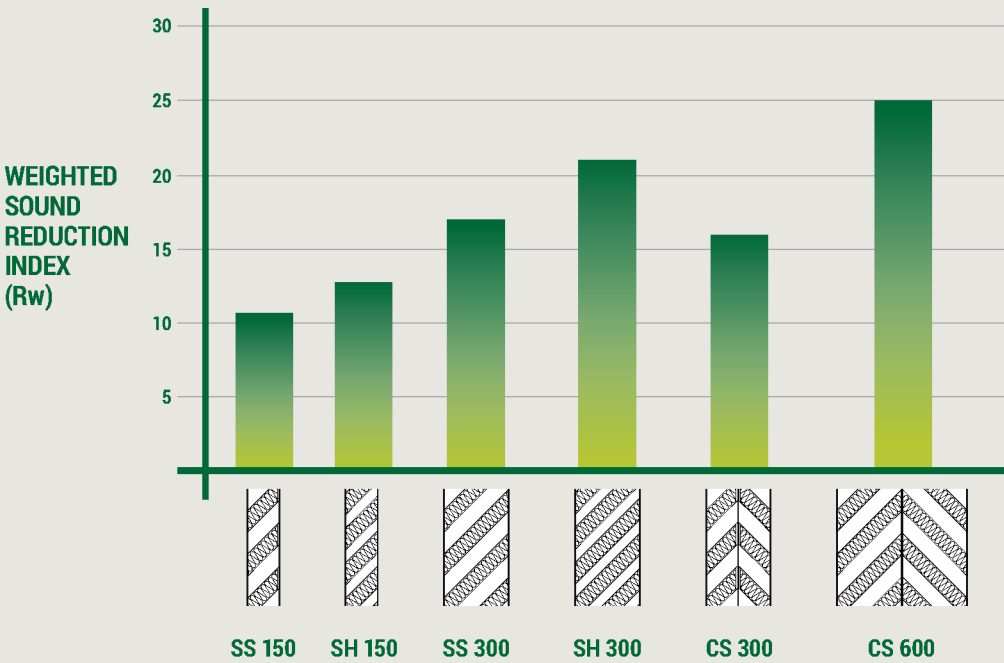
Doors are available as both single and double leaf. There's an extensive range of furniture options to meet both your safety and security requirements. They are offered for active airflow or provided as dummy profiles with blanking.

We're pioneers. Partnering with you to lead our industry, by creating the best products and structuring our business around you. Sharing our knowledge, embracing new ways of working using the latest technologies and being careful of our environment.



Nobody likes noisy neighbours.
Reduce noise levels with our
acoustically treated louvre systems

Sound reduction comparison chart



Acoustic Louvre options

1

A wide range of performance options available

Six different models are available with varying degrees of sound reduction performance using Acoustic Louvre depths of 150mm, 300mm and 600mm. Two models of matching 150mm deep Dummy Acoustic Louvres can also be provided with acoustic blanking at the rear where air movement is not required.

2

Optional panels fitted behind the Acoustic Louvres

These options will make your building work better and help to match your specific requirements.

 Rainwater rejection system

 Bird mesh

 Insect mesh*

 Single skin blanking

 Double skin acoustic blanking

 Thermal insulation

* Please contact Caice to ensure the correct application of Insect mesh

3

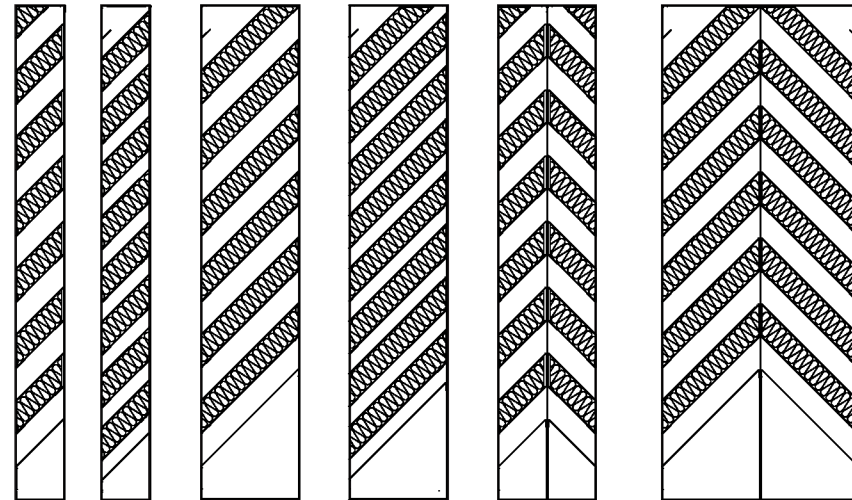
Fully integrated steelwork support system

We have developed a fully integrated steelwork support system to enable easy installation of our Acoustic Louvres for screening applications, enclosures or within large building apertures. Calculations can be provided to ensure structural and wind loading requirements are achieved.



1

SS 150 SH 150 SS 300 SH 300 CS 300 CS 600



2

3

Rainwater rejection system
Insect mesh*
Bird mesh
Single skin blanking
Double skin acoustic blanking
Thermal insulation
Fully integrated steelwork support system

CASE STUDY

Cornwall Energy Recovery Centre (CERC)

St Austell, Cornwall.

We designed a completely new Acoustic Louvre to meet the Class A rainwater penetration requirements for this exposed project near the coast.

High winds and working through the winter also made installation challenging at 50 metres above the ground. Yet it was completed safely and on time with special scissor lifts externally and abseilers inside.

Full article available.



Acoustic Louvre Product Code Definitions

Product

AL

Acoustic Louvre

Type

SS150	Single bank standard profile 150 deep
SH150	Single bank high performance profile (reduced airway) 150 deep
SS300	Single bank standard profile 300 deep
SH300	Single bank high performance profile (reduced airway) 300 deep
CS300	Chevron standard profile 300 Deep
CS600	Chevron standard profile 600 Deep
DS150	Dummy single bank standard profile 150 deep
DH150	Dummy single bank high performance profile 150 deep

Material

G	Galvanised Steel
---	------------------

Format

M	Modular
I	Internal mitred corner
E	External mitred corner
C	Plain corner
S	Single door (on its own)
D	Double door (on its own)
P	Penthouse with roof
Suffix NT	Blades In normal orientation, set out from top

Options

Integral Doors (where n= number off)

Sn	Integral single leaf door
Dn	Integral double leaf door

Flashing

I	Internal picture frame
E	External picture frame
C	Extended drip cill

Notching (where n= number off)

Nn	Notch
----	-------

Penetration (where n= number off)

Pn	Rectangular penetration
----	-------------------------

Removable (where n= number off)

Rn	Removable modules
----	-------------------

Fixings

F	Front fix brackets
B	Back joining brackets
A	Aperture fixing brackets

Other

H1	Standard door hardware
H2	Emergency exit door hardware
X	Special

Delivery

001-999	Number of items delivered to site
P	Protective packaging

Finish

U	Unfinished base material
A	Standard polyester powder paint
B	Premium polyester powder paint
C	Premium plus polyester powder paint
Suffix E	External louvre only finished (CS300 and CS600 only)
Suffix W	Whole product

Features

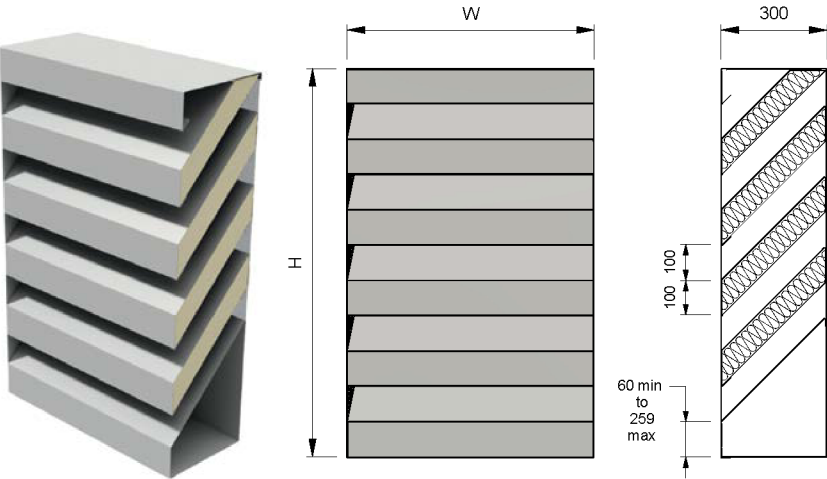
A	Class A rainwater rejection
N	No backing
B	Bird mesh
I	Insect mesh
S	Single skin blanking
D	Double skin acoustic blanking
T	Thermal insulation

SS300 Acoustic Louvre

Technical Data



Single Bank Acoustic Louvre, Standard Performance Profile, 300mm Deep



Typical weight 43kg/m²

Generally louvres above 50kg will be supplied in modules for assembly on site. Joining brackets and fixings will be provided for assembly.

Installation services, support steelwork, flashings, fixings to the structure and mastic will not be provided unless stated.

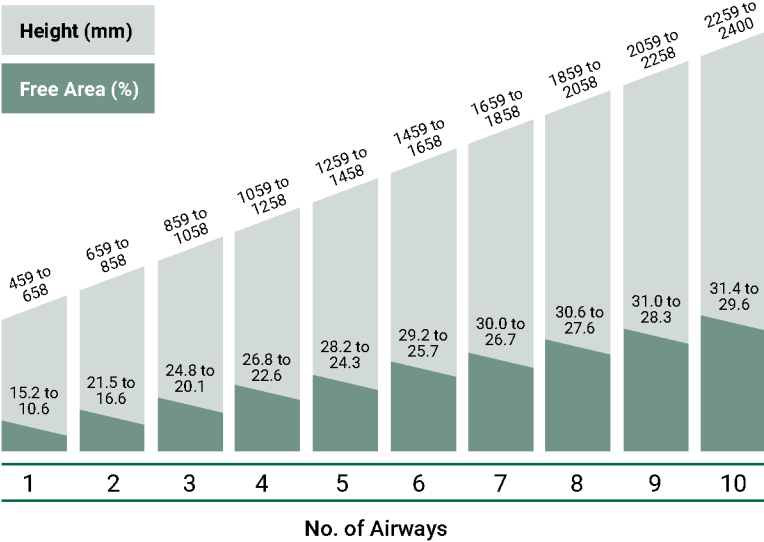
Refer to the Acoustic Louvre Schedule and Product Code Definitions for the size and specification of each Acoustic Louvre.

A minimum of 10mm clearance should be allowed between the structure and the Acoustic Louvre sizes shown.

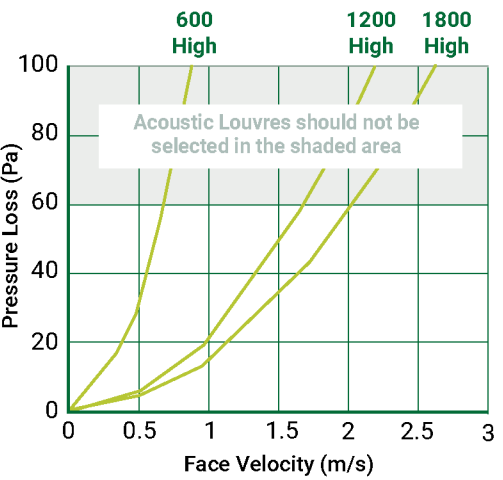
Performance

Acoustic Data	dB in each Octave Band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
Sound reduction index	6	6	9	13	21	20	16	13
Weighted sound reduction index (Rw)	17							
Static insertion loss	5	6	9	14	20	20	20	20
Regenerated sound power level at 1m/s face velocity	48	41	34	30	25	20	13	12
Regenerated sound power level at 2m/s face velocity	66	58	51	47	45	43	39	28

Airpath Free Area and Height range



Free area and pressure drop shown is based on a 1150mm wide single piece louvre fitted with bird mesh and will vary slightly for different widths and larger heights. Pressure losses for Class A rated louvres and/or Insect mesh are available upon request.

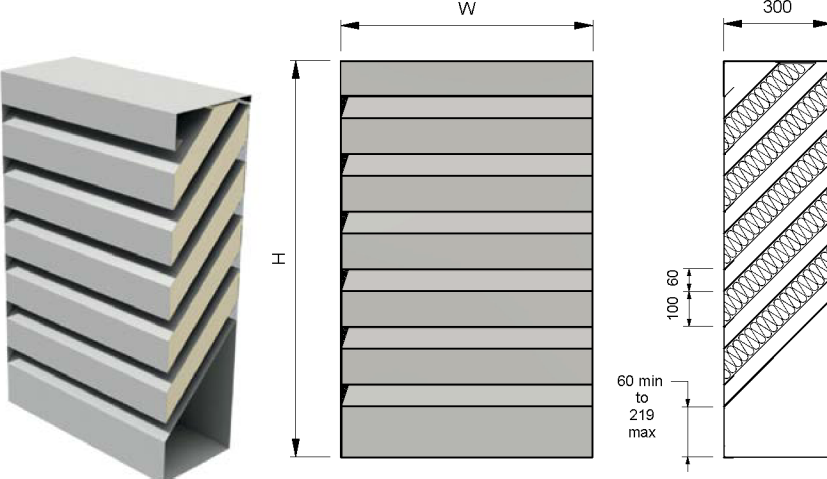


SH300 Acoustic Louvre

Technical Data



Single Bank Acoustic Louvre, Higher Performance Profile, 300mm Deep



Typical weight 53kg/m²

Generally louvres above 50kg will be supplied in modules for assembly on site. Joining brackets and fixings will be provided for assembly.

Installation services, support steelwork, flashings, fixings to the structure and mastic will not be provided unless stated.

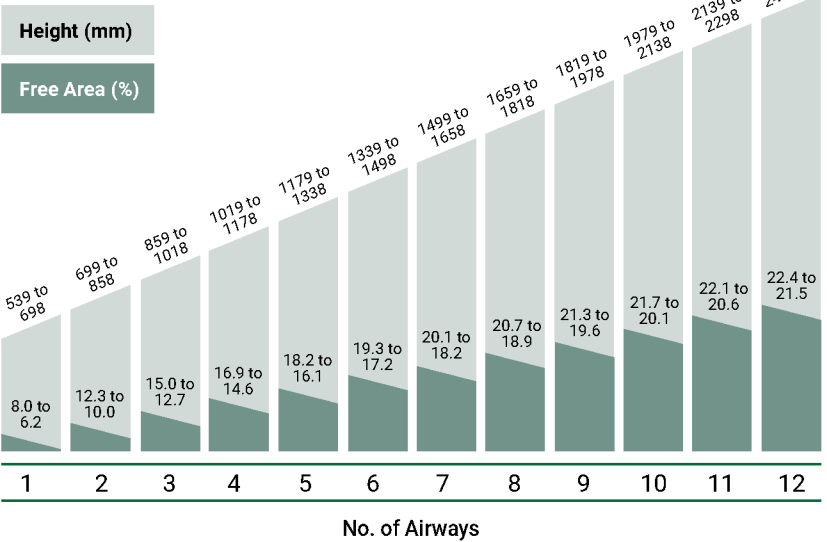
Refer to the Acoustic Louvre Schedule and Product Code Definitions for the size and specification of each Acoustic Louvre.

A minimum of 10mm clearance should be allowed between the structure and the Acoustic Louvre sizes shown.

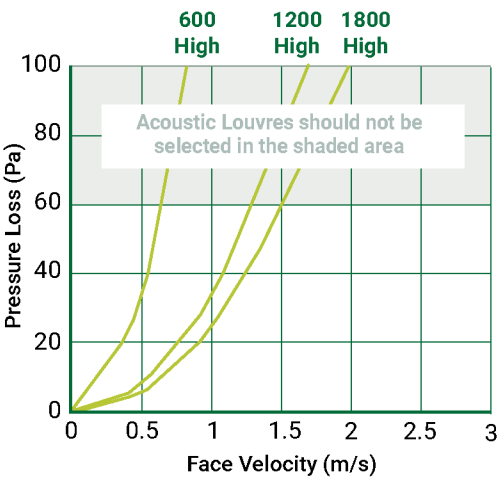
Performance

Acoustic Data	dB in each Octave Band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
Sound reduction index	7	7	10	17	29	30	27	21
Weighted sound reduction index (Rw)	21							
Static insertion loss	6	7	10	18	31	28	26	25
Regenerated sound power level at 1m/s face velocity	50	44	39	34	30	26	17	12
Regenerated sound power level at 2m/s face velocity	70	60	55	52	49	49	43	35

Airpath Free Area and Height range



Free area and pressure drop shown is based on a 1150mm wide single piece louvre fitted with bird mesh and will vary slightly for different widths and larger heights. Pressure losses for Class A rated louvres and/or Insect mesh are available upon request.



Contact Details

Enquiries

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Visit us online

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