NAP SILENTFLO

Flowline

Acoustic Louvres

NAP SILENTFLO
THE EXPERTS IN NOISE CONTROL

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Introduction

The design of commercial and industrial plant rooms invariably requires the passage of large volumes of air; air that is used for cooling, for consumption by engines or compressors and for ventilation or air conditioning.

In many installations, this airflow is created by noise generating equipment and the designer or engineer is faced with the problem of allowing the air to get in, and at the same time, preventing the noise from getting out of the plant room. This criterion is often quite important, particularly when a low pressure drop is required and significant acoustic performance is necessary to minimise noise annoyance. When one also considers that the architect will generally require an attractive, practical solution at low cost, then it is simple to understand why the multi-purpose NAP Flowline Acoustic Louvres have been developed.

Description

NAP Flowline Acoustic Louvres are designed for easy installation and for applications where space is limited, and to provide a superior acoustic performance and low regenerated noise levels under a wide range of operating conditions.

Aesthetically pleasing, they consist of fabricated metal louvre blades with acoustic infill, alternated with air gaps and fitted into a four-sided metal case. The open area of the louvre has been carefully optimised for maximum air flow and acoustic performance and the entry to each airway is streamlined for low resistance.

The air flow and pressure drop characteristics, excellent acoustic performance and balanced proportions of NAP Flowline Acoustic Louvres makes them popular with architects and engineers.

Long life and freedom from maintenance are assured by the use of galvanised steel, Aluminium or stainless steel sheet and inert non-combustible acoustic infill.

The acoustic and airflow performance of these louvres are guaranteed and supported by independent test results.

S-Line Louvres reducing plant-room break out noise

S-Line Louvres supplied in a circular shape

Flowline Louvres can be manufactured to suit any shape or configuration

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Applications

Because of their excellent noise reduction capability, NAP Acoustic Louvres can be used in almost any situation which must permit the flow of air, but control noise.

The modular design and wide range of sizes and finishes allows them to be used in most industrial or commercial projects.

Typical applications include:

- *Plant room ventilation*
- *Cooling towers*
- *Fresh air intake*
- *Compressor houses*
- *Power stations*
- *Electrical transformer houses*
- *Ventilation exhaust plenum chambers*
- *Diesel generator sets*
- *Car Parks*
- *Air conditioning plants*
- *Refrigeration plants*
- *Process air intakes*
- *Naturally ventilated areas*

Models

NAP Acoustic Louvres are available in two models, S-line (Slimline) and H-line (High Performance Louvre), and each model is available in depths of 300mm or 600mm.

300 S-line

The specially designed, low profile blades, are set at a pitch of 150mm and at an angle which prevents line-of-sight through the louvre, resulting in an enhanced high frequency acoustic performance and an extremely low pressure drop.

600 S-line

This model is comprised of a '300 S-line' as the front or exposed unit and another 300mm long unit (similar in construction to the '300 S-line') and when joined back to back, forms a chevron blade profile.

300 H-line

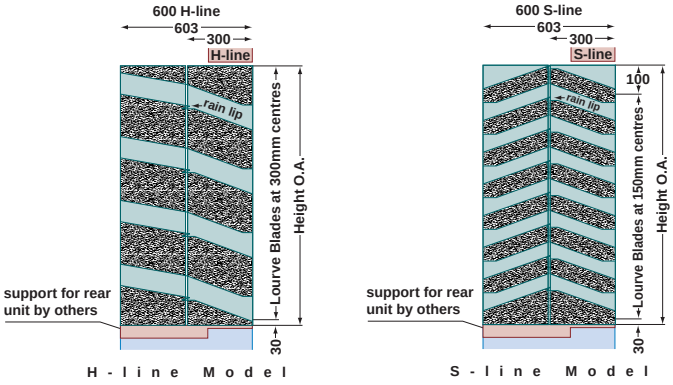
The specially designed, substantial blades are set at a pitch of 300mm and provide a superior low frequency acoustic performance in the critical 63Hz, 125Hz and 250Hz octave bands.

600 H-line

This model is comprised of a '300 H-line' as the front or exposed unit and another 300mm long unit (similar in construction to the '300 H-line') and when joined together, provide an even greater low frequency acoustic performance for extreme applications.

Sizes

Practical sizes should be chosen, given due consideration to manufacture, handling and transport. Large areas can be formed by a combination of modules and necessary structural frame. (Dimensions shown are typical, but may vary depending on overall louvre height).



Weight

The weight of Acoustic Louvres is given in the table below. For different sizes, alter the weights proportionately.

To obtain weights of 600 S-line and 600 H-line models, multiply weight of the appropriate 300 model x 1.85.

300 S-line

Acoustic Louvre Weights (kg)

	Nominal Width (mm)			
Nominal Height (mm)	500	1000	1500	2000
900	29	53	76	100
1200	37	68	99	130
1500	46	84	121	159
1800	55	99	144	188
2100	63	115	166	217
2400	72	130	188	247

300 H-line

Acoustic Louvre Weights (kg)

	Nominal Width (mm)			
Nominal Height (mm)	500	1000	1500	2000
900	32	60	88	115
1200	43	79	115	152
1500	53	98	143	188
1800	63	117	171	225
2100	66	136	199	261
2400	84	155	226	298

Standard Construction

The case sides are fabricated from galvanised sheet steel. The specially designed Acoustic Louvre blades of the 300 models are sheathed with galvanised sheet steel on the top (outward) face for weather protection and incorporates a

raised lip which prevents the ingress of water; the bottom (inward) face is sheathed with perforated galvanised sheet steel for maximum sound absorption.

The rear unit of the 600 S-line and 600 H-line models, which is not exposed to the weather, gives extra sound absorption by sheathing both sides of the louvre blades with perforated galvanised sheet steel.

In most instances were 600 H-line or 600 S-line are specified the louvres are generally supplied in a single case. However, for difficult installations they can be supplied in two halves. This must be detailed at the time of ordering.

The acoustic infill of the louvre blades is inert and non-combustible and is retained so that particle fatigue or corrosion does not occur.

Where exposed to severe weather or in wash down applications special hydrophobic infill can be incorporated.

A bird guard, manufactured from 25mm square galvanised wire, can be supplied fitted to the rear face of all models, if required.

Alternative Construction

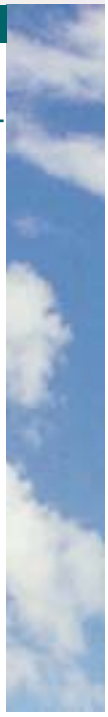
The Acoustic Louvres can be supplied in Aluminium or stainless steel for superior corrosion resistance and overall appearance. Generally the perforated blade bottom remains galvanised due to cost and lead time, however, aluminium or stainless steel perforated blade bottoms are available upon request.

Finish

NAP Acoustic Louvres are usually supplied unpainted, but if requested they can be supplied powder coated in a choice of standard colours.

Special projects often require special finishes and the NAP Aluminium Acoustic Louvres can be supplied in plain, powder coated or anodised finishes.

H-Line Louvres reducing plant-room break out noise



Acoustic Performance

The acoustic performance of NAP Flowline Acoustic Louvres has been measured in accordance with the American Standard ASTM E336-67T, Section A2.3 'Test Procedure for Measuring Transmission Loss in Non-Laboratory-Like Configurations' by an Independent Australian Test Laboratory.

This test procedure enables the determination of the Noise Reduction which is the difference in sound pressure levels between a reverberant enclosure and the free field. The field Transmission Loss is determined from the same standard and is equivalent to the Noise Reduction less 6dB.

Noise Reduction

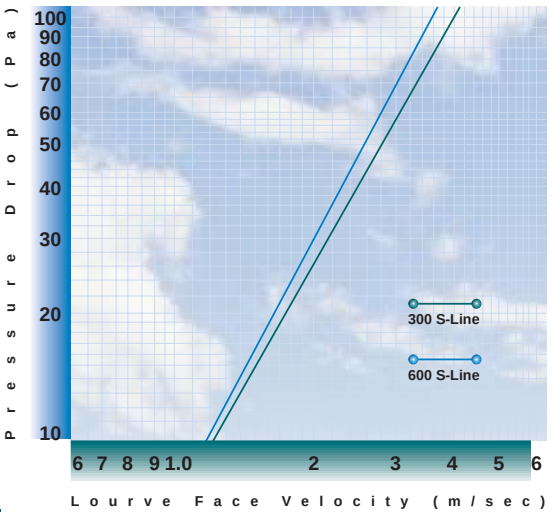
This term is widely used with many interpretations, but is generally accepted as being the difference in levels between a reverberant enclosure and the free field, when separated by the test section.

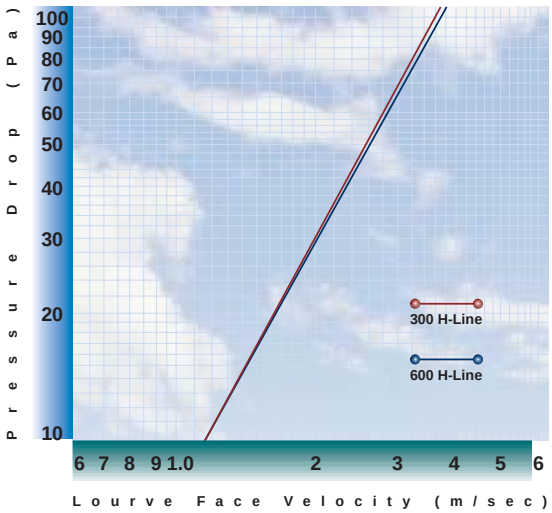
Noise Reduction (dB)

Octave Band Centre Frequency (Hz)

	63	125	250	500	1k	2k	4k	8k
300 S-line	7	9	11	16	19	23	24	21
600 S-line	7	11	14	23	33	43	44	40
300 H-line	9	13	15	17	20	19	21	21
600 H-line	9	14	22	27	33	33	30	27

Flowline aerodynamic performance data





Method of Selection

The NAP Flowline Acoustic Louvre required for a particular application can be determined by following this simple procedure:–

1. *Establish the acoustic criterion required for a given location, external to the room containing the noise source (for NR values, refer to AS 1469-1973 'Criteria curves for Rating Noise and Establishing Acoustic Environment').*

Typical NR Values

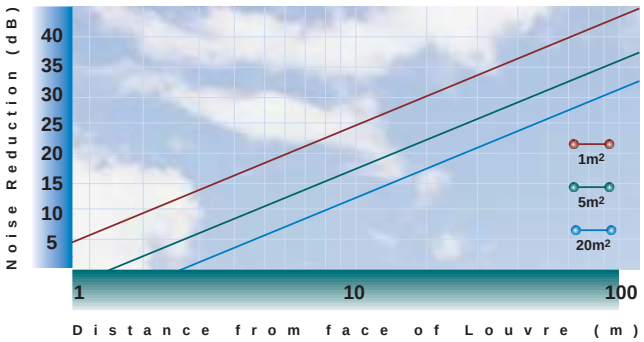
Sound Pressure Levels (dB)

	125	250	500	1k	2k	4k
NR50	66	59	54	50	47	45
NR65	78	72	68	65	62	60
NR80	90	86	83	80	77	76

Note that the approximate relationship between the dB(A) level of a noise and the NR number is dB(A) =NR+3.

2. *Estimate the distance from this point to the face of the Acoustic Louvre. Calculate the distance attenuation from the diagram below.*

Attenuation with respect to noise level just outside Louvre



3. *Establish the Sound Pressure Level inside the room, by acoustic measurement or prediction techniques.*
4. *Subtract results in step 2 from results in step 4 and establish the required Noise Reduction. Select the Acoustic Louvre which has a Noise Reduction greater than these figures, particularly at low frequencies. If no Acoustic Louvre matches the required performance, consult your NAP agent.*
5. *If the acoustic criterion can be met by using a S-line or a H-line Acoustic Louvre, the next step is to calculate the pressure loss. Having selected the appropriate model, determine the airflow requirements.*
6. *The Acoustic Louvre size can be established by one of two methods.*
   (a) by deciding the maximum pressure loss, read from the pertinent airflow graph and determine the maximum face velocity; the louvre face area is the total airflow divided by this maximum face velocity, OR
   (b) select a louvre size and calculate the face velocity. If the losses are too high, increase the louvre face area and recalculate.
7. *The correct louvre is a compromise between the optimum of the three conflicting requirements, ie. size, pressure drop and acoustic performance. Remember that these are ACOUSTIC louvres and this aspect should have first priority, otherwise, a great deal of effort and expense is wasted.*
8. *When the calculations suggest a certain size mid-way between models, always select one size larger rather than one size smaller.*

Typical Airflow and Pressure Loss Calculation;–

1. *Airflow requirement: 8500litre/sec=8.5m³/sec. Maximum allowable pressure drop=Pa.*
2. *From Face Velocity graphs, relating to the 600 S-line Acoustic Louvre, the maximum face velocity is 2.6m/sec.*
3. *The louvre face area is then 8.5/2.6m=3.3m².*
4. *The louvre selected must fit the Architect's physical requirements. An Acoustic Louvre, nominally 1800mm high would be: 3.3/1.8=1.83m wide.*

For the lowest cost and ease of ordering, select a louvre 1850mm wide.

Typical Selection Procedure

Octave Band Centre Frequency (Hz)

	125	250	500	1k	2k	4k
1. Criterion: NR50 at 10m	66	59	54	50	47	45
2. 10m² louvre distance attenuation	13	13	13	13	13	13
3. Acceptable Lp at 1 metre	79	72	67	63	60	58
4. Lp in plant room (measured or predicted)	87	83	80	83	74	70
5. NR required (Line 4 – Line 3)	8	11	13	20	16	13
This can be achieved by both the 600 S-line or the 600 H-line models. In this case, choose the 600 S-line model.						
6. Noise reduction of 600 S-line	11	14	23	33	43	44
7. Is our Criterion met?			Yes			

Multiple S-Line Louvre modules installed as a continuous wall

Typical Specification

Acoustic Louvres shall be NAP Flowline Acoustic Louvres, S-line or H-line models. They shall be fabricated from galvanised sheet steel, Aluminium or stainless steel sheet. The acoustic blades shall be filled with inert, non-combustible acoustic material. Where required, a corrosion resistant wire bird guard shall be provided.

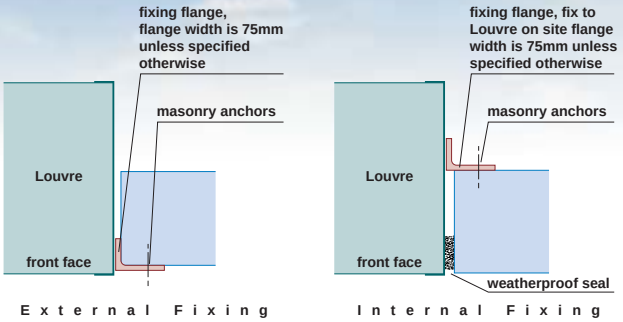
The Acoustic Louvres shall have a certified airflow and acoustic performance provided by an independent NATA registered Australian Testing Laboratory (and must meet the acoustic performance shown on page 4).

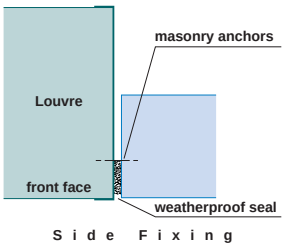
Installation

The most common application of NAP Flowline Acoustic Louvres is in plant room plena or in compressor and power houses. Where duct work connection are required, it is preferable to use NAP D-Series Duct Attenuators.

In most applications, the Acoustic Louvre is installed after construction of walls, we recommend that a clearance gap of 10mm be left on each of the three sides.

To ensure the best acoustic performance and for the most attractive finish, it is recommended that the Acoustic Louvre be mounted flush with the external wall by one of the methods shown and fixed with appropriate anchors (drill holes on site to suit). Any gaps between case and wall at fixing points must be packed to avoid distortion to the louvre case. After fixing, seal all gaps with a non-setting compound.





Multiple Louvre Applications

In applications of single module in height and multiple modules in width, Acoustic louvres are bolted together through the case sides in pre-drilled holes. A thin bead of non-setting compound is applied to the sides, front and back, to ensure that noise will not penetrate through minute gaps between the louvre cases.

In applications of single module in width and multiple modules in height, Acoustic Louvres can sit on top of one another, with a self-adhesive compressible PVC gasket between each unit, front and back.

In applications of multiple modules in width and height, which will involve a structural frame, it is recommended that your NAP agent be consulted.

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