DESIGNING BUILDING INTAKE AND EXHAUST FOR COMFORT AND HEALTH

In modern buildings, indoor air quality is an important parameter. More so, because inhalation of contaminants in the indoor air has been found to be a major fraction of the total personal exposure of the occupants to the environmental pollution during their lifetime.

Mechanical ventilation therefore an established mitigation strategy. However the common premise that outdoor air is 'clean' cannot be farther from truth. Because outdoor air quality varies due to proximity of other buildings, local pollution sources like traffic or industries etc.

Similarly, building exhaust re-entrainment is a possibility where the discharged stack is transported back into the buiding before dilution. Thus design and location of building intake and exhaust warrant critical importance....

Understanding the requirements for building intake and exhaust air

A. Location

First, the location and orientation of the building needs to be considered for intake air quality.

Then the local sources of outdoor contamination, like traffic, generators, nearby buildings etc. need to be identified.

Only then the optimal locations can be indentified for building intake and exhaust both.

B. Performance Criteria

Then, the appropriate inlet and outlet firments must be identified in accordance with key performance criteria like water ingress, acoustics and pressure drop etc.

C. Ambient Air Quality

The hygiene limits must be defined for the IAQ w.r.t health and productivity of building occupants. And means identified to validate and monitor these limits.

A validated design approach

A. Choosing the right location

Using WPC historical ambient air quality & wind pressure on exterior we prepare building model with site orientation & GPS pin. (Fig. 1a)

We also identify local sources of outdoor contamination, like moving vehicles, generators, stacks etc.

Then the optimal locations are indentified, both for building intake and exhaust. (Fig.1b)

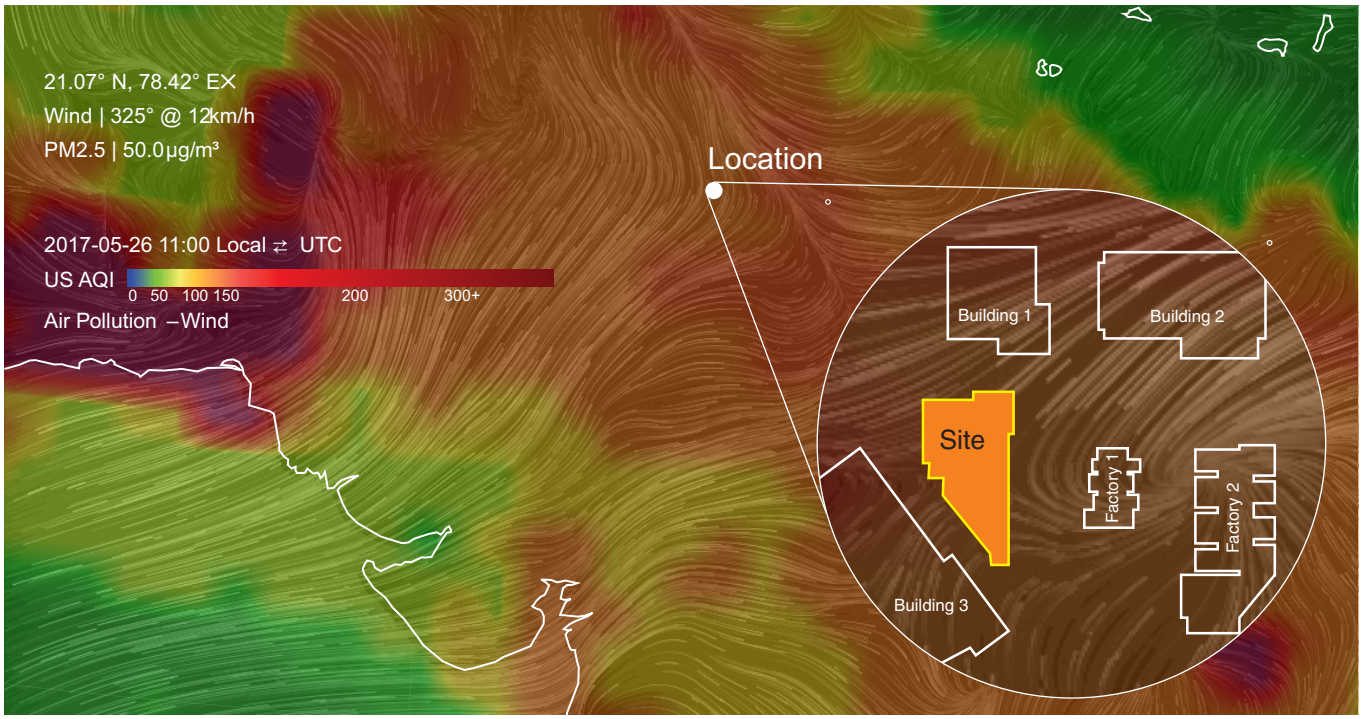


Fig. 1a: Building location parameters analysis

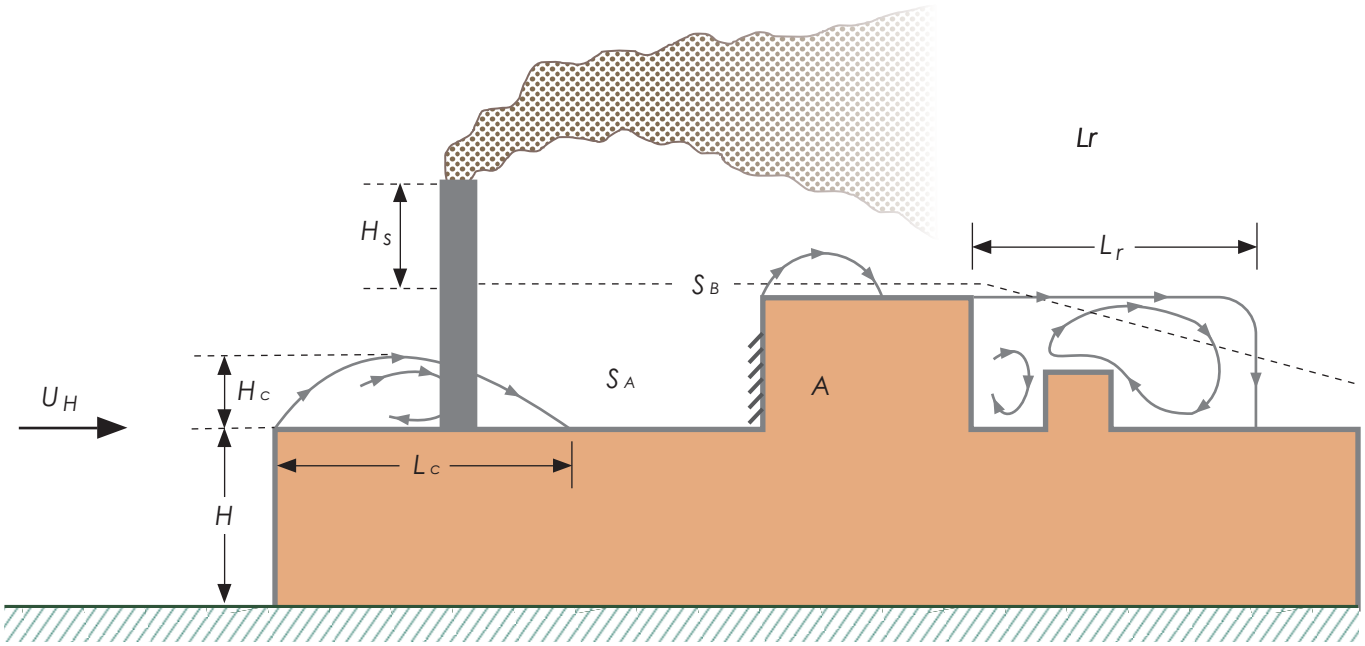


Fig. 1b: Determining the intake location

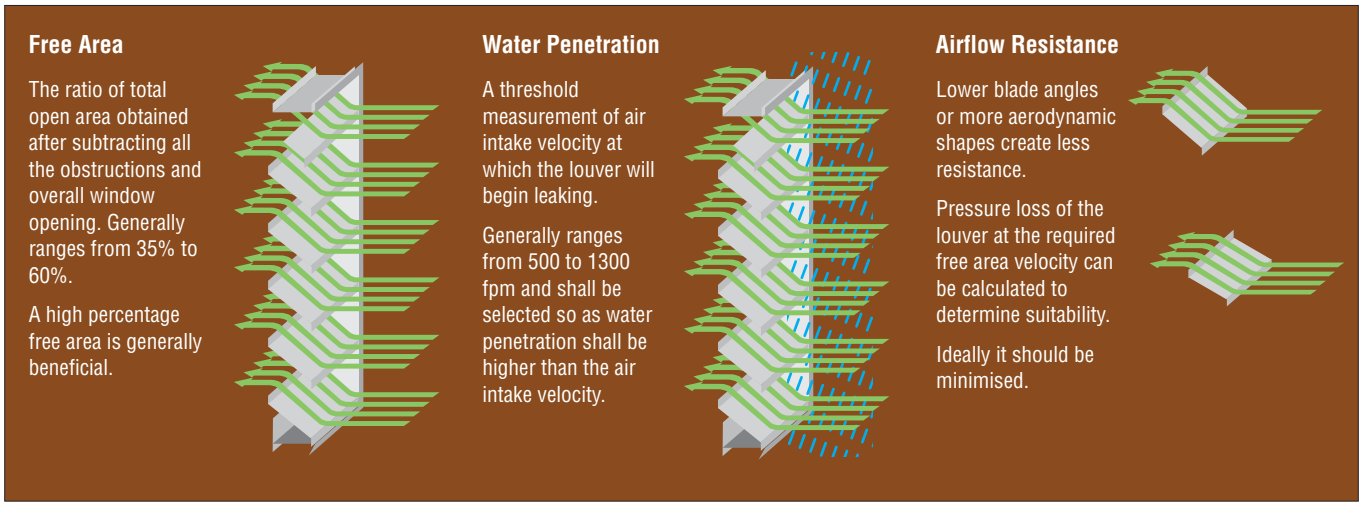


Fig. 2: Performance criteria for air inlet and outlet fitments.

B. Determining Performance Criteria

As per the identified location for building intake and exhaust alongwith weather patterns, key performance criteria like water ingress, acoustics and pressure drop are taken into account while choosing the appropriate inlet and outlet fitments. (Fig. 2)

C. Deciding Ambient Air Quality Parameters

Next, the hygiene limits are defined for health and productivity of building occupants. (Fig. 3a)These findings are validated by mesh of portable neural sensors (AAQ) and remote monitoring &

Contaminant	Hygiene Limit on the basis of Health & Safety of Occupants		
	Life Safety	Health	Productivity
Carbon Monoxide (CO)	115 ppm	9 ppm	<9 ppm
Nitrogen Oxides (NOx)	5 ppm	1 ppm	<0.1 ppm
Sulfur Oxides (SOx)	5 ppm	2 ppm	<0.25 ppm
Particulates (PM2.5)	350 µg/m3	60 µg/m3	15 µg/m3
Particulates (PM10)	600 µg/m3	250 µg/m3	50 µg/m3

Fig. 3a: Determining hygiene limits for Indood Air Quality

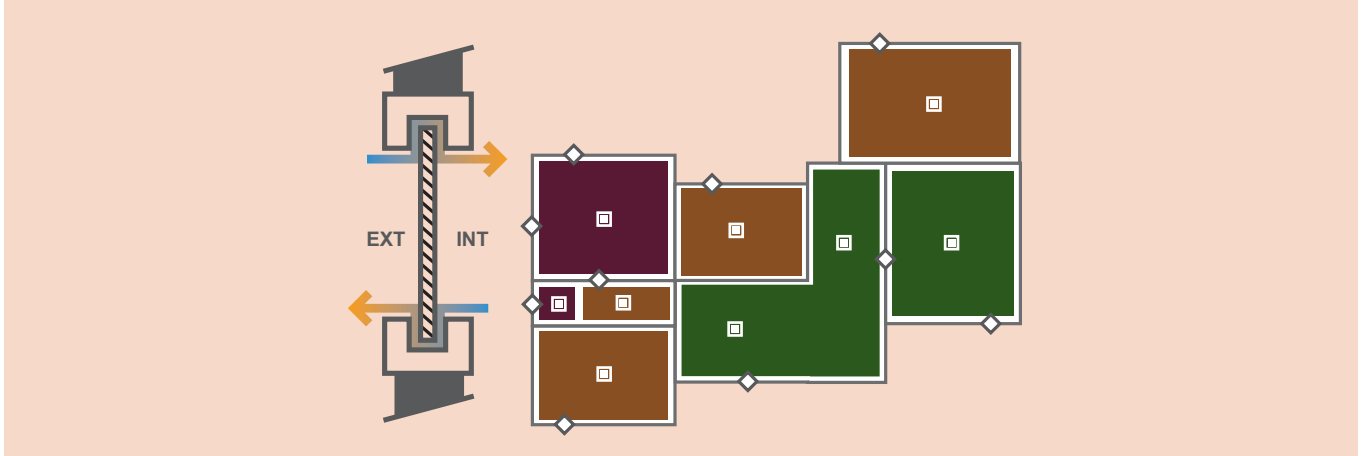


Fig. 3b: Validation and monitoring of hygiene limits in the buiding

Selecting the right louvers to separate indoor and outdoor environment

A louver is a key ventilation product that is designed to allow the air to pass through while keeping out unwanted elements such as water, dirt, and debris etc.

A number of fixed or operable blades mounted in a frame can provide this functionality. The basic considerations for selecting the appropriate louvers for specific applications are listed in the table below.

		Contruction Detail		Aesthhetics		Performance		
SNo	Louver Type	Blade	Frame	Depth (inches)	Alignment	Free Area%	Water Penetration (fpm)	Features
1	Thin Line	Extruded Aluminium	Extruded Aluminium	1.86	H	53	670	For curtain wall and minimum depth
2	Wide Line	Extruded Aluminium	Extruded Aluminium	4	H	49	700	For Window/Door Walls
3	Drainable	Extruded Aluminium	Extruded Aluminium	2.25	H	48	1060	Thin and effective for rain water protection
4	Drainable	Fabricated Steel	Fabricated Steel	4	H	23	1150	Effective for rain water protection
5	Stationary	Fabricated Steel	Fabricated Steel	3	H	49	700	Stationary standard louver
6	Adjustable	Fabricated Steel	Fabricated Steel	3	H	49	700	Operable louver blades
7	Standard	Extruded PVC	Fabricated Steel	3	H	34	800	Stationary standard PVC louver offering low resistance to airflow
8	Sight Proof	Extruded PVC	Fabricated Steel	4	V	41	1250	Wind driven rain protection
9	Sand Trap	Fabricated Steel	Fabricated Steel	3.2	V	NA	NA	Sand protection
10	Acoustic	Fabricated Steel	Fabricated Steel	6	H	31	800	Sound absorption
11	Combined with backdraft damper	Extruded Aluminium	Extruded Aluminium	4.5	H	40	1060	Combination of drainable louver with backdraft damper
12	Combined with adjustable damper	Extruded Aluminium	Extruded Aluminium	4.5	H	38	1060	Combination of drainable louver with adjustable damper

Extruded Aluminium Thin-line Louver

Commonly used to protect air intake and exhaust openings in building interior or exterior where high free area and low airflow resistance is required.

Design incorporates extruded aluminium one side flange frame for easy installation and stationary narrow profile horizontal louver which makes this product ideal for installation into curtain walls, windows, doors, or as air conditioning grilles.

Extruded Aluminium Drainable Louver

Made out of specially designed weather louver to protect air intake and exhaust openings in building exterior walls where high free area and low airflow resistance is required with increased protection against water penetration.

Design incorporates extruded aluminium 2 inch deep drainable head member with one side flange and stationary horizontal louver to channel water to the jambs which guide the water through vertical down-spouts for escape at the sill.

Steel Fabricated Adjustable Louver

Commonly used to protect air intake and exhaust openings in building exterior or interior where high free area and low airflow resistance is required with adjustable louver operation. Design incorporates steel fabricated one side flange frame for easy installation and adjustable 3 inch deep horizontal louver which makes this product ideal for installation into standard walls, air handler, windows, doors, or as partition grilles.

Extruded PVC Standard Louver

Commonly used to protect air intake and exhaust openings in building exterior or interior where high free area and very low airflow resistance is required.

Design incorporates steel fabricated one side flange frame for easy installation and extruded PVC stationary airfoil 3 inch deep horizontal louver which makes this product ideal for installation into standard walls, air handler, windows, doors, or as partition grilles.

Extruded Aluminium Wide-line Louver

Commonly used to protect air intake and exhaust openings in building exterior or interior where high free area and low airflow resistance is required.

Design incorporates extruded aluminium structural member and stationary 4 inch deep horizontal louver which makes this product ideal for installation into standard walls, windows, doors, or as partition grilles.

Steel Fabricated Drainable Louver

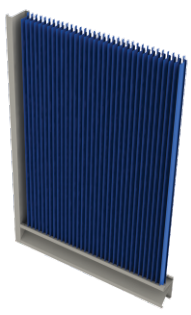
Made out of specially designed weather louver to protect air intake and exhaust openings in building exterior walls where high free area and low airflow resistance is required with increased protection against water penetration. Design incorporates steel fabricated 4 inch deep drainable head member with both side flange and stationary horizontal blades to channel water to the jambs which guide the water through vertical down-spouts for escape at the sill.

Steel Fabricated Stationary Louver

Commonly used to protect air intake and exhaust openings in building exterior or interior where high free area and low airflow resistance is required.

Design incorporates steel fabricated one side flange frame for easy installation and stationary 3 inch deep horizontal louver which makes this product ideal for installation into standard walls, air handler, windows, doors, or as partition grilles.

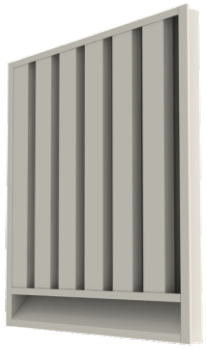
Extruded PVC Sight Proof Louver



Commonly used to protect air intake and exhaust openings in building exterior or interior where high free area and low airflow resistance is required with increased protection against water penetration.

Design incorporates steel fabricated one side flange frame for easy installation and extruded PVC sight proof 4 inch deep vertical louver which makes this product ideal for installation into standard walls, air handler, windows, doors, or as mist separator.

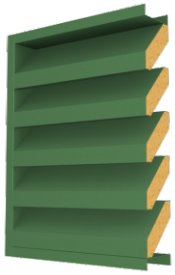
Sand trap Louver



Commonly used as pre-filter for the protection of air conditioning plants in area exposed to extreme levels of industrial pollution.

Design incorporates steel fabricated vertically arranged sections and holes for sand drainage and self cleaning. It is designed to separate large particles at low velocities, thus avoiding excessive dust loading on conventional filters but not to serve as a substitute.

Standard Acoustic Louver



Commonly used to protect air intake and exhaust openings where high free area and low airflow resistance is required with sound absorption from escaping noise.

Design incorporates steel fabricated C type frame for easy installation and insulated double skin stationary 6 inch deep horizontal louver which makes this product ideal for installation into standard walls, air handler, windows, or doors.

Louver & Gravity Backdraft Damper Combined

Features a stationary front louver that provides added weather protection and secondary gravity gravity intake/exhaust backdraft damper.

Design incorporates extruded aluminium 4.5 inch deep drainable head member with both side flange, primary stationary horizontal louvers to channel water to the jambs which guides the water through vertical down-spouts for escape at the sill, and secondary gravity louver blades.

These louvers are ideal for situation where airflow is required in one direction with protection against water penetration.

Combination of Louver & Adjustable Damper

Features a stationary front louver that provides added weather protection and secondary operable damper.

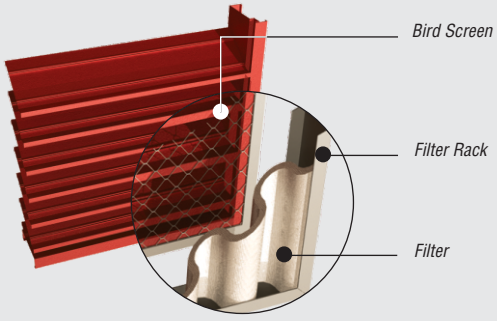
Design incorporates extruded aluminium 4.5 inch deep drainable head member with both side flange, primary stationary horizontal louvers to channel water to the jambs which guide the water through vertical down-spouts for escape at the sill, and secondary gear driven blades.

These louvers are ideal for situations where airflow is not required at all times and blade closure is desired to restrict weather infiltration. Available with electric actuator.

OPTIOINALATTACHMENTS

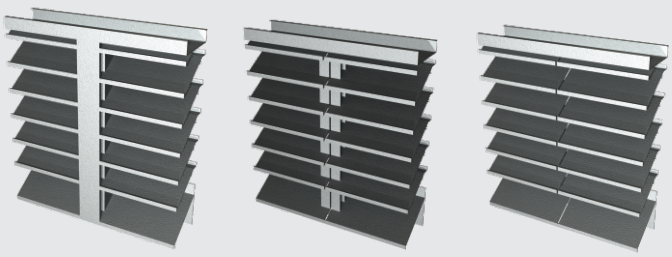
Bird screen Filter & filter Racks

Bird Screens serve to prevent unwanted access of birds & insects. Filter racks are optional for fresh air applications.



Mullions

Required for multi width louvers. Conaire offer three different types of mullions to chose from.



Visible Mullion | Recessed Mullion | Concealed Mullion

NEED MORE INFORMATION?

If you have found this information useful and wish to know more about dampers for specific applications, please get in touch to set up a meeting or a presentation.

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