A GUIDE TO SPECIFYING LOUVRES

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What is a Louvre?

Louvre's can be defined as a passive device, intended to allow the passage of air into or out of a building or ventilation system, while restricting the entry of rain.

A framed opening, as in a wall, door or window, fitted with fixed or moveable horizontal slats for allowing air and light through whilst stopping rain.

A way of providing necessary airflow, both intake and exhaust to HVAC and heavy plant machinery.

Why are they used?

Louvre's can be defined as a passive device, intended to allow the passage of air into or out of a building or ventilation system, while restricting the entry of rain.

As well as providing natural ventilation, an efficient louvre system can improve airflow to building systems, which means less power is needed to move the volumes of air required In the cases of HVAC systems, this improvement in energy efficiency can sometimes mean a smaller and less powerful system is required for space heating and cooling .

Types of Louvre's

Performance (or Weather) Louvre—The main objective of Performance Louvre is to allow the passage of air, whilst providing the room beyond the louvre with protection from rain penetration.

Standard Louvre—Will provide the maximum airflow required with some degree of rain defence. These louvres are preferred for projects where economy is the primary consideration, high free area is important and occasional water penetration will not cause significant problems.

Screening Louvre—Is often used on the top of buildings to conceal HVAC systems. Their primary objective is to hide unsightly equipment.

Free Area

The principle reason for using louvre's is to move air, however, specifying louvre's on free area alone can cause problems for both architects and building occupiers.

The percentage free area of a louvre is affected by its size. Typically, percentage free area of a louvre is given for a specific size, usually 1m x 1m. Changing the size of the louvre can significantly affect the percentage free area available.

Factors that impact airflow.

- Flashings
- Mullions
- Structural supports
- Bird & insect screens

The most efficient specification solution is based on the actual needs of the building.

Specifying your louvre

Specifying louvre is a compromise between airflow and water ingress. A car park may require maximum ventilation, but little protection from rain penetration. Alternatively, a plant room containing special machinery or electrical equipment may need high levels of ventilation, but with maximum protection from water entry ingress.

It is important to consider the following factors when specifying louvres:

Airflow	Site Weather Conditions	Site Location	Building Use
Aesthetics	Maximum Pressure Drop	Water Penetration	

Weather louvre's

A weather louvre does not have any moving parts. It is designed to work as efficiently as possible at letting air through whilst keeping water out. The key elements of a weather louvre are:

- Airflow - The volume flow rate of air required and the size of the louvre face
- Water penetration - Importance of preventing water getting beyond the louvre.

Airflow

When selecting weather louvres, one of the most important aspects is the air velocity at the louvre face. This can be calculated using the following formula:

Face Velocity (m/s) = Volume Flow Rate (m^3/s) / Face Area (m^2)

A weather louvre's performance depends on the face velocity. A weather louvre is tested at intervals from 0.0m/s to 3.5m/s face velocities to determine its range.

Energy efficiency

The ultimate efficiency of design is a combination of the louvre size (the larger area the better) and how freely it allows air and water to pass through it.

Energy usage and louvres comes down to the fan power required to deliver a specified volume flow rate through the louvre. The greater the resistance to the air moving through the louvre, the greater the difference in pressure between the outside and inside of the louvre (pressure drop). The greater the pressure drop, the more fan power is required to pull the same volume flow rate of air through the louvre.

Improved efficiency of louvre design, will save money and contribute to an improved energy rating for the building. Increasing the size of the louvre at the design stage means that the same volume flow rate requirement can be achieved, but at a lower velocity.

Water penetration

As well as allowing air to flow through the louvre, a weather louvre must also keep rain out. The acceptable level of water penetration is dependent upon the application and how important it is for the area beyond the louvre to stay dry. Key considerations for working out your water penetration requirements are:

- The degree of allowable water penetration (0% - 100%)
- The severity of local/site weather conditions
- The position of the louvre on the building, sheltered or exposed

Allowable water penetration is detailed in BS EN 13030:2001 water penetration banding.

Class	Maximum allowable penetration of rain l/h. m²
A	0.75
B	3.75
C	15
D	>15

Local weather conditions naturally vary from place to place so it is important to check your expected site conditions against the standard test conditions. The positioning of louvre is also key for both rain penetration and airflow. A rural hilltop will expect a higher rain penetration and airflow than a sheltered urban position. A sheltered louvre will likely have a larger fan requirement than an exposed louvre.

Achieving a balance

The better a louvre is at letting air through, the worse it is likely to be at keeping water out. Achieving a balance to each element (airflow and rain penetration) is key in deciding which louvre is right for your building. According to BSRIA the typical effect of the variables affecting louvre performance are:

Action	Effect on energy performance	Effect on water rejection
Install more water resistant louvre	Worse	Better
Install lower pressure drop louvre	Better	Worse
Increase air velocity	Worse	Worse
Increase louvre face area (lowering required air velocity)	Better	Better

The degree to which these variables affect performance depends on the design of the louvre. To help overcome the trade-off between efficient airflow and water penetration the following may help, depending on the site application:

- Increase the size of the louvre face to achieve the same air volume but at a lower velocity, reducing pressure drop and water penetration at the same time
- Make provisions for water penetration such as drains behind the louvre
- Opt for a more highly engineered product to reduce the amount of trade-off

Testing

BS EN 13030:2001 sets out the guidelines for the testing and classification of all weather or performance louvres. During testing, the resistance to airflow is assessed and the louvres are subjected to 75mm/hr of water, blown against a 1m x 1m louvre at a velocity of 13m/s. The louvre is then given a 3 part classification:

1. Effectiveness
2. Discharge Loss Coefficient (DLC)
3. Overall Performance

Effectiveness

This classification rated A-D designates the effectiveness class of the weather louvre against water (rain) penetration.

Class	Effectiveness	Maximum allowable penetration of rain l/hr
A	1 to 0.99	0.75
B	0.989 to 0.95	3.75
C	0.949 to 0.80	15
D	Below 0.8	>15

Louvre performance is dependant on the intake velocity. A louvre may be class A at 0m/s but at 3.5m/s it might be a D. Historical weather conditions at the site need to be considered to establish the maximum and minimum expected face velocity.

Airflow class

This classification, rated 1-4 designates the louvres ability to allow air to pass through it and is determined by establishing the Discharge Loss Coefficient (DLC) at various airflow velocities. Each class covers a specific range, as can be seen in the table below. The higher the DLC the less resistant to air the louvre is. The Airflow Class gives a guide to M&E consultants of how the louvre performs at various ventilation rates and the actual DLC figure is used to establish the actual area of louvre required.

Airflow Class	Discharge Loss Coefficient (DLC)	Rating
1	0.4 & Above	Excellent
2	0.3 to 0.399	Very Good
3	0.2 to 0.299	Good
4	0.199 & below	Fair

Overall performance

This is calculated by multiplying the effectiveness by the coefficient, giving an Overall Performance rating.

NOTE: Overall performance should not be used as the sole determining factor when choosing louvres, as it can mask poor weather performance on a louvre with good air-

Checklist

- ☐ Face Velocity value
- ☐ Energy Efficiency - Large or small louvre face area
- ☐ Volume Flow rate requirement
- ☐ Maximum allowable water penetration l/h. m^2 (or Class A-D)
- ☐ Severity of local weather conditions
- ☐ Position of the louvres
- ☐ Relevant performance data (site requirements)
- ☐ Product suitable for application? (Bird guards etc.)

Two Point Seven Facades Ltd can support you at every stage of the selection process, from specification to installation. Please contact us for further details.