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Introduction to Intake and Exhaust Louvers

An AMCA International White Paper

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AMCA INTERNATIONAL LOUVER MARKETING TASK FORCE

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Introduction to Intake and Exhaust Louvers

ABSTRACT

To better understand the type of louver required for a specific application, it is important to have a good foundational understanding of how they work. This white paper will provide an overview of basic louver function and describe many of the louver designs found on the market today.

In today's era of sustainable buildings, there is a growing need to supply buildings with fresh outdoor air. That means the need to protect outdoor air and building exhaust openings with louvers will continue to flourish. Building envelopes and the components that protect them have and will continue to adapt over time, and louvers have evolved to meet market demands and changing design and code requirements.

LOUVER TYPES

A louver is a device comprising multiple blades that, when mounted in an opening, permits the flow of air but inhibits the entrance of water or other elements. Traditional louvers with "Z" or "J" type non-drainable blades have been in use in building construction for centuries. They provide a means for large volumes of airflow but offer virtually no rain defense. This insufficiency led to the design of "K" type non-drainable blade louvers. These louvers were originally dubbed "stormproof" and featured a rain hook in the blade design. Unfortunately, they fail to live up to their name, providing only very little rain defense.

Drainable blade louvers were created in an attempt to mitigate the effects of water infiltration. The dual drainable blade louver was developed with hopes of improved performance over single drainable blade louvers. However, these louvers provided minimal rain defense and were insufficient in wind-driven rain conditions.

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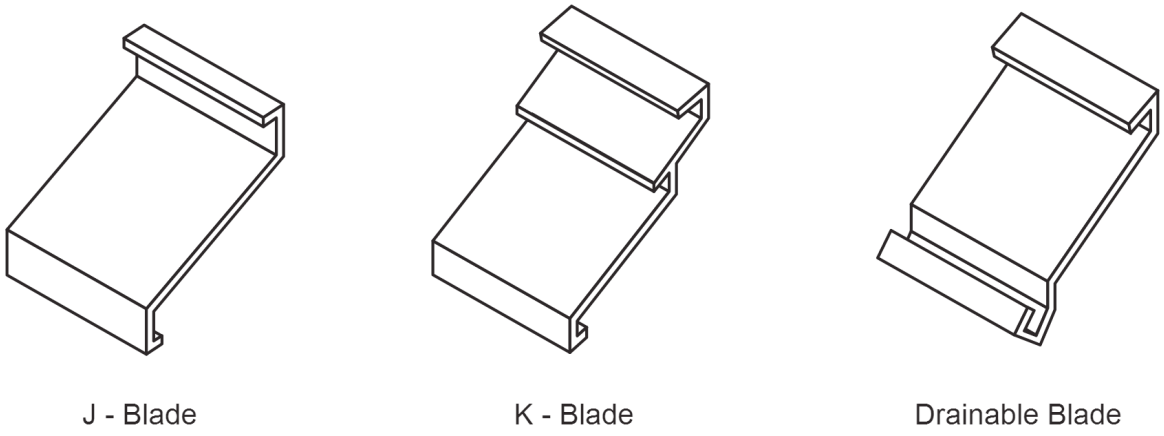

Figure 1. Cross sectional diagrams of different types of louvers. *Image courtesy of AMCA International*

In 1999, in response to a demand for greater levels of envelope protection, AMCA added a new test to its ANSI/AMCA Standard 500-L[1]. The original test for water penetration uses still air, and it continues to be a criterion for evaluation. But the updated test standard addressed concerns of severe weather (wind-driven rain) on louver performance, loosely based on European test standards generated by HEVAC.

This change in market requirements led manufacturers to develop a new product: the wind-driven rain louver. Typical wind-driven rain louvers can be characterized by their close blade centerlines, sophisticated, aerodynamic blade shapes, and front and sometimes rear rain gutters. These louvers effectively mitigate water infiltration inside buildings and in many cases have significantly higher airflow capacities than traditional louvers.

Additional louver types for various applications are have also been developed to meet design conditions and market demands: adjustable blade, combination louver/dampers, vertical blade, Y-Blade, acoustical louvers and various architectural configurations for aesthetic purposes. Another type of louver has been designed to reject wind-driven sand, meeting regional requirements for dry, desert areas. This type of louver is covered in a separate white paper, “Introducing the AMCA Sand Louver Test Standard.”[2]

PERFORMANCE CRITERIA

The three most common performance criteria evaluated for selection of louvers in a given application are as follows:

1. PRESSURE DROP

Pressure drop is the difference in pressure between two points in a flow system. It is also referred to as air performance.

2. FREE AREA

Free area is the minimum area through which air can pass, usually expressed as a percentage. It is not to be confused with face area, which is the total cross-sectional area of a louver.

3. WATER PENETRATION RESISTANCE

Water penetration resistance is a calculation of the amount of water that passes through a louver while subjected to specific airflow conditions. It is expressed as the weight of water passing through the louver divided by the free area at a specified free area velocity. The maximum rating for water penetration velocity is 6.35 m/s 1250 fpm.

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