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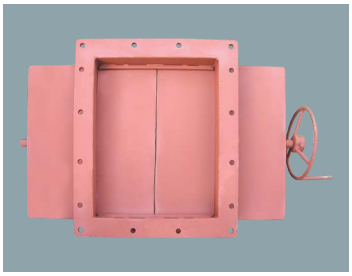
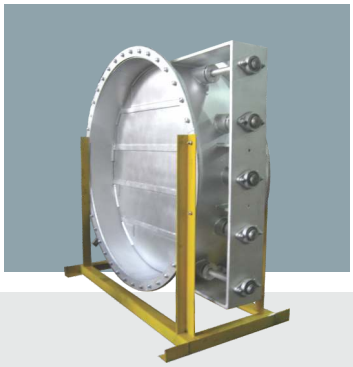
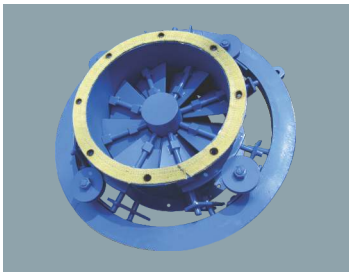
Efficient™
Envirotech Pvt. Ltd.

DAMPERS

Dampers for Commercial & Industrial Air Handling Applications







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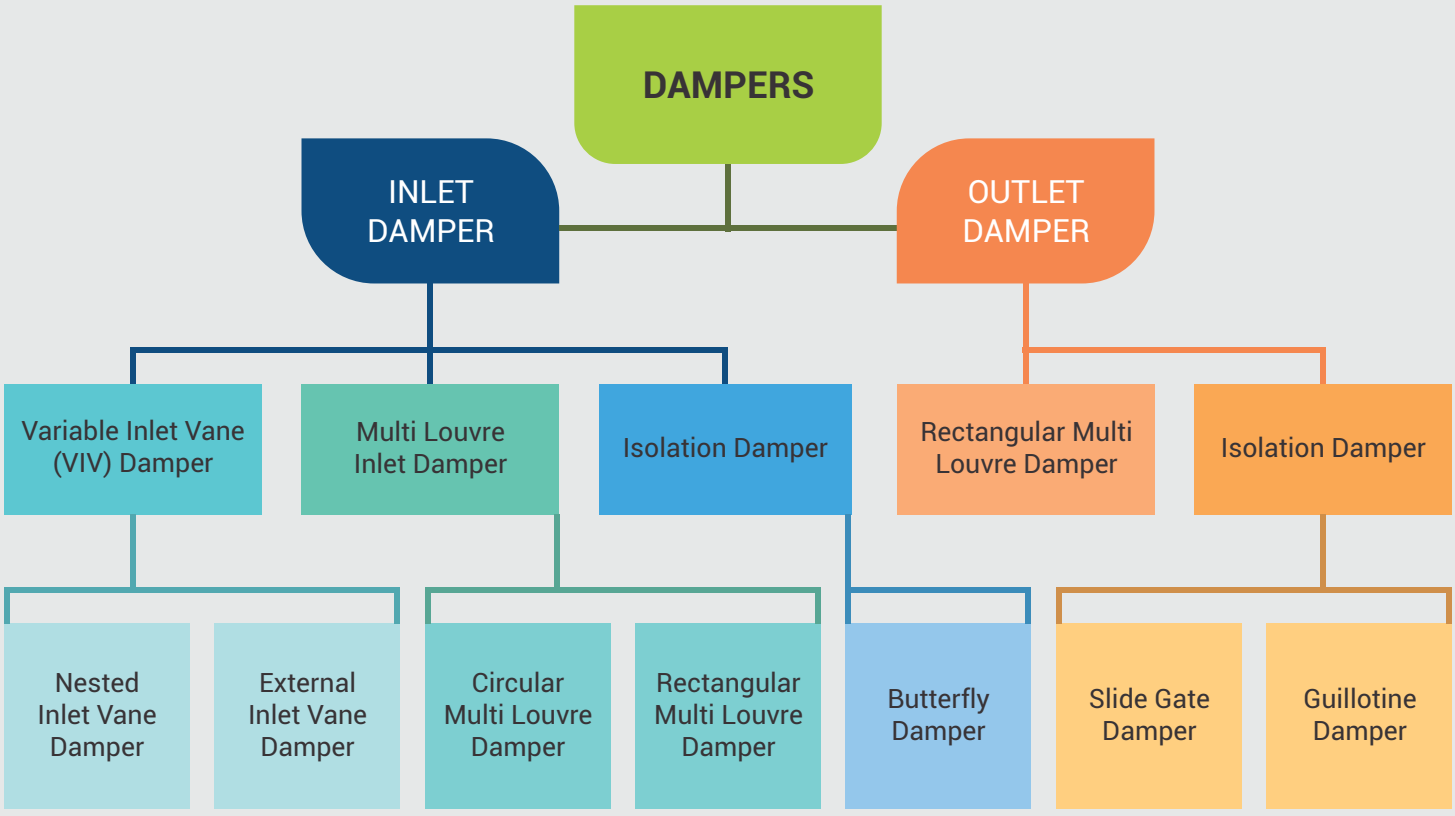
CENTRIFUGAL FAN DAMPERS

Efficient Centrifugal Fan with dampers for industrial, ventilation and process applications are an outstanding combination

Dampers are used with Centrifugal Fans to provide a simple, reliable and cost effective means for controlling air systems. Efficient Envirotech Pvt. Ltd. has an extensive offering of modulating and isolation dampers for commercial and industrial applications.

- Each Centrifugal Fan model has a damper that is sized to handle the maximum air velocity.
- Damper designs have been optimized to maximize Fan performance by reducing system losses.
- Wide variety of types and construction options are available, which offers versatility and flexibility for selecting the best combination suitable to meet system requirements.
- Dampers are factory tested and inspected before shipping: Fine adjustments for blade operation by linkage adjustment, setting of actuator limits is done at site by our efficient service team.
- Wherever possible, Centrifugal Fans and dampers are shipped together as one unit so there is no field mounting required.



INLET DAMPERS

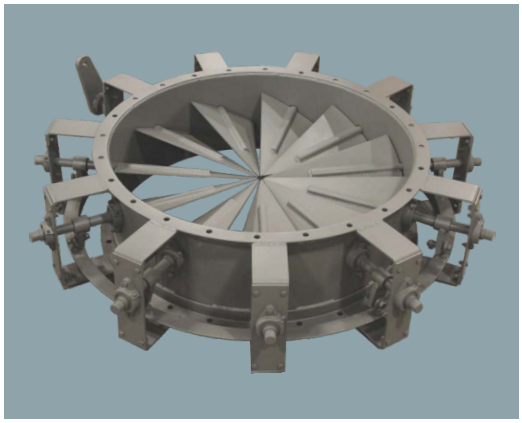
Inlet dampers are broadly classified under the following types:

1) Variable Inlet Vane (VIV) available in through shaft (nested) and external inlet vane type
2) Multi Louvre dampers available in circular and rectangular construction

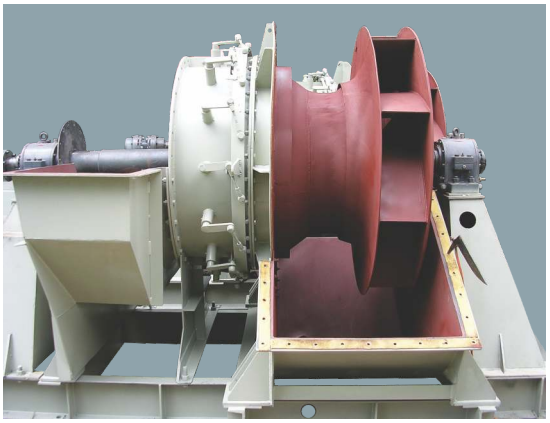
VARIABLE INLET VANE (VIV) DAMPERS

These models are often installed on the fan as energy saving devices when the airflow needs to be modulated or run for extended periods of time at reduced flow. They are commonly supplied with rotary actuators for ease of remote process control. Actuators may be manual, electric or pneumatic and are mounted out of the airstream. They are intended for ducted applications and those with higher pressures and velocities. They are also effective for reducing the fan load at start-up or conditions with varying air densities.

Type : External Inlet Vane Dampers



Type : External Inlet Vane Dampers



Type : Nested Inlet Vane Dampers

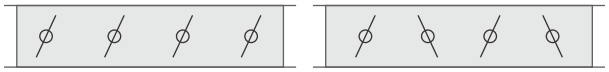
INLET DAMPERS

MULTI LOUVRE INLET DAMPER (MLID)

Multi Louvre dampers are offered for modulation and control with parallel or opposed blades. Each style has distinguishing characteristics in regards to control of the fan's performance plus a change in air velocity profile.

- Parallel blade dampers have excellent control over the range of 75% to 100% wide open volume due to the amount of control arm swing required to modulate the blades. Parallel blades are used when greater control is required near the top end of the volume operating range or for systems requiring two position (fully open or fully closed) operation. Parallel blades should not be used upstream of critical components due to uneven airflow.
- Opposed blade dampers offer the best control over the entire operating range. Opposed blades are used for applications where it is necessary to maintain even distribution of air downstream from the damper. These are best suited for ducted outlets.

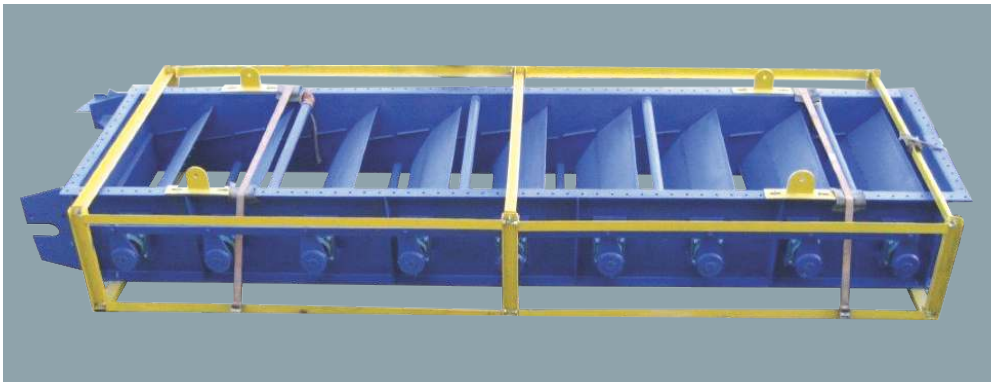
Top View of Blade Action Styles



Parallel Blade | Opposed Blade

PARALLEL BLADE DAMPER

OPPOSED BLADE DAMPER



Type : Rectangular Multi Louvre Damper
Size : 7700 x 2600 x 700

Type : Circular Multi louvre Damper
Size : ID 600mm

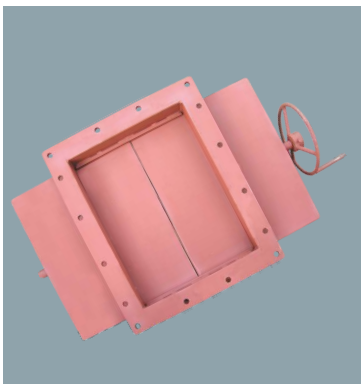
INLET/OUTLET ISOLATION DAMPERS

Inlet/Outlet Isolation Dampers Can be classified under three main types:

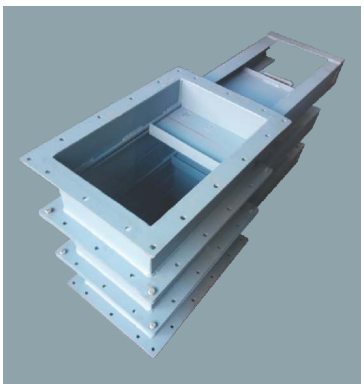
1) Butterfly Damper
2) Slide Gate Damper
3) Guillotine / Shut Off Damper

These dampers are used to isolate the fan from the process during shutdown or maintenance operations. They are usually operated by hand or pneumatic actuators (On/Off type)

Type : Butterfly Damper



Type : Slide Gate Damper



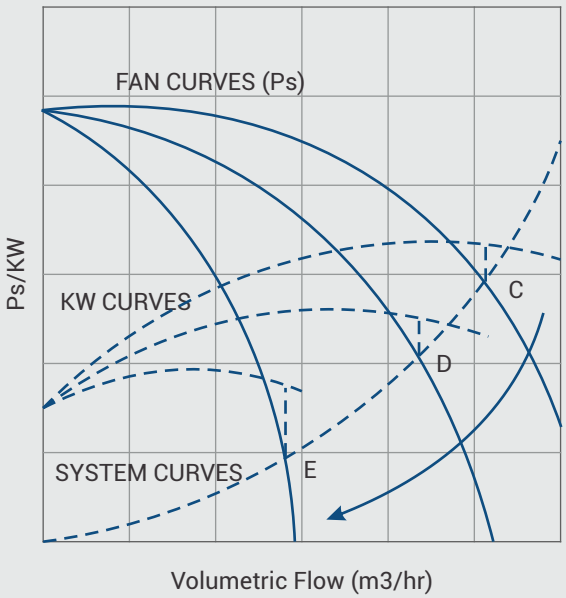
Type : Guillotine/Shut Off Damper

HOW INLET DAMPERS AFFECT FAN PERFORMANCE

Inlet dampers start a pre-spin at air entry. The pre-spin placed on the entering airflow will be in the same direction as the wheel rotation. This pre-spin also reduces the energy requirements of the fan and the overall effect is very similar to reducing the speed of fan without inlet damper.

Centrifugal fans with Variable inlet vane dampers have different operating points depending on the blade position of the damper. As an inlet damper is operated viz opened or closed, new operating points are found on the system curve. *See the figure to the right*. Different operating points are represented by C, D, and E with C the most wide-open and E the least.

Each point has unique static pressure and power curve. These points show that by closing the inlet damper, airflow is reduced and less energy is required by the fan.

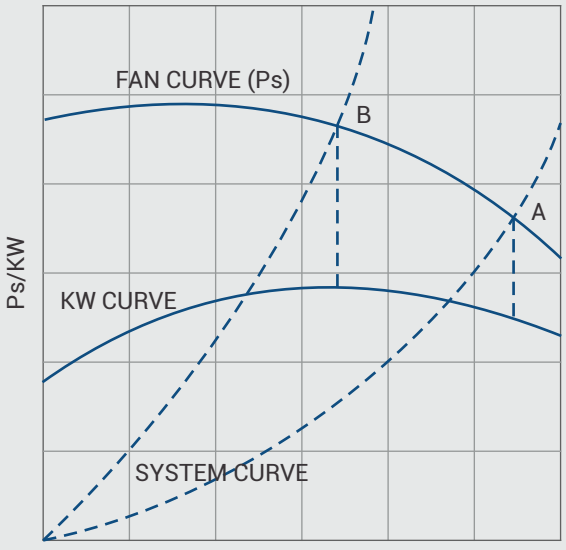


Centrifugal Fan With Inlet Damper

HOW OUTLET DAMPERS AFFECT FAN PERFORMANCE

Where outlet volume control dampers are used, the fan static pressure changes with the resistance produced by modulating or closing the damper blades.

The figure to the right illustrates the performance characteristics of a centrifugal fan with different damper blade positions. Point A shows the performance when the damper is in an open position. Point B illustrates the shift in the operating point as the damper starts to close. For each blade position there will be a new system curve and operating point. The original static pressure (Ps) and power (KW) curves remain unchanged.



Centrifugal Fan With Outlet Damper

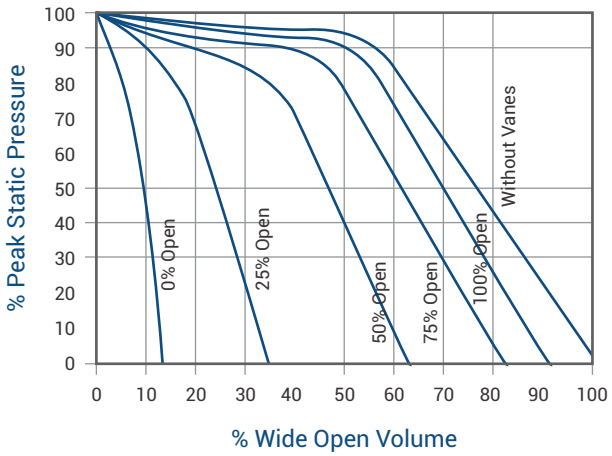
DAMPER SELECTION

PARAMETERS FOR SELECTION OF INLET VANE DAMPER

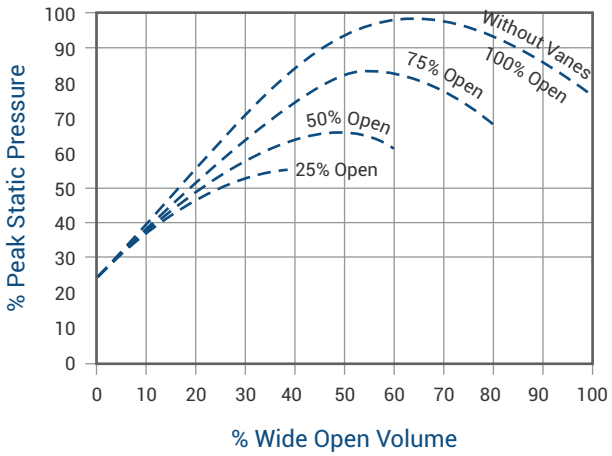
When selecting an internal / external Variable inlet vane damper,the following points are to be considered : Direction of the rotation of fan as viewed from the Inlet side of the fan clockwise(cw) or counter-clockwise (ccw). – Air pre-rotation Is critical for the proper functioning of the fan. If the wrong direction of rotation is selected, there will be a moderate pressure increase, Power consumption will increase significantly, and pulsations may occur.

The graphs below show the effects that blade actuation has, and on Static Pressure, Power (kw) vs Flow (m3/hr) with inlet vane dampers and parallel bladed inlet box dampers. Field results may differ from laboratory tested values.

Static Pressure vs. Wide Open Volume



Power vs. Wide Open Volume



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