

Car Park Ventilation

Your complete solution to car park ventilation.



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Ventilation Products

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Why ventilate with jet fans?

Jet fan ventilation (also known as impulsion or induction ventilation) uses non-ducted axial or radial fans to move vast amounts of air at low speed through generated air streams, supplying fresh air from outside whilst extracting pollutants from the inside. Jet fans are placed near the car park's ceiling similar to ventilation systems in road tunnels.

Jet fan ventilation technology is now the standard in car park ventilation in many countries across the world. Its' concept is based on air streams generated by any number of virtually silent, free-blowing axial or radial fans efficiently moving air from the supply to the exhaust points on each car park level. The jet fan ventilation system is regulated by sensors

that monitor the CO levels on specific car park levels. These sensors can activate the appropriate number of fans needed to meet specific ventilation requirements and choose the relevant speed of the fans to maintain reduced sound emissions.

Our simple 3 step process.

1. Planning Concepts

Design considerations by assessing car park specifications, ventilation requirements and jet fan dynamics.

2. Computational Fluid Dynamics

Actually see how your car park ventilation will perform before installation has even begun.

3. Engineering

Designing the system layout for the welfare and well-being of all users, maintenance workers and emergency services.

Planning Concepts

Design considerations



Whether small or large, Jet Fan ventilation systems can be tailored to your car park needs.



Reduced consumptions means low operating costs

To keep car park pollutant measures continually monitored and regulated through mechanical ventilation systems leads to high management costs. The consequences of ducted ventilation systems that require high air speed are load losses in the ducts and high energy consumption.

A jet fan ventilation system utilises the car park architecture to help the transfer of polluted air to the outside. This is why jet fans can be operated at lower speeds, ensuring significant energy savings.

Construction cost savings and efficient use of the car park space

Induction jet fan ventilation systems do not require bulky ventilation ducts that reduce available indoor

space. Nor do they need the installation of oversized fans to control pressure losses.

Induction jet fans feature reduced height making them ideal for low-ceiling car parks where maximising space is essential to the users, maintenance workers and emergency services. Whether installed in a low- or high-ceiling car park, their reduced height allows extensive views for surveillance video cameras, increasing security and user safety.

Jet fan ventilation systems allow for a virtual partition of the car park through 'fire zones'. The fire zones confine smoke in certain areas without spread. Therefore, firewalls are no longer required leaving increased availability of vehicle parking spaces.

High air quality inside the car park

Jet Fans must be correctly positioned within a car park to ensure a sufficient air exchange rate and maintain low CO levels.

Air flows generated near the car park ceiling promote the car park air circulation, preventing the stagnation of polluted air, without affecting user thoroughfare with undesirable air movement.

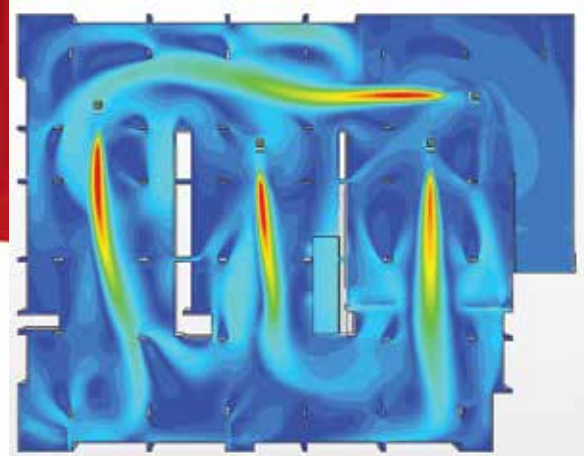
Mechanically ventilated car parks minimum requirements for daily ventilation:

The maximum permissible carbon monoxide level is 50ppm averaged over eight hours, with levels not exceeding 100ppm for 30 minutes.

CFD Analysis

Computational Fluid Dynamics

With CFD modelling you can easily adjust the position of your Jet Fans to best suit maximum ventilation before they are even installed.



Computational Fluid Dynamics (CFD)

Computational Fluid Dynamics (CFD) analysis is a valuable tool to efficiently design and plan a ventilation system for your car park. It precisely predicts air flows by dividing the car park space into thousands of different cells (mesh) using specific mathematical models generated with real field experience. With a CFD analysis, you can visually ascertain air flows and smoke trails to predict their dispersal to various areas and fire ignition points, and investigate the influence jet fans may have if differently positioned.

In this way the designer can optimise the layout and number of jet fans required, and avoid unproductive and expensive oversizing. Once

the system is installed, it is a good practice to carry out a test to check the efficiency of the system to limit smoke in the fire ignition area and transfer it from the car park without obstructing emergency exits.

ALLVENT provides both the CFD modelling to demonstrate the ventilation system is adequate and effective, and a full technical report to obtain council or local authority approval prior to installation.

The Final Report Includes:

- A description of the car park and the ventilation system;
- The design criteria and targets of the analysis;
- The details of the CFD model setting; and
- The final results of the analysis.



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Engineering

Design and system layout

3

Find the perfect layout for your Jet Fan ventilation system, engineered with precision.



Design Criteria

An efficient jet fan ventilation system depends on precise design and planning. It must include the car park layout, main characteristics, type (underground or aboveground), overall surface, height, number of access ramps and their layout within the car park space, position of openings and extraction intakes.

Jet Fan ventilation systems consist of:

- Jet Fans - installed on the car parks ceiling;
- Main Fans - placed on the supply and extraction points;
- Switches - on/off;
- Sensors - CO, smoke and heat; and
- Fan Control Unit - managing the operation of Jet Fans, main fans and dampers based on the sensors' readouts. It also ensures correct ventilation in the car park and dilution of CO concentrations.

Jet Fans

Induction jet fans feature an overall shorter height and a higher thrust, which make them particularly suitable for low-height car parks. Also, their laminar flow prevents unwanted turbulence.

Main Fans

To elevate the appropriate ventilation in a car park, the quick extraction of smoke (in case of fire), and the supply of fresh air near the emergency exits, jet fans must be combined with axial fans installed near the ventilation intakes/risers. Metal (die-cast aluminum) blades are used.

Sensors and Switches

The accurate operation of a jet fan ventilation system includes the automatic control of the installed fans. Sensors activate the fans at the appropriate speed and time to limit CO concentrations. In case of fire, the fans can also be managed by a series of smoke and/or heat sensors. The system must also include a series of on/off switches, the operation of which is controlled by the fire brigade.

Thrust	Ideal distance between two Jet Fans side-by-side	Ideal distance between two Jet Fans in series
30 N	8–10m	15–20m
50 N	15m	35–40m
80 N	15m	55–60m
100 N	15–17m	70–80m



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Allvent Jet Fan Range



IVRD Series



EC Jet Series



IDV-HC Series



IVR-EC Series



IVAD Series

The unique, patented outlet venturi and the ultra-flat centrifugal impeller helps the induction jet fan to maintain a very low installation height, enabling the designer to position the fans at the ideal location. This flexibility allows for a reduction in the number of fans needed, lower energy consumption, fewer cables, and lower installation and maintenance costs.

Technical Data

Model	Code	Description	Air Flow (l/s)	Thrust (N)	Sound Pressure (dBA)	RPM
				HIGH SPEED	HIGH SPEED	
HC-EC	ALV750	240V EC JET FAN	680	20	58	780
IVR EC 400		240V EC JET FAN	1300	50	64	1950
IVR EC 450		415V EC JET FAN	1750	75	68	1800
IVRD 500	ALV1104	415V AC JET FAN	1690	43	73	1440
IDV-HC 50	ALV1100	415V AC JET FAN	1860	50	59	1420
IDV-HC 100	ALV1101	415V AC JET FAN	2970	100	75	1425

NOTE: Speeds for each model may need to be reduced to maintain acceptable noise levels within the car park.



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Jet Fan Accessories



Firecat 12V

Non-latching Smoke Detector

The Firecat is a low current, industrial standard sensor which can operate either as an optical, opto/heat combined, rate of rise heat or fixed 77" heat sensor via selection switches.

The detector is equipped with a set of volt-free contacts. It can be configured to auto-reset from the alarm setting, has a dual LED indicator to indicate the alarm setting, and be configured to give a short flash in the normal setting.

The Firecat smoke detector system can be integrated and fitted to ALL jet fan models.



Universal Controller

TC5044

The TC5044 is a programmable controller that has pre-programmed blocks for CO. The controller is housed in a 4 DIN module, 70 x 88 x 62mm enclosure and comes with its own DIN rail mount or can be mounted on a standard 35mm DIN mounting rail. The TC5044 controller has a 2 x 16 character LCD display with white backlighting, 4 blue relay status LED's and 3 push buttons for INCREASE, DECREASE, and SELECT.



CO Smart Sensor

CO3800

The CO3800 Carbon Monoxide smart sensor is a slim, wall-mounted sensor with a tiny fan that draws air in from the bottom of the polycarbonate housing through a dust filter, over the sensor and discharges through the top to ensure a positive response to CO emissions while the sensor is well protected inside the housing.

The CO3800 sensor operates on a two-wire, non-polarised connection to the TC5044 controller.



Plug and Play Cabling System

CN-70 Series keyed, screw-locking, multi-poled connectors

Miniature power (115Vac) connector with 5A current rating. Enhanced stability and security via threaded locking collar plug. Construction incorporates a cord clamp to avoid stress on the contact connections.

The plug and play cabling system can be used on all installations: Pre-wired Control Cabinet, CO Sensors, and Smoke Detector kits are available.

See our quality range of Exhaust/Supply fans at www.allvent.com.au



AXF Series



KEF Series



VRC/DRC Series



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