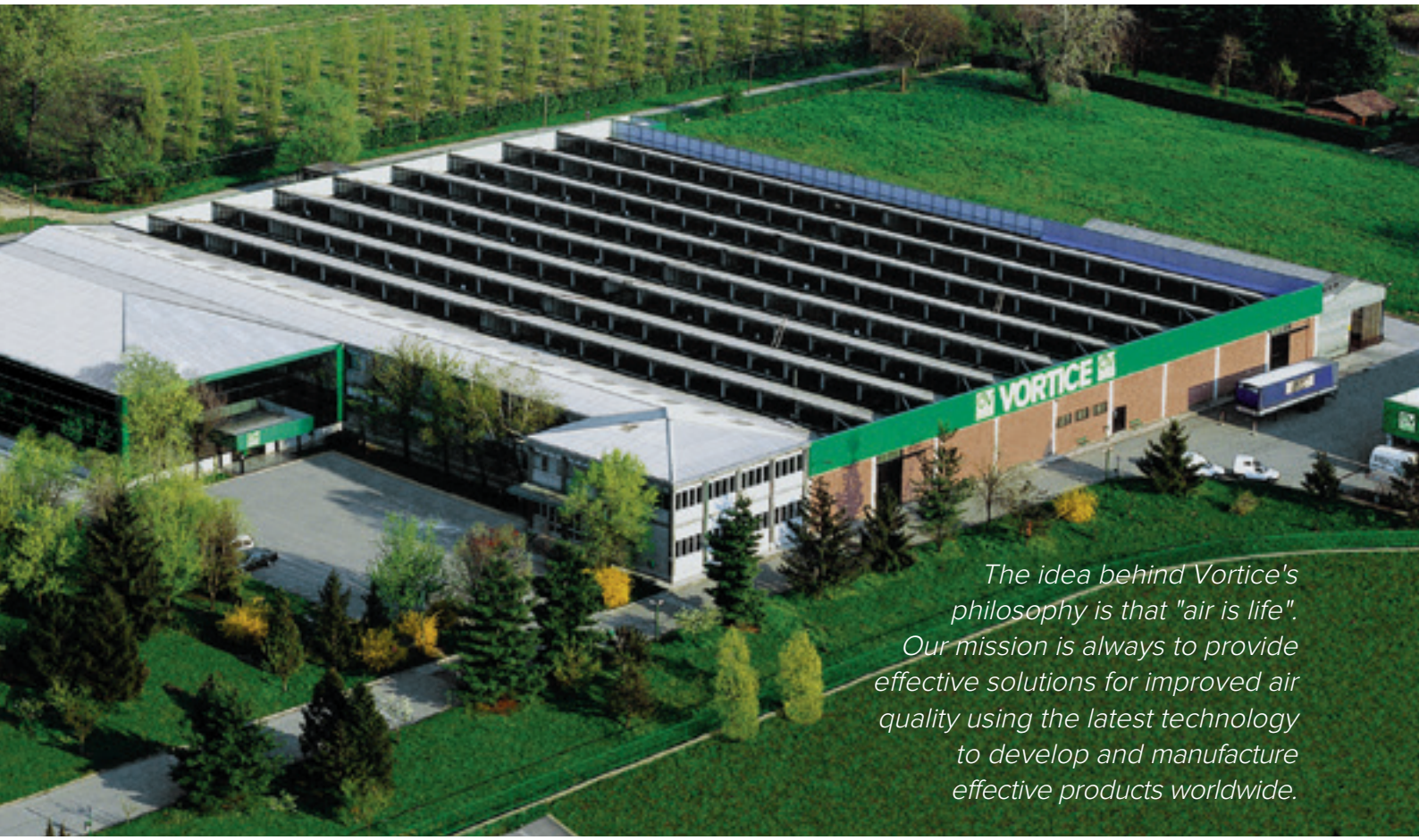
VORTICE

vortice.com

INDUSTRIAL VENTILATION

VORT JET FAN SYSTEM

NEW



Our current Vortice Headquarters have been located in Tribiano (Milan) since 1972.

Vortice has achieved European market leadership by dedicating its efforts to the production of appliances for ventilation, climate control, heating, air purification and air treatment, for domestic of commercial and industrial areas. Since 1954 Vortice has is synonymous with quality and excellence and continues to make significant improvements by investing in continuous its investiment program aimed at constantly improving the functionality, efficiency and reliability of its products.

VORTICE IN THE WORLD

UNITED KINGDOM

Founded in 1977, Vortice Limited is located at Burton on Trent in the East Midlands.

CHINA

Founded in 2012, Vortice Ventilation System is located in ChangZhou, about 200 Km from Shanghai.

SOUTH AMERICA

Founded in 2012, Vortice Latam in San Josè Costarica.

INDEX

INDUSTRIAL VENTILATION

VORT JET FAN SYSTEM

Ventilation and Jet Fans in underground car parks

Inner-city traffic is constantly growing all over the world. In Europe, a recent research work highlighted that, in 2017, the number of cars every 100 inhabitants was 62,4 in Italy, 55,7 in Germany, 49,3 in Spain, 47,9 in France and 47,2 in the United Kingdom. Such a huge number of vehicles causes serious traffic problems, worsened by the fact that most of European cities have developed around historical centres that were born when mass motorisation was yet to come.

However, they also feature a series of theoretical risks related to the exposure to carbon monoxide (CO), nitrogen dioxide (NO2), benzene (C_6H_6), and particulate (PM2.5 and PM10), usually found in the cars' exhaust fumes. Not to mention the risk of fire, which requires specific measures to protect people's health and safety. That's why underground car parks must feature an efficient fire-fighting system, suitable emergency exits, and effective ventilation systems, which

The increasing demand for parking spaces has led to the construction of many car parks, often multi-storey and totally or partially underground to optimise space and facilitate access to final destinations (shopping centre car parks are a perfect example). For the above reasons, underground car parks provide huge economic benefits.

can keep pollution rates below warning levels and dilute the concentration of flammable substances.
In case of fire, they must also ensure the extraction of high-temperature fumes, access to emergency exits and facilitate the work of fire fighters.

Damage caused by smoke

Due to its toxicity, high temperature and reduced visibility, smoke is responsible for 80% of fire-related deaths:

TOXIC

Smoke is **toxic** and causes poisoning.

HOT

Smoke is **hot** and can cause external burns (by direct contact or radiation) and internal burns (by inhalation).

IRRITATING

Smoke is **irritating**. Soot and aerosol may damage respiratory tracts and eyes.

REDUCED VISIBILITY

Smoke **reduces visibility**. Suspended particles and aerosol scatter light, hide emergency exits, can make the person evacuating the room fall and hinder the identification of the origin of the fire.

Minimum requirements and regulations

When building an underground car park it is necessary to comply with a certain amount of regulations that strongly depend on the country where the parking is to be built. The level of acceptability varies from country to country depending upon the level of conservatism within the approving authorities and awareness of fire engineering in the design community.
The prescriptive codes that apply in each country vary in approach and extent of coverage. The British Standard BS7346 part 7 gives recommendations and guidance on functional and calculation methods for smoke and heat control systems for covered parking areas.

Taking the BS7346 as a starting point, car park ventilation systems can be designed to catch one or more of the four following objectives in the event of a fire:

- to grant good air quality in the car parking, to preserve the health of the occupants;
- to assist fire fighters to clear smoke from the car park during and after a fire;
- to provide clear smoke-free access for fire fighters to a point close to the seat of fire;
- to protect the escape areas of the parking.

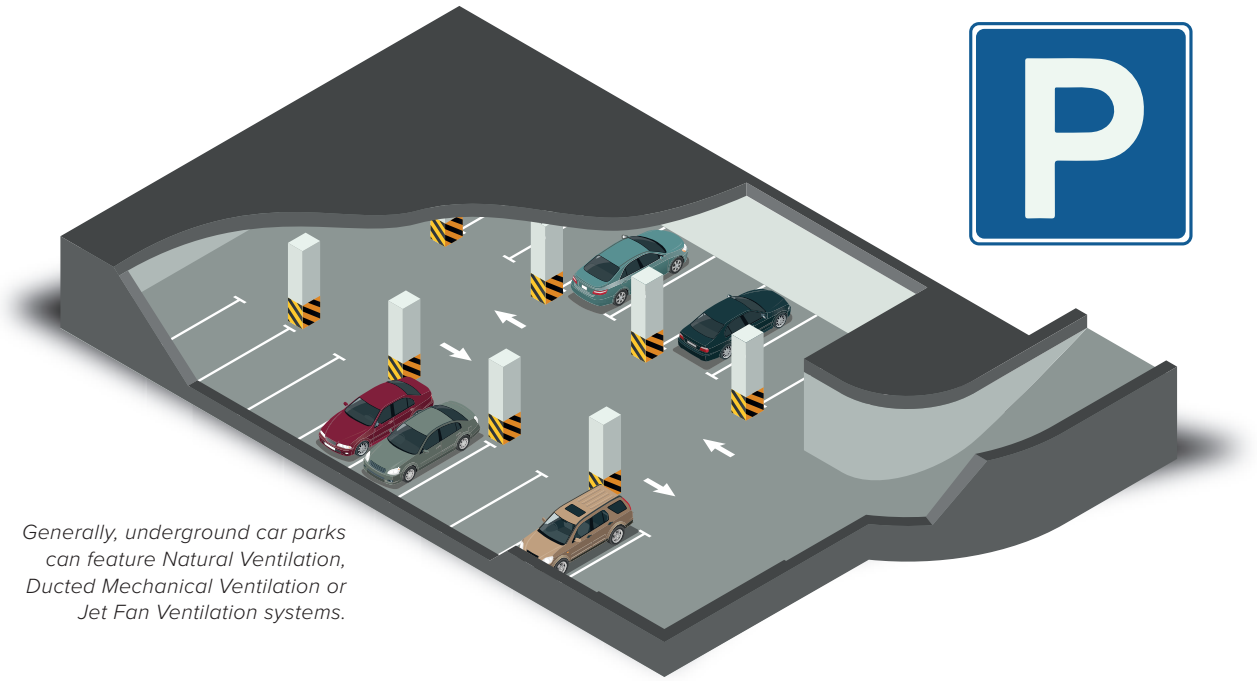
Ventilation under fire conditions:
The minimum airflow rate for a mechanically ventilated car park is 10 air changes per hour under fire conditions. Naturally ventilated car parks require a minimum 2.5% of the net floor area of the car park in openings linked directly to atmosphere with at least 50% of the opening being split between two opposing walls.

Minimum requirements for the day-to-day ventilation of mechanically ventilated car parks:
The maximum permissible carbon monoxide level is 30 ppm averaged over eight hours, with levels not exceeding 90 ppm for 15 minutes.

Here below some standards requirements communally asked:

- **BS 848-10**
  Fans for general purposes
  Part 10: Performance testing of jet fans;
- **BS 5839-1**
  Fire detection and fire alarm systems for buildings
  Part 1: Code of practice for system design, installation, commissioning and maintenance.
- **BS 5588-12**
  Fire precautions in the design, construction and use of buildings
  Part 12: Managing fire safety.
- **BS 7346-4**
  Components for smoke and heat control systems
  Part 4: Functional recommendations and calculation methods for smoke and heat exhaust ventilation systems, employing steady-state design fires - Code of practice.
- **BS 7346-5**
  Components for smoke and heat control systems
  Part 5: Functional recommendations and calculation methods for smoke and heat exhaust ventilation systems, employing time-dependent design fires - Code of practice.
- **BS EN 12101-3**
  Smoke and heat control systems
  Part 3: Specification for powered smoke and heat exhaust ventilators

Ventilation systems in underground car parks



Generally, underground car parks can feature Natural Ventilation, Ducted Mechanical Ventilation or Jet Fan Ventilation systems.

Natural ventilation

Natural Ventilation requires the presence of openings on sides of the car park to ensure transverse ventilation. Usually, this kind of ventilation is used in aboveground car parks, but can also be used in small underground car parks, whose design includes large ventilation shafts.
However, this solution suffers the strength and direction of the wind, which influences the fume extraction direction and makes it impossible to ensure the number of air changes required for keeping pollutants below the safety thresholds.

Ducted ventilation

Ducted ventilation requires the use of fans through ducts designed in compliance with specific standards to extract polluted air and in case of fire, smoke. Outdoor fresh air can be supplied through negative pressure additional ducts serving other fans or via natural openings outside wards. The effectiveness of this type of system depends on the position of the ducts and grilles, which must be distributed evenly to prevent air stagnation and ensure healthiness and safety in case of fire.

Jet fan ventilation

The **Jet Fan Ventilation** (also known as impulsion or and induction ventilation) is based on non-ducted axial or radial fans placed near the car park's ceiling.
As the ventilation systems installed in road tunnels, this type of fans move huge amounts of air at low speed through the generated streams. In thus way, they supply outdoor fresh air and extract pollutants and smoke in case of fire.

Why ventilate with Jet Fans

Jet Fans technology is now the standard in car park ventilation in many countries all over the world; its concept is based on an air stream injected by a number of free-blowing silenced axial fans or radial fans effectively moving air on each car park level from the supply to the exhaust points, graviting proper on ventilation, smoke exhaust and control of smoke spreading. Compared with traditionals natural and ducted ventilation systems, Jet Fans ensure a series of benefits, such as:

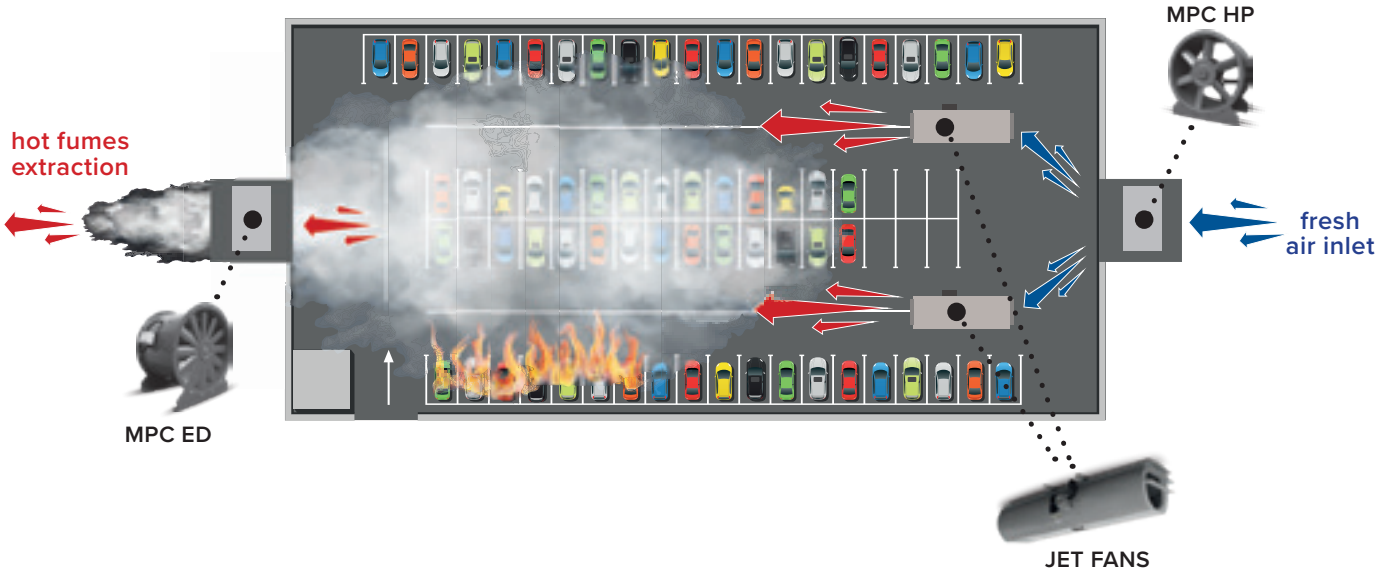
Efficient control of the propagation of smoke in case of fire

When suitably positioned in the car park, the air stream resulting from Jet Fans help to limit the amount of smoke near the fire ignition point, preventing fire from propagating in the neighbouring areas, while promoting the extraction towards the extraction points and keeping the emergency exits clear.
In this regard, more than the hourly flow rate, the parameter that most influences the choice of Jet Fans suitable for a specific application and their installation is the thrust, intended as product N = V * Q * **ϱ**, where: **V** = air speed (m/s); **Q** = volumetric flow rate (m^3/s); **ϱ** = air density (kg/m^3)

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

Utmost efficiency and low noise emissions

The operation of a Jet Fan ventilation system is adjusted by sensors that monitor the amount of CO, temperature levels, and the presence of smoke. These sensors can start the right number of fans at appropriate speed to meet specific ventilation requirements or to manage the fire, preventing energy waste and reducing sound emissions.



Reduced consumptions and thus low operating costs

The need to keep pollutant rates constantly below the thresholds through mechanical ventilation systems leads to high management costs. Ducted ventilation systems combine performance, overall dimensions and operating costs. However, they also require high air speed, which results in load losses in the ducts and thus high consumption. On the other hand, in a Jet Fan ventilation system it is the car park's architecture that conveys the air without reduced cross sections. For this reason the air can be moved at lower speeds thus ensuring significant energy savings.

Construction cost savings and efficient use of the car park's space

Jet Fan ventilation systems do not require bulky ventilation ducts, reducing useful indoor space and requiring the installation of oversize fans to overcome pressure losses.
That's why they are worth the cost of the installation of electronic controls and relative wiring. Furthermore, induction Jet Fans feature reduced height. That's why they further promote the design of low car parks and maximise the overall available volume. Their reduced thickness allows for the quick identification of the fire ignition point, as surveillance video cameras have a clearer visual. Moreover, Jet Fan ventilation systems allow for a virtual partition of the car park through the so-called "fire zones", in which smoke is confined without propagating to other areas. Therefore, fire walls are no longer required as in the past, and there is more space available for parking the vehicles.

High air quality inside the car park

The correct position of a set of Jet Fans inside a underground car park ensures a sufficient air exchange rate for maintaining the level of CO below the threshold and preventing the stagnation of exhaust gas. The flows induced near the ceiling promote the room air recirculation without bothering the occupants like high-speed streams do.

Jet Fan ventilation systems. How they are made

Jet Fan ventilation systems consist of:

- **Jet Fans,** installed on the car park's ceiling.
- **Main fans,** placed on the supply and extraction points.
- **Motorised dampers,** placed along the car park's perimeter, or ducts communicating with the outside.
- **Switches** (on/off)
- **Sensors** to detect CO, smoke, and heat.
- **Fan control unit**, mananging 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.

Moreover, in case of fire, the electronic control unit promotes the restriction of the smoke in the ignition area and its removal without affecting the occupants.

Types of Jet Fans

Jet Fans are divided into two macro categories: **Impulse Jet Fans**, which consist of an **axial fan**, usually with die-cast aluminium blades, and **Induction Jet Fans**, which feature a **centrifugal impeller** with metal backward-curved blades.

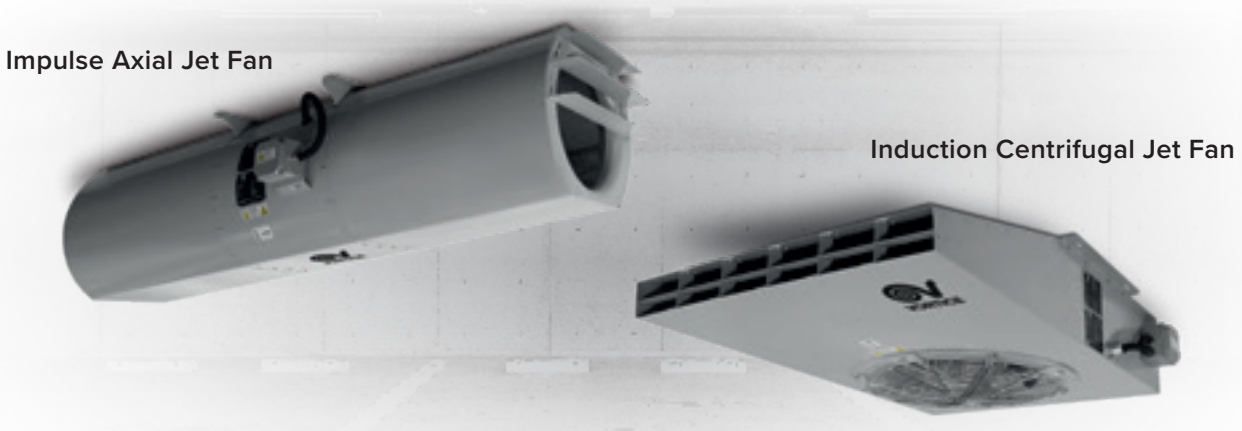
They are usually equipped with 2-speed motors to promote lower consumption and sound emissions during normal operation in ventilation mode; in the meantime allowing for high flow rates to prevent fumes from propagating and ensure quick removal in case of fire. As per law, they are certified (as any fan intended for the treatment of high-temperature fumes) by a third-party authority in compliance with the EN 12101-3 standard.

The certification takes into consideration a series of classes based on the maximum fume temperature and the continuous operating time admitted. Due to the lack of a European Regulation, every EU member state has set different classes. The most popular are F300/120 (indicated in the British regulation BS7346-7:2013 and implemented in Italy, and F400/120, corresponding to a 2 h (120') continuous operation when used to extract fumes at 300 °C and 400 °C, respectively.

Induction Jet Fans also feature two end silencers to minimise sound emissions and thus improve the occupants' comfort during normal operation in ventilation mode.

They also have two deflectors, placed near the delivery, to optimise the circulation of air within the car park. This type of Jet Fans are available with different nominal diameters (315 mm, 335 mm, and 400 mm) are the most popular ones. Moreover, their reversible versions allow for the installation of a reduced number of units, thanks to the possibility to reverse the jet flow.

Induction Jet Fans feature a over shorter height and a higher thrust, which make them particularly suitable for low-height car parks. Moreover, their laminar flow prevents turbulence.



Main fans

To promote the correct ventilation in a car parking, 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 ducts. Metal (die-cast aluminium) blades are commonly used due to the high flow rates required and the need to withstand high temperatures of a fire smoke. Main fans designed to extract hot fumes must be certificated by an independent authority in compliance with the EN 12101-3 standard.

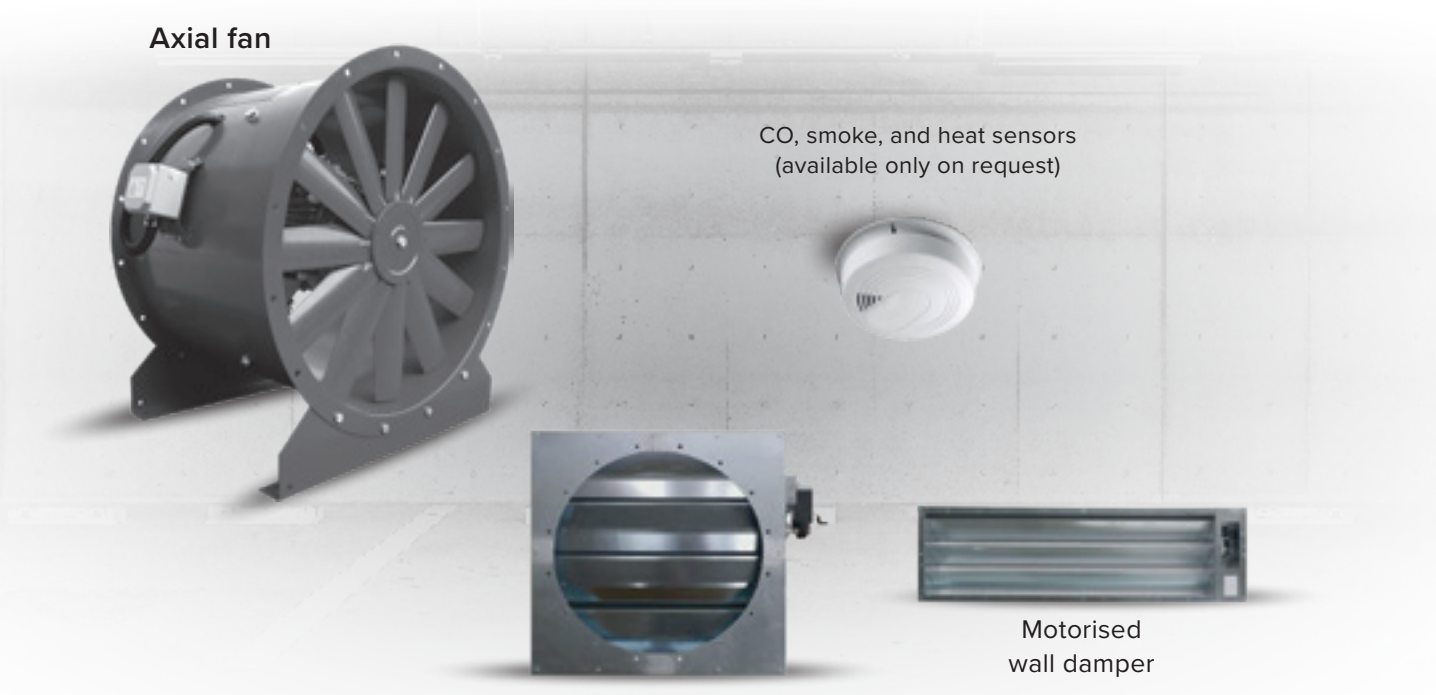
Motorised dampers

Motorised dampers must be installed near every main fan and outlets. They are automatically activated to prevent air leaks and short circuits while the fans are off, as well as the propagation of smoke in case of fire.

Sensors and switches

The correct operation of a Jet Fan ventilation system includes the automatic control of the installed fans, which must be activated at the correct speed and time to limit concentrations of CO and flammable mixtures. In this regard, Italy's law sets out a minimum ventilation rate equal to 3 changes/hour and the automatic start of the system when a sensor detects a concentration of CO >= 100 ppm, or when two sensors simultaneously measure concentrations of CO >= 50 ppm, or when one or more sensors detect concentrations of flammable mixtures > 20% the lower flammability limit.

Moreover, in case of fire, as an alternative to the control via sprinklers, the fans can be managed by a series of smoke and/or heat sensors. The system must also include a series of on/off switches, whose operation is controlled by the fire brigade.



VORT JET FAN SYSTEM

Fan control unit (FCU)

The fan control unit is an integral part of the Jet Fan ventilation system. FCU is designed to independently control every storey of the car park it based on a PLC (Programmable Logic Controller) and includes a control panel and a series of frequency speed controllers (inverters) to adjust the main fans' speed depending on requirements:

- In **Ventilation mode**, the FCU makes Jet Fan start at the lowest speed and adjusts the speed of the main fans based on the concentrations of CO and flammable mixtures.
- In **Fire mode**, which can be automatically activated by the car park's safety system, by the smoke and/or heat sensors serving the control unit, or by the fire brigade, the FCU automatically sets Jet Fans and main fans to their maximum speed. Both the Jet Fans and main fans must restrict the area involved in the fire, limit the propagation of fire and leave the emergency exits clear Usually, Jet Fans are activated slighly later the main fans to prevent smoke from propagating outside the "fire zone".

The whole system can be traced by the BMS; there must be a manual emergency start at the MCC (Motor Cable Center) panel.

Design Criteria

An efficient Jet Fan ventilation system depends on correct design and planning, which cannot disregard the car park's layout, as well as its main charateristics, type (underground or aboveground), number of rooms, overall surface, height, number and layout of the access ramps, position of openings and extraction ducts and emergency exits.

Commonly, every storey of a car park is divided into sections (fire zones) within which any fire that breaks out must be restricted. The presence of ventilation ducts near the emergency exits ensures the required amount of fresh air to facilitate the evacuation of the occupants. Other ventilation ducts, opposite to these ones, can be positioned to extract the fire smoke. Jet Fans provide horizontal ventilation flows free from air recirculation and featuring even speeds.

In particular:

- Every fire zone must include a smoke extraction point.
- The ventilation system must ensure an air speed equal to or lower than 5 m/s near the access ramps and emergency exits.
- Input fresh air speed must never exceed 2 m/s to prevent smoke from propagating.
- The volume of air moved by the Jet Fans system must not exceed that of the extracted air.
- Fresh air flow rate must be lower that the extracted air flow rate (usually, the ratio is 7:10).
- Each fire zone must be kept under negative pressure to prevent smoke from propagating.
- Jet Fans delivery must not interfere with the sprinklers' jets so as not to affect their effectiveness.
- For safety reasons, air flow rate of the main fans must exceed by at least by 50% the design values.

Vortice supporting customer

Supporting Customers all over the world: this is one of the milestones of the Vortice® Group philosophy; for this reason, the Vortice® Technical Pre-Sales Service is available to recommend the most suitable products or systems for different needs.

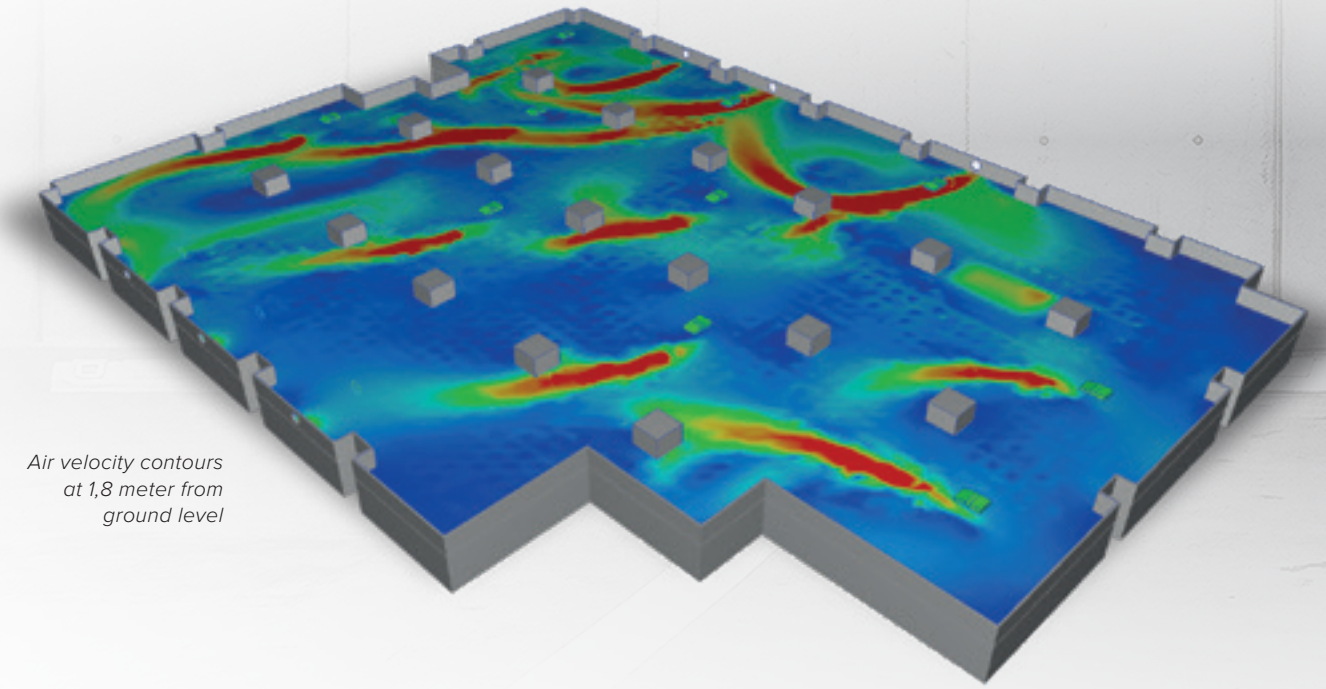
Customer Service becomes fundamental for the design of a ventilation system for garages/parking lots.

From the beginning of the project, Vortice® is at customer's side for choosing the most suitable solution: site visits for preliminary checks (if required), development of the system according to the designer's specification, airflows study using CFD (Computational Fluid Dynamics), often required by regulations and by the security control authorities.

Computational Fluid Dynamics (CFD)

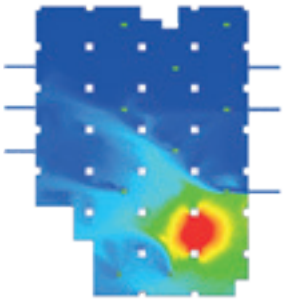
Properly to design and plan a ventilation system for car park, Computational Fluid Dynamics (CFD) analysis is a valuable tool since it allows to predict in a very precise way the flows of hot fumes generated by the fire over a period of time.
The space to be analysed is divided into different thousands of cells (mesh) using specific mathematical models to be generated thanks to real field experiences.

With a CFD analysis, it is possible to visualise the air flows and smoke trails, to predict their distribution in the various areas of the car park, to simulate some propagation base on the fire ignition point and to study the influence Jet Fans may have if differently positioned.
In this way the designer can optimise the number and layout of Jet Fans and avoid useless and expensive oversizing. Once the system is installed, it is a good



Air velocity contours at 1,8 meter from ground level

practice to carry out a test to check to which extent the system can limit the smoke in the fire ignition area and remove it from the car park without obstructing the emergency exits.
To demonstrate that the ventilation system is adequate and effective VORTICE® provides the CFD modelling and a full technical report to obtain the approval of local authorities prior to installation.



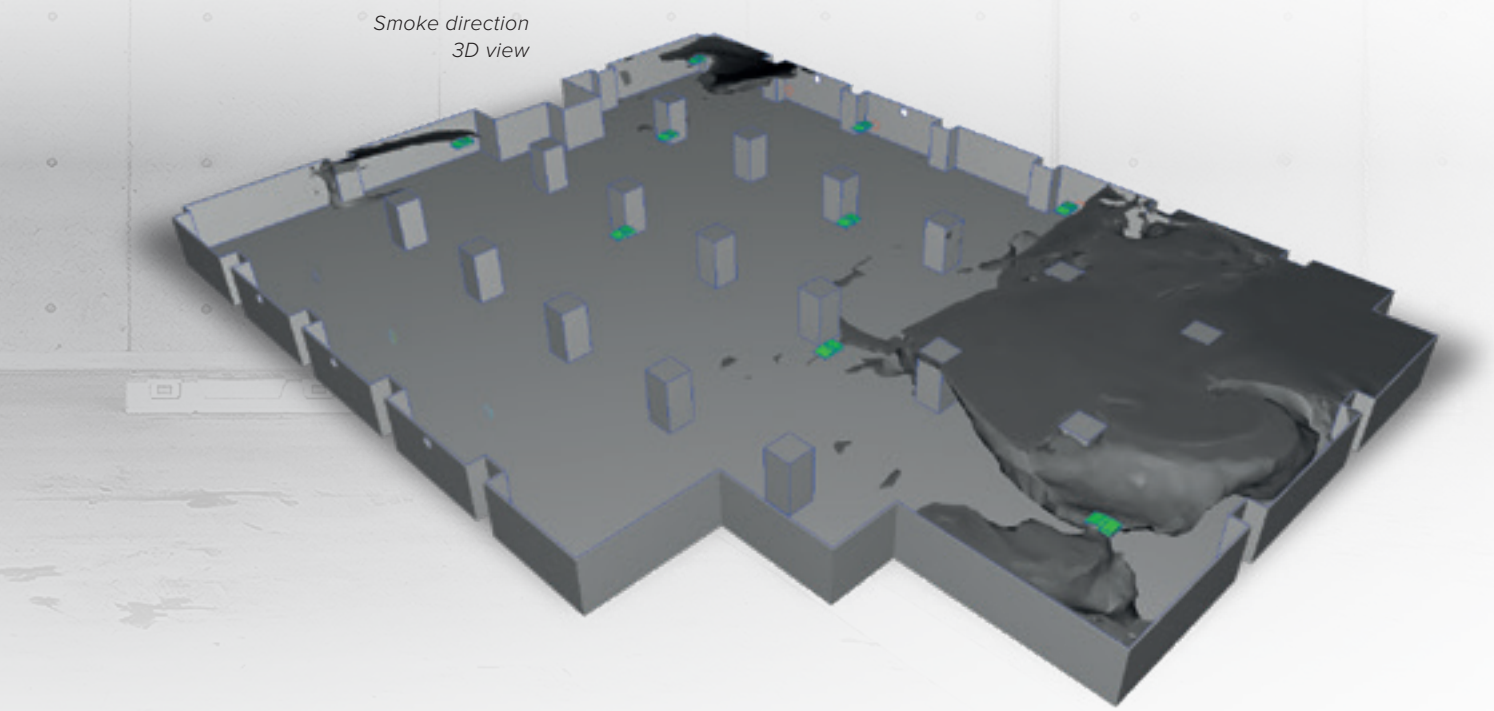
Air temperature contours, taken after 10 seconds from fire ignition

Air temperaturecontours, taken after 5 minutes from fire ignition

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**
- **The final results of the analysis**

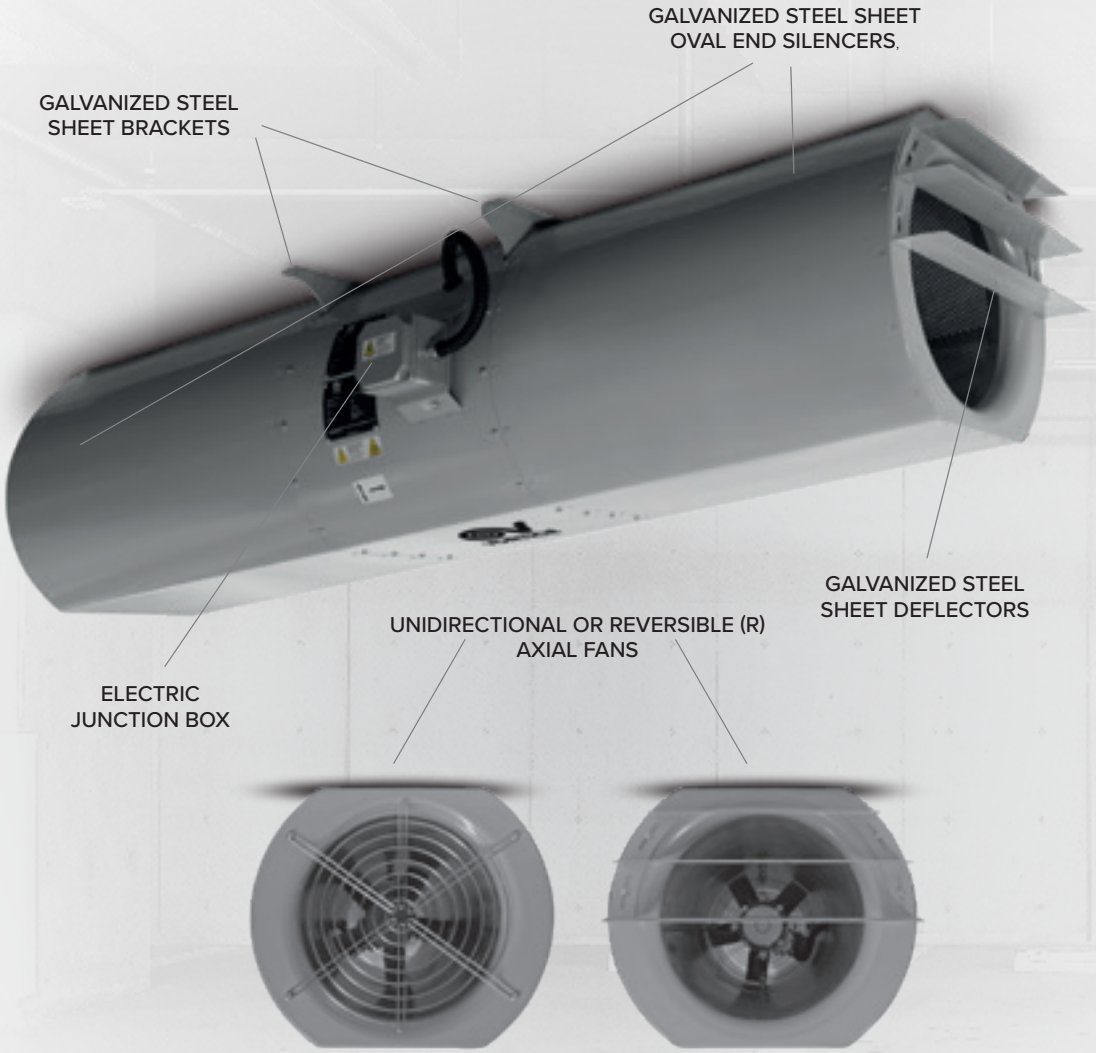
Smoke direction 3D view



VORT JET-A Range

Impulse axial jet fans

- 8 models, different in size, performance and functions.
- Construction in galvanized steel sheet.
- Unidirectional or reversible (R) axial fans with impellers of nominal diameter of 315, 355 and 400 mm, with die cast aluminium airfoil blades, studied to optimise aeraulic efficiency, reduce turbolences and thus contain consumption and noise emissions.
- Double speed, three-phase induction motors with shafts mounted on ball bearings (Dahlander).
- Galvanised steel sheet deflectors on the delivery side and galvanized steel grille in correspondence with the extraction side, to prevent damage to persons and prevent the intake of foreign bodies. Reversible models (R) are equipped with a pair of galvanised steel deflectors with protection grilles.
- Galvanized steel sheet brackets for ceiling installation, supplied as per standard with the product.
- Galvanized steel sheet oval end silencers, to contain clearance. Designed to guarantee correct laminar flow of the air handled. Rock wool sound-proofing lining, density 80 kg/m^3.
- Electric junction box mounted outside the product, easy to access for correct wiring of the product to the mains.



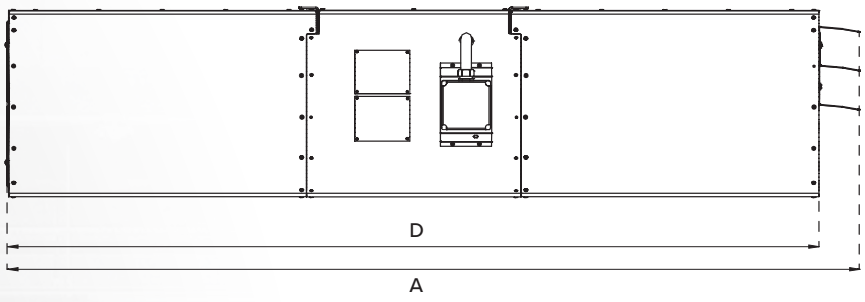
TECHNICAL DATA

PRODUCTS	CODE	Diam. Ø (m)	V~50HZ	Motor Power (kW)	A min/max	Poles	Flow rate m³/h min/max	Air speed (m/s)	Lp dB(A) min/max @ 1 m	Class.	Thrust (N)	KG
VORT JET-A 315/2	45641	315	400	0.24 0.96	0.72 2.3	2/4	2250 4500	16 8	66 48	F300-120	24 6	114
VORT JET-A 315/2 R*	45643								67 49			115.2
VORT JET-A 355/2	45645	355	400	0.3 1.32	0.96 2.99	2/4	3500 7000	20 10	70 53	F300-120	45 10	123.4
VORT JET-A 355/2 R*	45647								71 54			124.6
VORT JET-A 400/2	45649	400	400	0.3 1.32	0.96 2.99	2/4	4100 8200	18.2 9.3	63 50	F300-120	50 13	139.3
VORT JET-A 400/2 R*	45651								64 51			140.5
VORT JET-A 400/2 S	45653	400	400	0.6 2.64	1.85 5.56	2/4	5325 10650	11.8 23.7	54 70	F300-120	50 12	148.3
VORT JET-A 400/2 S R*	45655						5000 10000	11.2 22.3	71 55		96 17	149.5

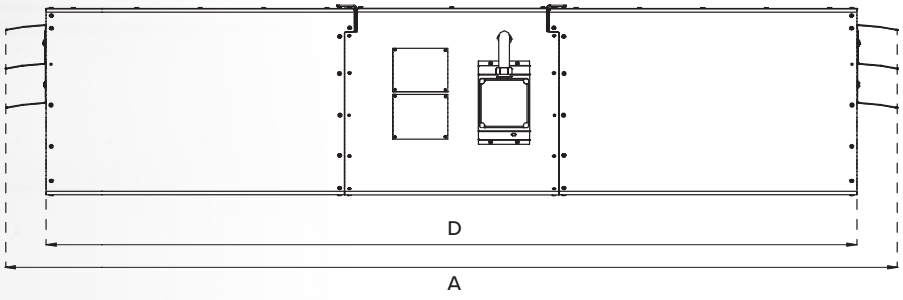
*Reversible models

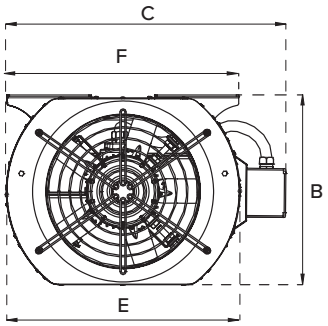
DIMENSIONS

Serie VORT JET-A



Serie VORT JET-A R





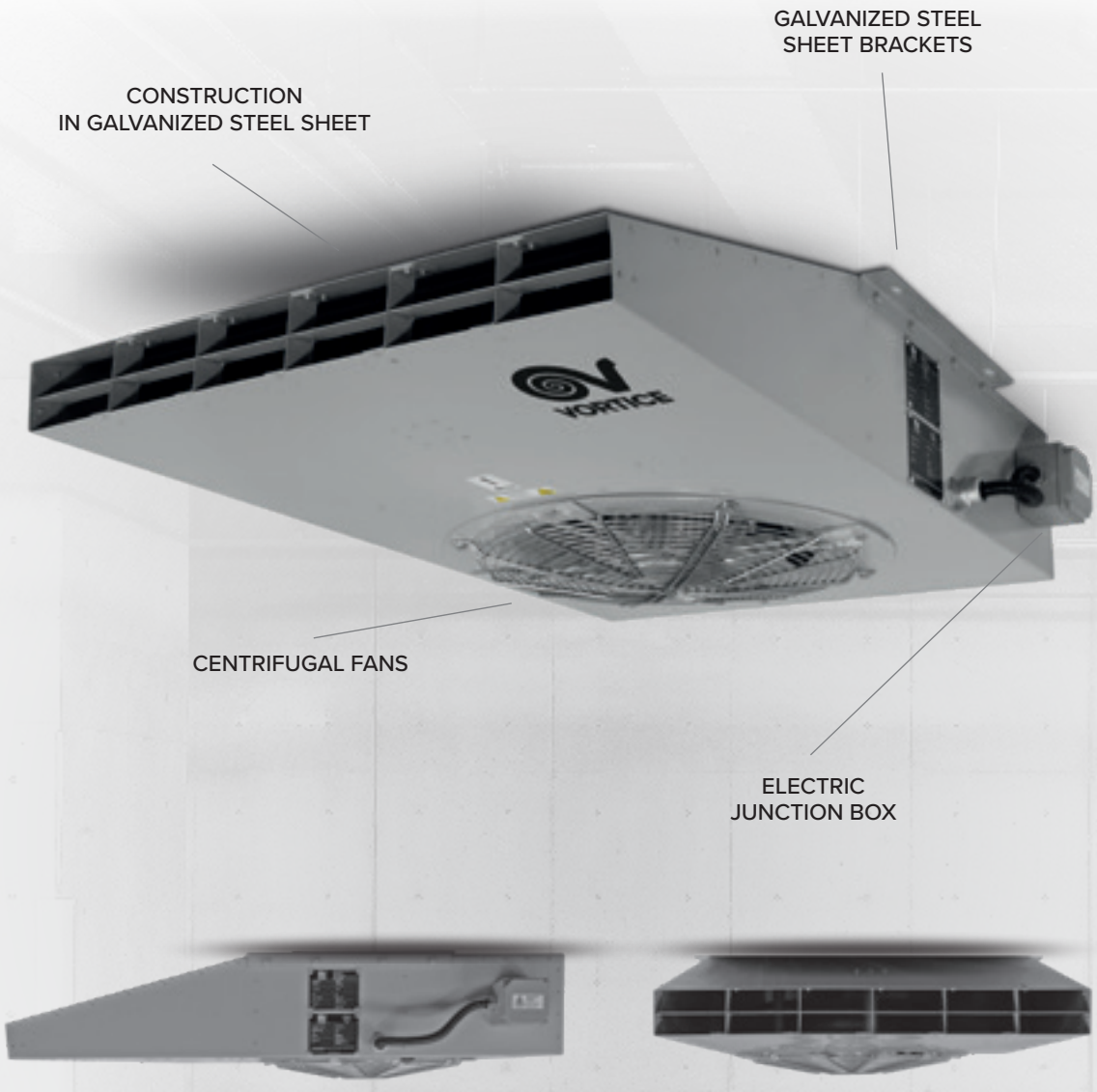
PRODUCTS	A	B	C	D	E	F
VORT JET-A 315	1747	389	572	1661	478	475
VORT JET-A 355	1907	444	613	1821	514	515
VORT JET-A 400	2087	488	659	2001	562	560
VORT JET-A 315/2 R	1827	389	572	1661	478	475
VORT JET-A 355/2 R	1984	444	613	1821	514	515
VORT JET-A 400/2 R	2167	488	659	2001	562	560

Dimensions (mm)

VORT JET-R Range

Induction centrifugal jet fans

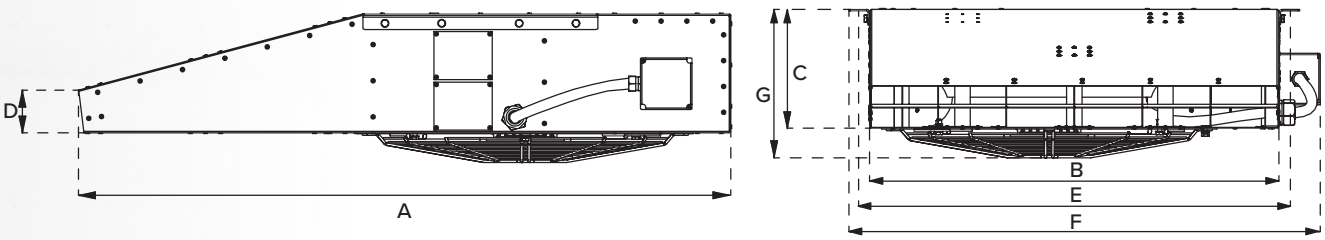
- 8 models, different in size, performance and functions.
- Construction in galvanized steel sheet, characterised by reduced thickness (height varies from 295 mm to 335 mm, depending on the model), to allow installation in premises with limited height.
- Centrifugal impeller with backward-curved blades, with nominal diameter of 560 and 630 mm, depending on the model.
- Double speed (Dahlander), three-phase induction motors, with shafts mounted on ball bearings.
- Galvanized steel sheet brackets for ceiling installation, supplied as per standard with the product.
- Electric junction box mounted outside the product, easy to access for correct wiring of the product to the mains.



TECHNICAL DATA

PRODUCTS	CODE	Diam. Ø (m)	V~50HZ	Motor Power (kW)	A min/max	Poles	Flow rate m³/h min/max	Air speed (m/s)	Lp dB(A) min/max @ 1 m	Class.	Thrust (N)	KG
VORT JET-R 560/2	45657	560	400	0.36 1.44	1.55 3.5	2/4	2858 5087	12.6 25.6	73 58	F300-120	50 12	83
VORT JET-R 630/2	45659	630	400	0.66 2.64	2.42 6.05	2/4	3830 9072	13.3 31.5	74 59	F300-120	96 17	143

DIMENSIONS



PRODUCTS	A	B	C	D	E	F	G
VORT JET-R 560/2	1265	795	230	80	837	920	295
VORT JET-R 630/2	1830	1150	290	67	1200	1275	335

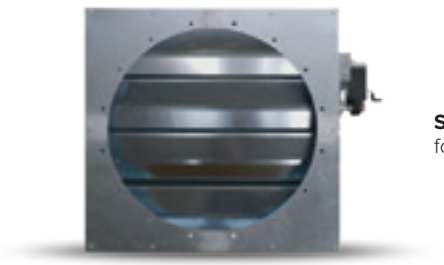
Dimensions mm

VORT JET FAN SYSTEM

SYSTEM ACCESSORIES

- **VORT JET CP** fan control unit, able to manage automatically the operation of the interlocked appliances (main fans, jet fans and dampers). The unit optimises operation based on the concentration of CO, prevents unjustified waste of energy during daily use and, at the same time, provides maximum performance in the event of a fire. The system may be integrated into a BMS - Building Management System and, when required, manually controlled from the LCD panel.
  it consists of:
  - Variable frequency speed controllers (inverters), to adapt the performance of the MCP HP and MPC ED fans installed in the car park to the effective requirement.
  - PLC (Programmable Logic Controller), programmed depending on the requirements of the specific system.
  - Touch screen control panel, for manual or automatic control of the system components.
  - Emergency Button, for manual start-up of the system if the automatic device fails to operate.
- **CO sensors**, for automatic management of the system depending on the concentrations of carbon monoxide.
- **Smoke sensors**, for automatic activation of the system case of fire.
- **Wall-mounted motorised dampers Motorised dampers for fans** designed to minimise pressure losses in the open position and leakages when closed. They are made of galvanized steel sheet and driven by servomotors that control opening and closing. They act as back-draught shutters and prevent unwanted short-circuiting of air flows when installed near the extraction or supply of MPC-HP and/or MPC-ED fans, in case they are mounted very close to each other.

ACCESSORIES

MODELS	DESCRIPTION			CODE
	**SRM** - Galvanized steel sheet motorised rectangular dampers for wall installation The dampers are available in many heights, varying in steps of 200 mm, equal to the height of the individual fin, up to a maximum of 2000 mm. They are also available in various lengths, in the range of 200 mm and 2000 mm in steps of 50 mm.			-
	**SCM** - Galvanized steel sheet motorised circular dampers for installation on walls and coupled with axial fans.	SCM-400	Ø 400	21438
		SCM-450	Ø 450	21439
		SCM-500	Ø 500	21440
		SCM-560	Ø560	21441
		SCM-630	Ø 630	21442
		SCM-710	Ø 710	21443
		SCM-800	Ø 800	21444
		SCM-900	Ø 900	21445
		SCM-1000	Ø 1000	21446
		SCM-1120	Ø 1120	21447
		SCM-1250	Ø 1250	21448
		SCM-1400	Ø 1400	21449


C07
C07
C07
C07

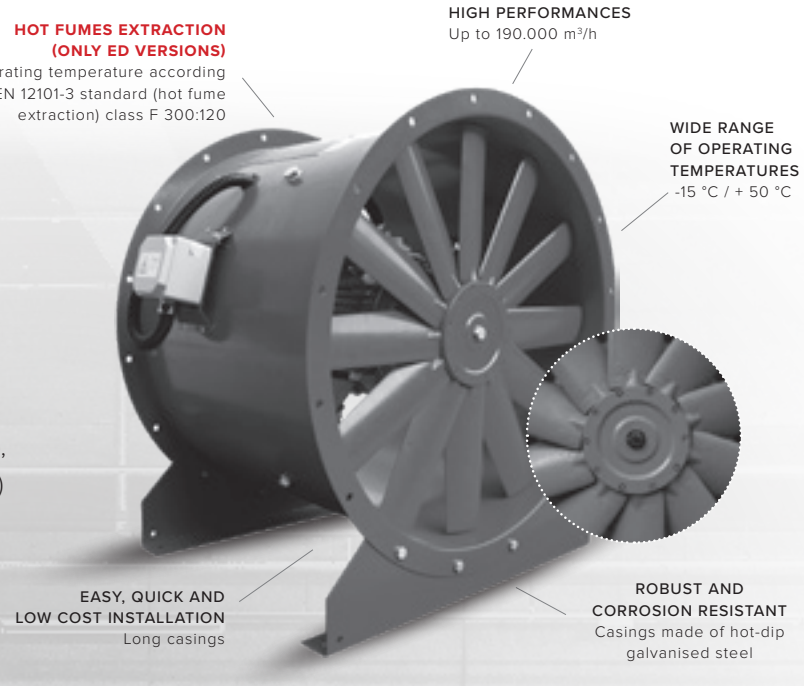
MPC HP and MPC EC Range

Fully cased axial flow fans

MPC HP are fully cased axial fans, MPC ED are dual role (ventilation and hot fumes extraction), fully cased axial fans, certified F300/120 in compliance with EN 12101-3 standard. Both ranges combine high performances with high efficiencies. Impellers are dynamically balanced to minimize vibrations and assure smooth operation; blade pitch angles can be adjusted (in factory) to offer performance flexibility. Compatible with both horizontal and vertical installation, fans of MPC HP and MPC ED series are designed to meet the ventilation requirements of large commercial and industrial environments.
The range consists of 12 (from 400 mm to 1.400 mm), nominal diameters; air-flows are up to 190.000 m³/h (52.8 m³/s); each diameter is provided in a number of variants, including different number and pitch angle of the blades, size and number of poles of motor and length of casing, so as to cover a wide range of application needs.

- Hot deep galvanized sheet metal casings for a long lasting protection against corrosion;
- Die-casted impellers; aerofoil-shaped blades to combine high efficiency and low noise; manually adjustable (in factory) blade pitch.

- Three-phase, 2 or 4 poles (depending on model), F class (MPC HP) or H (MPC ED) insulated, IP55 protected, motors. Three-phase, two speed (Dahlander) motors (2/4 and 4/8 poles) available on request.
- IP67 terminal box mounted externally, outside the air-flow.



ACCESSORIES

SLE/SLE-P
Silencers/
Sllencers with pod

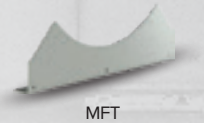
NRD
Rubber in share
anti-vibration mounts

XS
Enclosed spring
anti-vibration mounts

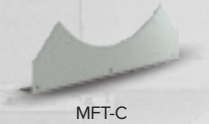
MFL
Galvanized
counter flanges

MSC
Galvanized
wire guard

EBY-ED
Circular flexible connections,
resistant up to 70 °C



MFT
Mounting brackets made
of hot-dip galvanized steel



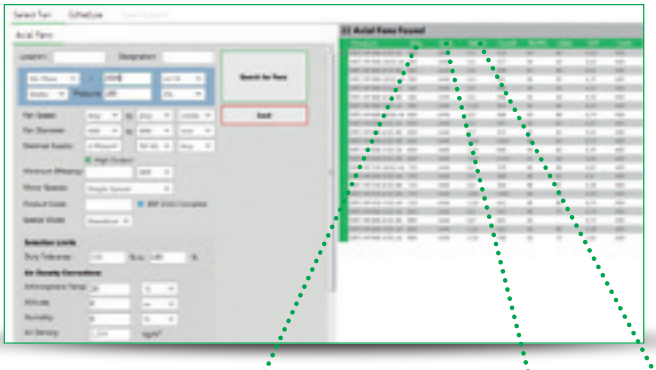
MFT-C
Mounting brackets made
of epoxy coated steel

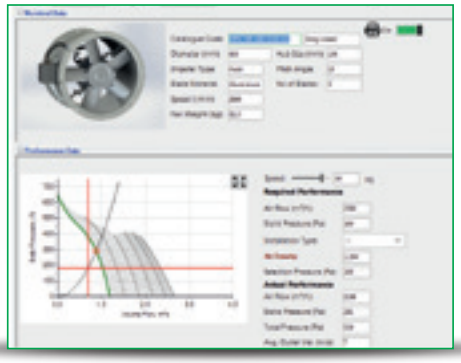
IRET INVERTER
Frequency inverters

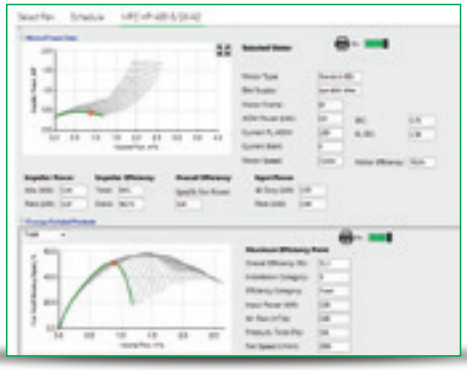
Vortice fan selection

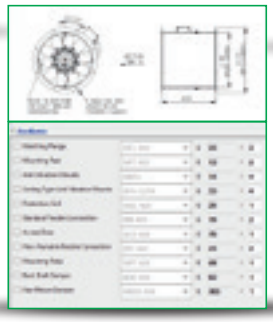
Our selection program allows customers the ability to select the right fan starting from the duty point (flow rate and static pressure) in case MPC HP and MPC ED. The fan selection process has been designed for easy customer use.
Fans can be selected from categories ranging from “MPC HP” to “MPC ED” to "VORT JET". These categories can be further broken down into diameter, prices and efficiency.
Once the product categories/types are selected and the operating conditions are entered, the program searches across all available products meeting the selection criteria.

Once a fan is selected, the user has the option to view its technical data, its performance curve (if any) and its identification code, print the results or save the selection for future use. In addition, he can create a drawing for the selected fan. The software allows the user to specify a very detailed list of input data and parameters. It enables also a very detailed and specific selection, giving the user the possibility to specify a wide range of information for the fans to be selected In a very quick and straightforward way, the software propose a set of fans that match the input criteria.









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