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# VENTILATION SYSTEMS FOR UNDERGROUND CARPARKS

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FALVENT Industrial Company is a Saudi rising company focuses its business activity on the manufacture of industrial fans, ventilation systems and smoke exhaust fans, which integrates in development, manufacturing, installation, sales and after-sales services with its own factory and the strategic cooperation with main advantage manufactories, FALVENT has served and developed the professional ventilation solutions for their customers.

✉ [info@falvent.com](mailto:info@falvent.com)

☎ +966114600607

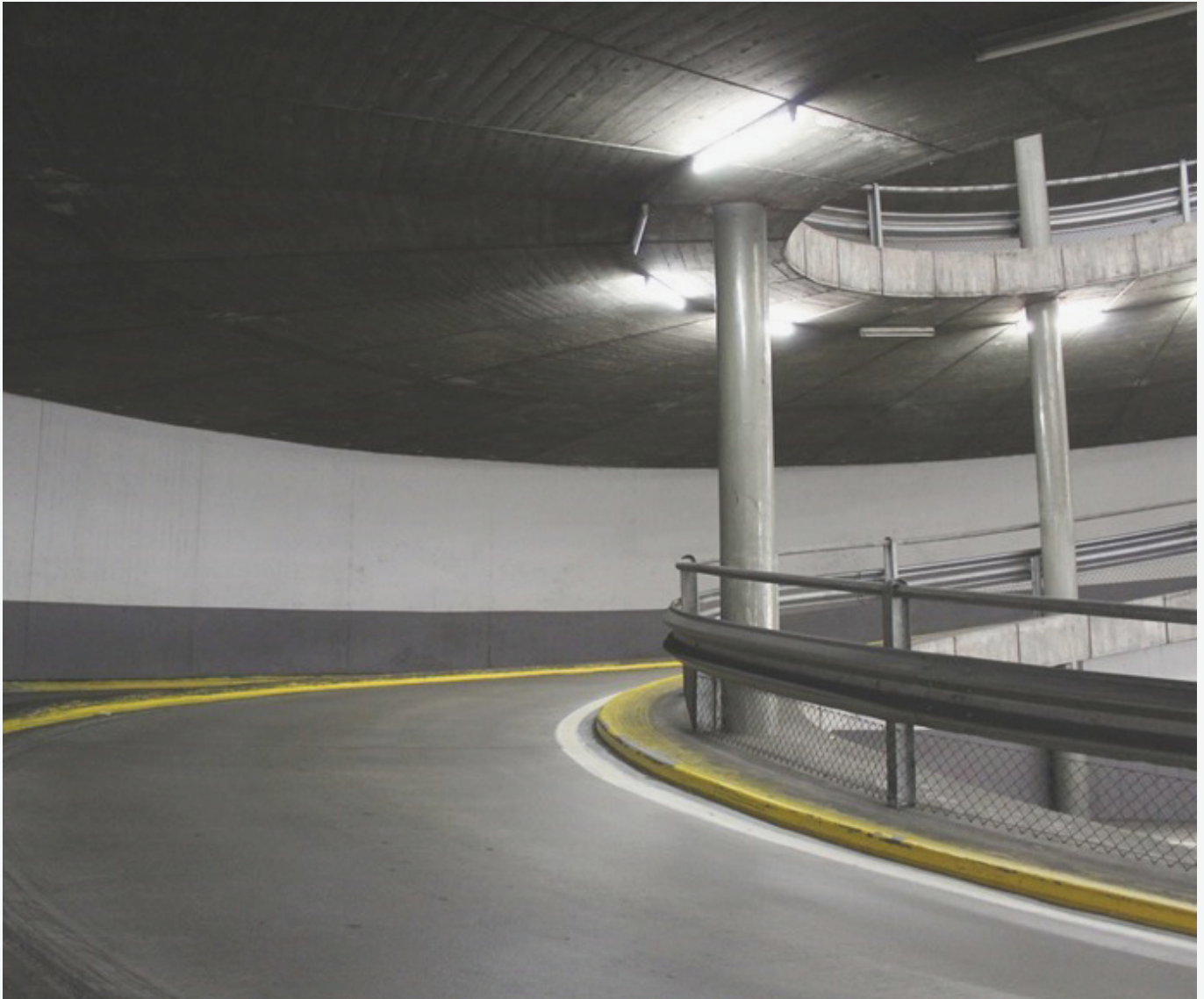


# CAR PARKS VENTILATION OVERVIEW

Underground parking plays a variety of roles in our daily lives, not only for saving ground space and clearing it of cars, but also allows to park a lot more vehicles. It can also allow a lot more storage space.

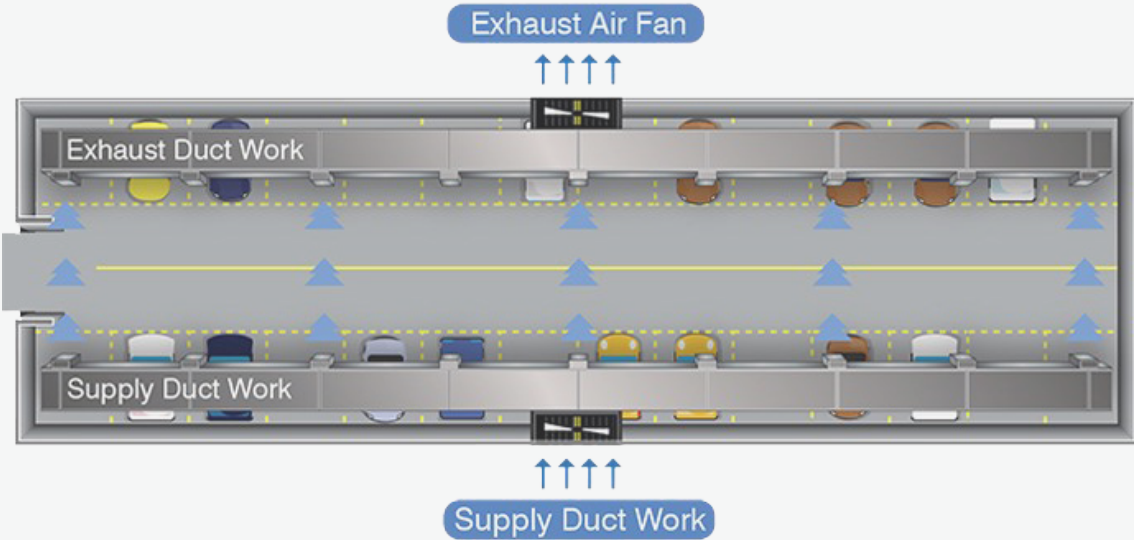
Underground car parks are generally unable to vent toxic exhaust fumes naturally, and the same is true of harmful smoke if a fire breaks out, due to there not being enough openings for the natural ventilation hence the mechanical extract systems are required.

Mechanical ventilation must provide 6 ACH (Air Changes per Hour) under normal conditions. In the event of fire this rises to 10 ACH.



# DUCTLESS CAR PARKS VENTILATION SYSTEM

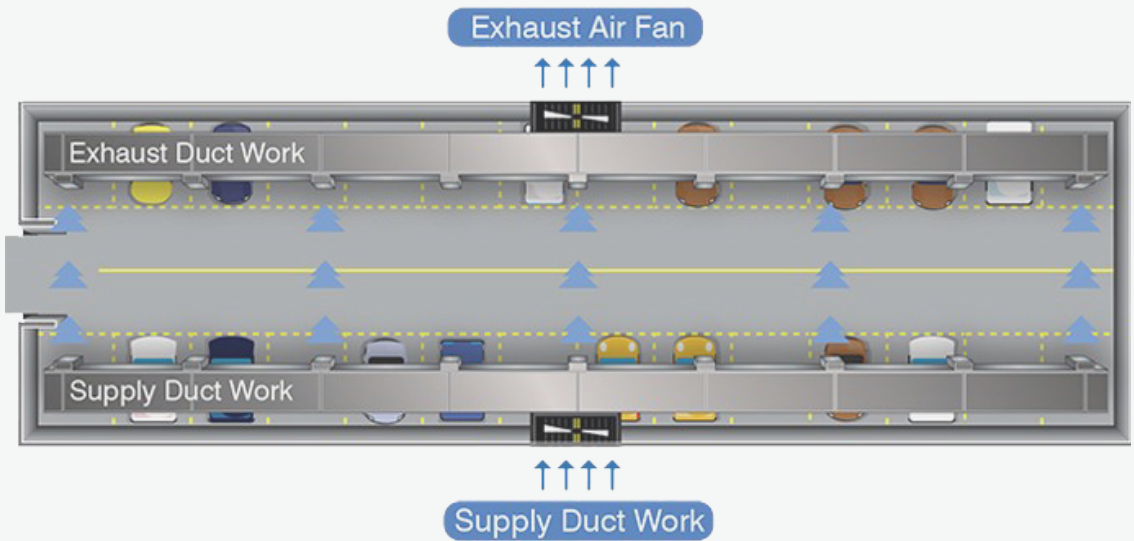
Rectangular or circular ducts that are used to move air from the intake/exhaust to the desired location but that demands a larger space for ducting installation but this is difficult under constraint of a normally limited space in car park.



# DUCTLESS CAR PARKS VENTILATION SYSTEM

Ductless designs use jet fans at specific locations over driveways to drive contaminants away without need for ducts as both to reduce levels of polluted air and to assist with the extraction of smoke in the event of a fire.

A jet fan is a long cylindrical fan that generates a high-velocity jet of compressed air ejecting from the trailing edge of the blade, resulting in the forward movement of air



## JET FANS VS DUCTED SYSTEM

The advantages of using jet fans, instead of a conventional ducted system, are:

- Less ductwork to install making coordination of services easier and with no obstruction to other services.
- Lower height required, resulting in savings in the construction cost.
- Lower emergency power required thus, a smaller emergency generator set is required.
- Lower running energy cost, due to lower static heads required for the main fans.
- Lower operating cost.
- The ability to identify the origin of fires.
- Better air movement.
- Ease of operation (zone control is possible).
- Generation of lower noise levels.
- More pleasing aesthetics.
- Less cleaning of ducts.
- Better air distribution through greater air movement within car parks.
- can be operated to be fully reversible to move the smoke in one of several directions, depending on the location of the fire.





# WHY WE ARE DIFFERENT

Falvent offers innovative and customized concepts for the ventilation and smoke exhaust for car parks. Jet fans, supply and exhaust fans, sensors and controls work hand in hand to react depending on the situation, to move the smoke out of the car park on the shortest way.

FALVENT work with a qualified consultants to delivery of projects on time, to an agreed cost and to the highest quality.

In order to optimize our solutions, we also use advanced CFD analysis to get an effective performance.

FALVENT cooperates with the strategic cooperation with main advantage manufactories to produce fans according to international manufacturing as well as in line with the Saudi market.

FALVENT starts working with its customers from the initial study of the carpark , in order to provide an optimal solution for each project.

Also, FALVENT has a technical assistance department with the following services:



**Installation and Erection**



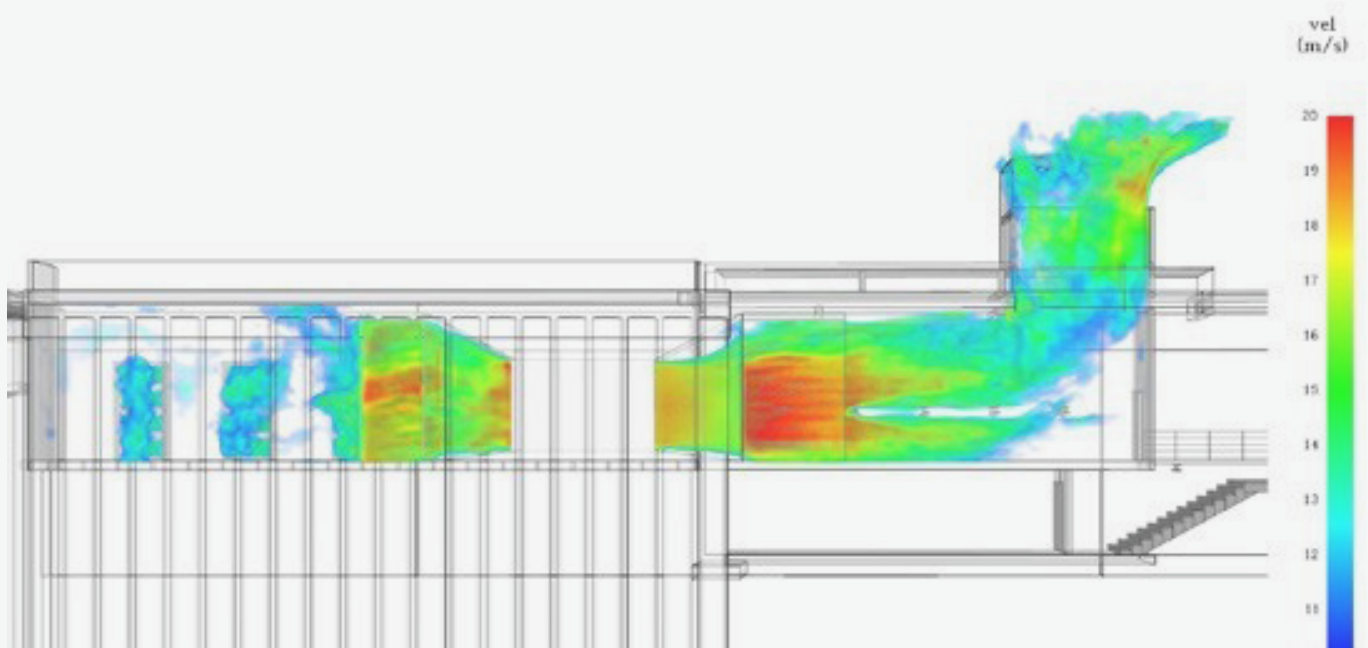
**Maintenance and Diagnostics**



**Testing and Commissioning**



**Spare parts and Upgrade**



# JET FANS AND MAIN AXIAL FLOW FANS

The jet fans and main flow axial fans can be used to clear the atmosphere inside the car parks and achieve the safe evacuation during the emergency case.

## CARPARK JET FANS (CFC SERIES)

- Casing made of Carbon steel with epoxy paint protective coating.
- and provided with an adjustable bench that allows a wide range of motors to be installed.
- The silencers are placed on both sides of the fan casing and made with 70kg/m<sup>3</sup> density rockwool and manufactured using perforated plate inside.
- and fitted with inlet and outlet cones designed for minimum pressure loss
- Protection guard for inlet and deflector in the outlet.
- Junction box on the casing for easy on-site wiring.
- Mounting support included.
- Impeller made of aluminum alloy
- Unidirectional or Reversible blade.
- TEFC Three phase motor, 380V/60Hz.
- Degree of protection IP 55.
- Class of insulation F.
- Efficient IEC standard motor, efficiency class IE2 or IE3
- Specific bearings for operating between 20,000 h and 100,000 hours.



# TECHNICAL CHARACTERISTICS

Model	Thrust Tc in N	Volume flow Qv in m <sup>3</sup> /h	Rated motor power in kW	Sound pressure level 3m in dB(A)	Sound power level in dB(A)	Item no
CFC 315 D2	28	4801	1,1	65	83	148040
CFC 315 D2 F3	28	4801	1,1	65	83	148041
CFC 315 D2 F4	28	4801	1,1	65	83	148042
CFC 315 D42	29/7	4912/2401	1,1/0,25	64/47	82/64	148043
CFC 315 D42 F3	29/7	4912/2401	1,1/0,25	64/47	82/64	148044
CFC 315 D42 F4	29/7	4912/2401	1,1/0,25	64/47	82/64	148045
CFC 355 D2 01	49	7197	1,5	70	88	148046
CFC355 D2 F3	49	7197	1,5	70	88	148047
CFC355 D2 F4	49	7197	1,5	70	88	148048
CFC355 D42	50/12	7049/3641	1,5/0,37	68/50	85/68	148049
CFC355 D42 F3	50/12	7049/3641	1,5/0,37	68/50	85/68	148050
CFC355 D42 F4	50/12	7049/3641	1,5/0,37	68/50	85/68	148051
CFC400 D2	85	10743	2,2	73	91	148052
CFC400 D2 F3	85	10743	2,2	73	91	148053
CFC400 D2 F4	85	10743	2,2	73	91	148054
CFC400 D42	87/22	10020/5502	2,2/0,5	87/22	91/72	148055
CFC400 D42 F3	87/22	10020/5502	2,2/0,5	87/22	91/72	148056
CFC400 D42 F4	87/22	10020/5502	2,2/0,5	87/22	91/72	148057

*The above mentioned value related to unidirectional jet fans.*

*For reversible jet fans will give approximately 5% lower thrust than those shown in the table.*

## MAIN AXIAL FLOW FANS (AXF SERIES)

Falvent assemble and design the finest axial fans on the market with competitive prices and our team works hard to ensure that you receive the highest quality custom-designed axial fans, precisely as ordered and delivered on time to meet your project goals.

The range of axial fan sizes and capacities cover low to medium pressure systems for ventilation as well as for removal and transport of air within practically all environments. Falvent axial fans obtained the UL Certification which guarantees the compliance of the products with the safety requirements. Falvent axial fans tested in accordance with UL-705 standard and certified in ZACT: Power Ventilators category and rigorous tests have been carried out via UL team like temperature test, water spray test, dielectric voltage test and starting current test.

Thus, Falvent axial fans have product safety certification UL logo.

Falvent has met the requirements in ISO 9001, which defines an ISO 9001 Quality Management System (QMS) and obtained the ISO certification accordingly.

Falvent axial fans has CE mark logo where it declared with EEE regulations and meets the requirements of the relevant European product safety legislation.





# TECHNICAL CHARACTERISTICS

Model	Impeller Dia	Max Air Flow		P <sub>out</sub>	Full Load Ampere	Voltage	Frequency	Phase	Speed	Noise Level
	mm	m3/hr	m3/s	(Kw)	(A)	(V)	(Hz)		rpm	db
AXF 315 D2 0.55	315	3250	0.90	0.55	1.26	380	60	3	3450	346805
AXF 315 D4 0.25	315	1550	0.43	0.25	0.739	380	60	3	1740	346806
AXF 315 D4 0.37	315	1760	0.49	0.37	0.96	380	60	3	1740	346807
AXF 355 D2 1.1	355	5880	1.63	1.1	2.33	380	60	3	3450	346808
AXF 355 D4 0.55	355	3100	0.86	0.55	1.23	380	60	3	1740	346809
AXF 400 D2 1.5	400	8600	2.39	1.5	3.09	380	60	3	3450	346810
AXF 400 D4 0.75	400	5150	1.43	0.75	1.71	380	60	3	1740	346811
AXF 450 D2 2.2	450	12750	3.54	2.2	4.45	380	60	3	3450	346812
AXF 450 D4 0.55	450	7100	1.97	0.55	1.23	380	60	3	1740	346813
AXF 500 D2 4.0	500	19630	5.45	4	7.6	380	60	3	3450	346814
AXF 500 D4 0.75	500	10400	2.89	0.75	1.68	380	60	3	1740	346815
AXF 560 D2 4.0	560	23400	6.50	4	7.6	380	60	3	3450	346816
AXF 560 D4 1.5	560	15300	4.25	1.5	3.15	380	60	3	1740	346817
AXF 630 D4 2.2	630	22100	6.14	2.2	4.72	380	60	3	1740	346818
AXF 630 D4 3.0	630	25400	7.06	3	6.98	380	60	3	1740	346819
AXF 630 D4 4.0	630	29250	8.13	4	8.03	380	60	3	1740	346820
AXF 710 D4 3.0	710	29400	8.17	3	6.98	380	60	3	1740	346821
AXF 710 D4 4.0	710	32600	9.06	4	8.03	380	60	3	1740	346822
AXF 710 D4 5.5	710	35100	9.75	5.5	10.4	380	60	3	1740	346823
AXF 710 D4 7.5	710	39150	10.88	7.5	14.2	380	60	3	1740	346824

AXF 800 D4 5.5	800	37450	10.40	5.5	10.4	380	60	3	1740	346825
AXF 800 D4 7.5	800	42550	11.82	7.5	14.2	380	60	3	1740	346826
AXF 900 D4 7.5	900	53000	14.72	7.5	14.2	380	60	3	1740	346827
AXF 900 D6 4.0	900	41500	11.53	4	8.99	380	60	3	1150	346828
AXF 1000 D4 15.0	1000	71850	19.96	15	28.7	380	60	3	1740	346829
AXF 1000 D4 18.5	1000	77100	21.42	18.5	33.9	380	60	3	1740	346830
AXF 1000 D6 5.5	1000	62270	17.30	5.5	12.5	380	60	3	1150	346831
AXF 1120 D4 18.5	1120	79800	22.17	18.5	33.9	380	60	3	1740	346832
AXF 1120 D6 7.5	1120	64900	18.03	7.5	15.9	380	60	3	1150	346833
AXF 1120 D6 11.0	1120	72400	20.11	11	22	380	60	3	1740	346834
AXF 1250 D4 37.0	1250	110650	30.74	37	66.1	380	60	3	1740	346835
AXF 1250 D6 15.0	1250	92400	25.67	15	28.3	380	60	3	1150	346836
AXF 1400 D6 30.0	1400	142500	39.58	30	58.8	380	60	3	1150	346837



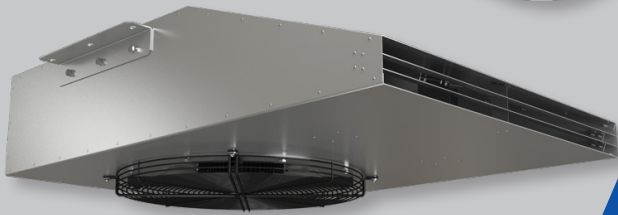
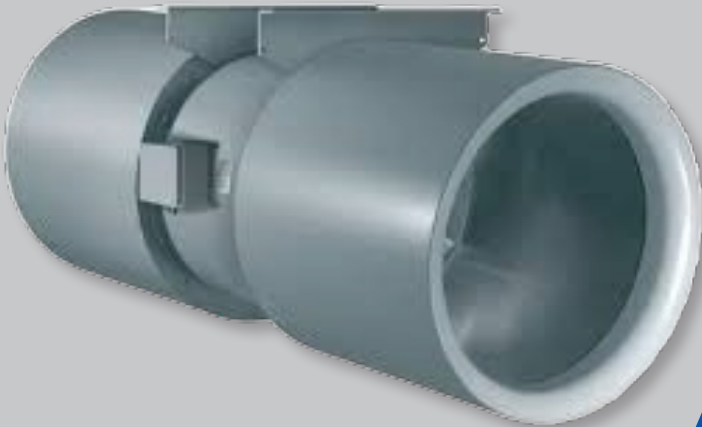


# VFD ROLE IN CARPARK VENTILATION

The variable frequency drive (VFD) controls the fan motor running achieve the effective control of the carparks ventilation fans as follows:

- Can be adjusted by the tunnel's overall control system to meet changing air flow needs during the day.
- Has a very significant impact on energy consumption. Very small speed changes can yield large energy savings – a speed reduction of 10% results in a 27% energy saving.
- Reducing fan speeds can also reduce noise levels – reducing the speed by only 20% will reduce sound pressure by more than 50%.
- Helps in evacuation and fire suppression promptly changing fan speed and rotation direction according to a need.





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## CONTACT US

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 Al Kharj Industrial City - Riyadh  
- Saudi Arabia

 +966114600607

 [info@falvent.com](mailto:info@falvent.com)