

JETVENT
AXIALS



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Impulse Ventilation

oxides
imes from vehicle fluids

JETVENT

Introduction

JetVent Axial Impulse fans have been specifically designed to provide a high velocity airflow to help overcome problems caused in part by obstructive structural beams and the low overall ceiling heights found in car parks.

The innovative design of the **JetVent Axial** Impulse fan has been proven to provide major benefits in terms of reduced installation and running costs as well as effective smoke running costs as well as effective smoke and contaminant movement. The Fan outlet Deflector shall be supplied on customer request, since its an optional accessory.



Excellent Performance & Safety

Technical excellence and innovation in application of our equipment are the cornerstones of any Elta product – Jet Vent is no exception to this approach.

The harmony of our engineering excellence and technical sophistication combine to provide a first - class product which meets demanding smoke, as well as general fume applications.

With tomorrow's technology at our finger tips, utilising market leading software, Elta can pinpoint, analyse and make design changes and improvements to our products without the expense of conventional prototyping, working with our customers to meet their specific needs.



Jet Vent: The principle

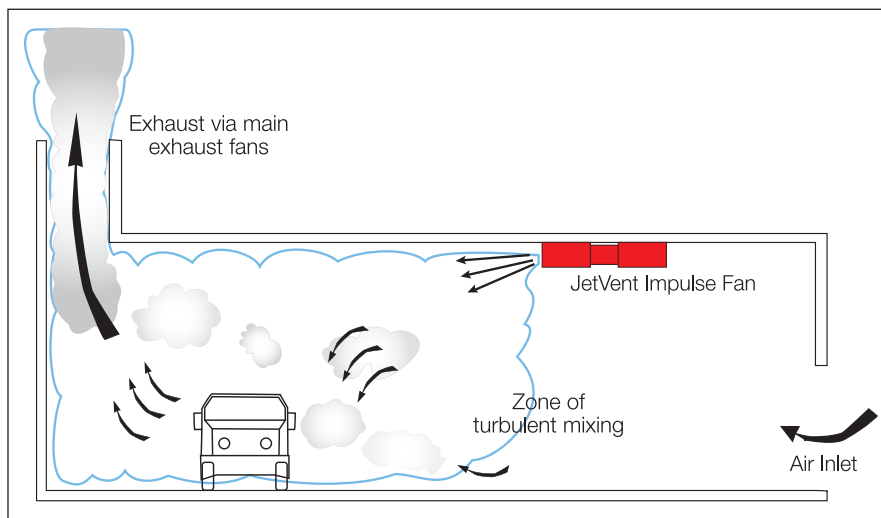
The impulse ventilation system is based on a number of small, strategically located high velocity fans in place of the large and expensive distribution ductwork traditionally used in car parks.

Impulse fans operate on well proven tunnel ventilation principles, producing a high velocity jet which adds momentum to the air in front of the fan imparting thrust to all the surrounding air via mixing and entrainment as it diffuses. The volume of entrained air is significantly greater than that passing through the fan.

The impulse fans are carefully positioned to direct the airflow towards the main extract fan intake points. The main extract fans are sized to provide the required flow rates, however, given the reduced need for, or complete elimination of the large, expensive ducting, the resulting reduction in system resistance means the exhaust fans are typically smaller and consume less energy.

Impulse fan performance is rated in terms of the thrust developed by the fan, which is the product of the mass flow rate times the change in velocity, i.e. volume flow rate times the air density times the fan outlet velocity and is measured in Newtons.

Figure 1.0: Impulse Ventilation. Section View: Discharge angled to efficiently move air



Why Impulse Ventilation?

There are a number of very obvious yet subtle differences between conventional mechanical and impulse ventilation systems, namely;

- The distribution ducting used in traditional systems (Figure 2.0) is replaced by a number of small JetVent impulse fans (Figure 3.0) to direct the airflow across the designated area.
- Without the distribution duct resistance, smaller exhaust and supply fans and / or motors can be used.

Figure 2.0 Conventional ducted system

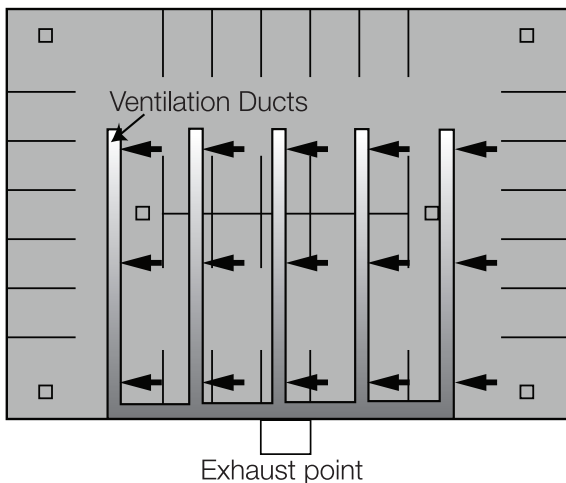
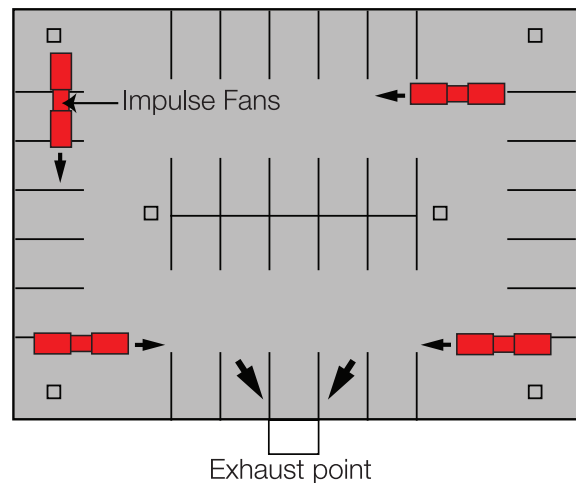


Figure 3.0 Equivalent impulse layout



Features & Benefits

The Jet Vent Axial Impulse fan range comprises several standard and non-standard sizes. They are provided with either uni-directional or truly reversible airflow, as well as a number of optional ancillaries.

Jet Vent can run in either normal extract mode or at a once only smoke operation at 300°C for 2 hours which means cost savings as a single fan provides both general and smoke extract requirements.



■ No Ductwork Requirement

By adding momentum to the air, Jet Vent thrusts air towards the desired extract points to ensure contaminant laden air and smoke are cleared effectively and efficiently.

This principal eliminates the need for ductwork within the car park, as the Jet Vent effectively transfers the polluted air, (allowing for better use of limited space) in underground facilities.

By eliminating ductwork, the system resistance for the application is greatly reduced, which means lower pressure drops are required by the extract fans, lower power consumption, and reduced running and energy costs.

Greater flexibility in installation and operation of Jet Vent units easily avoids the potential problem of stagnant areas.

Jet Vent used in conjunction with multi-purpose sensors provides further energy savings by selectively operating fans in polluted areas only, at specific speeds.

■ Lower Maintenance

With no ductwork, maintenance costs are greatly reduced as there is no ducting to become blocked, damaged or subject to leakage.

■ Cost Effective

Jet Vent provides scope for reduced installation and overall construction costs compared with using more traditional ducted systems. The high efficiency impellers make this application a very economical method of moving high volumes of air.

■ Better security

The elimination or reduction in ductwork means a safer, lighter environment with better security (due to the increased visibility), for efficient use of CCTV cameras.

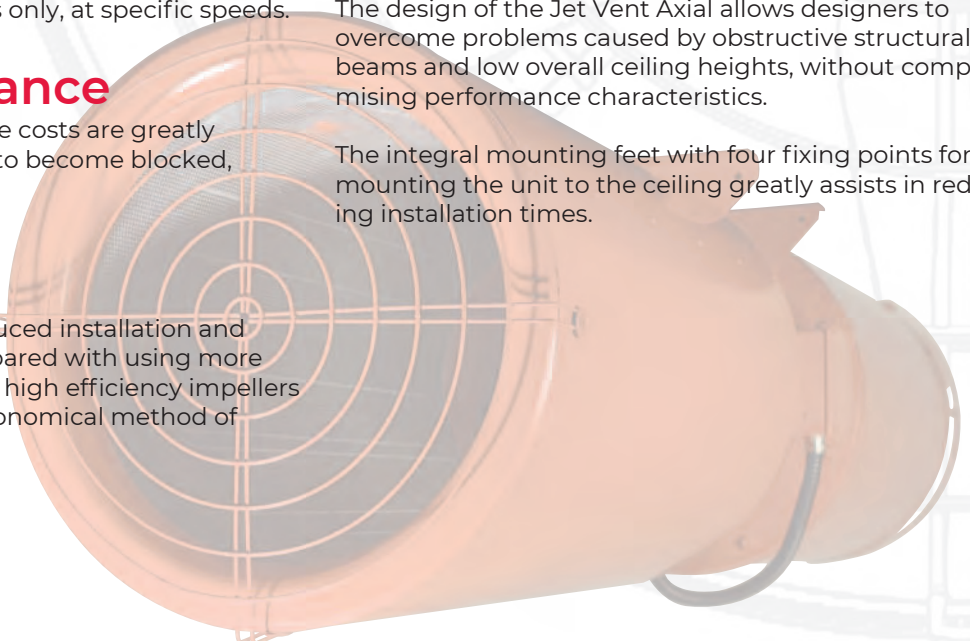
■ Slim, Robust design

Jet Vent axial fans are of a robust, heavy duty construction for added strength and durability.

Fan casings are heavy gauge, sheet steel, roll formed, welded and hot dipped galvanised after fabrication to BS 729.

The design of the Jet Vent Axial allows designers to overcome problems caused by obstructive structural beams and low overall ceiling heights, without compromising performance characteristics.

The integral mounting feet with four fixing points for mounting the unit to the ceiling greatly assists in reducing installation times.



JetVent Axial ventilation system

An impulse ventilation system can be tailored to suit virtually any car park design and size. The system layout will first need to be identified followed by the creation of an initial design- A Computational Fluid Dynamics (CFD) analysis is often required to prove and further refine the impulse ventilation system design.

CFD is the science of predicting fluid flow under a given condition. CFD analysis can accurately simulate the behavior of fluid and can provide valuable information to engineers. CFD Analysis is used as a validation tool to study the behavior of air inside the car parking area and to optimize the effectiveness of the designed ventilation system. CFD Analysis provides foresight to the HVAC engineers by accurately calculating the flow parameters (like velocity, temperature, -etc) throughout the car parking area during design stage. This enables the engineer to compare different ventilation designs and finalize the best ventilation design suitable for the intended building.

CFD Analysis is used to simulate both normal mode and fire mode operation of the designed ventilation system. The objective of these simulations is to ensure tenability conditions recommended by standards are maintained at all times inside the car parking area during worst case conditions as shown some simulations result in Fig-1 to 4.

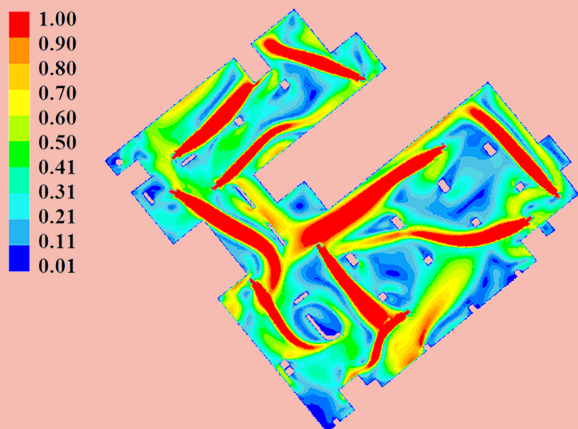


Fig--1: Velocity Contour

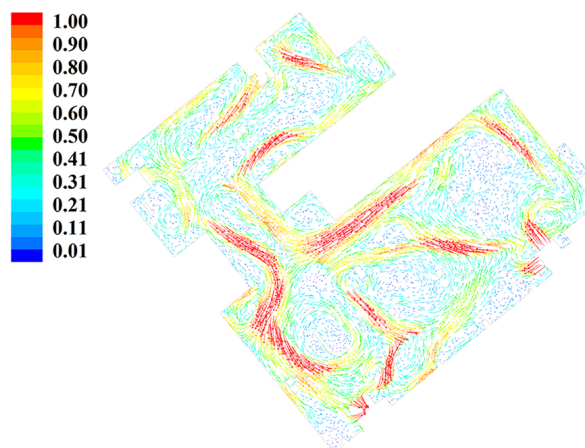


Fig--2: Velocity Vector Image

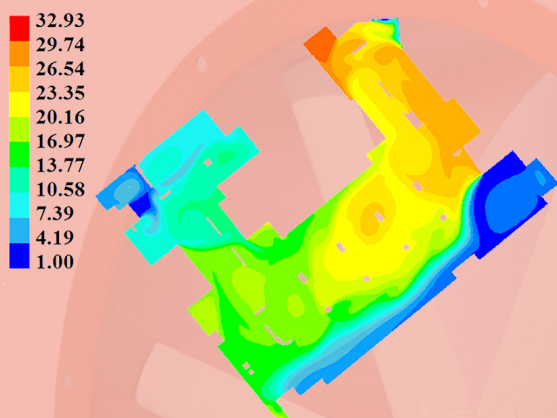


Fig--3: CO Concentration Contour

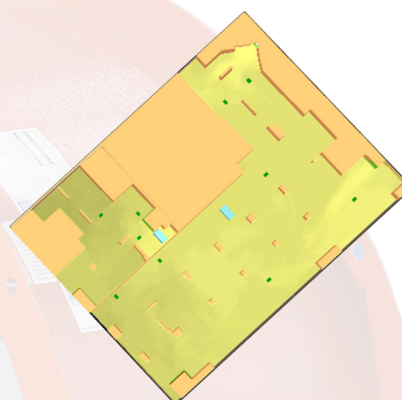
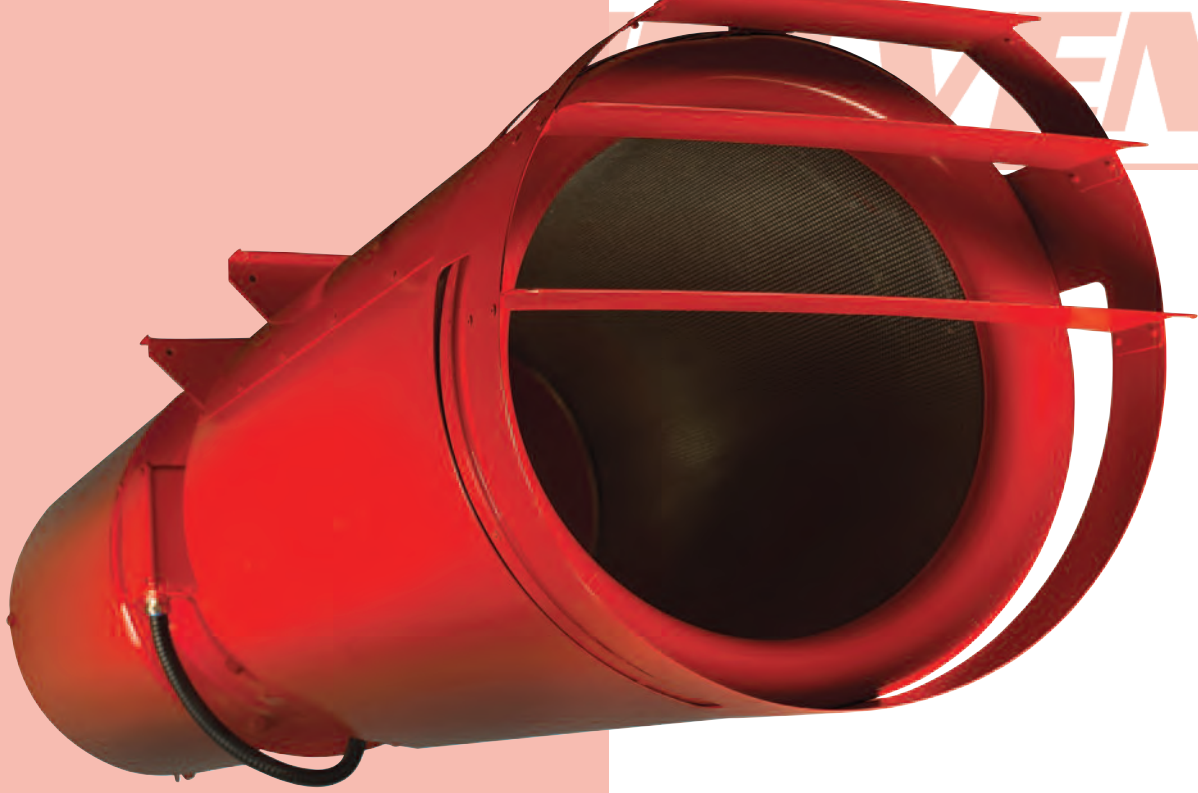


Fig--4: Smoke Image

Elta Fans is able to facilitate a CFD and assist with the information required to perform the analysis. For further information on how to create an initial impulse ventilation system design, contact your Elta Fans representative about the "JetVent Practical Guide for Selection & Application"



Specification

The Jet Vent Axial Impulse range comprises multiple thrust types, suitable for ambient temperature operation (at 40°C) plus a one off operation at 300°C for 2 hour high temperature smoke conditions to European Standard EN12101-3:2015.

■ Impeller

Adjustable pitch aerofoil section impellers are provided with blades made from high quality pressure die cast aluminium alloy (LM6). Hubs are made from pressure die cast aluminium (LM24). The assembled impellers have their blades positively locked by pinning, which provides added security for operation in the smoke regime.

Impellers are dynamically balanced to Grade G6.3.

■ Silencers

Integral inlet and outlet silencer are mounted to either side of the fan housing, Silencers are constructed from pre-galvanised sheet steel outer and pre-galvanised perforated sheet inner lining.

The inlet silencer has a zinc plated guard attached, whilst the outer silencer has a deflector fitted to guide the air in the direction required.

NOTE: All accessories for these units are incorporated during testing to ensure accurate thrust test figures are obtained from our thrust rig.

■ Casing

Jet Vent axial fans are of robust, heavy duty construction for added strength and durability. Fan casings are heavy gauge, sheet steel, roll formed, welded and hot dipped galvanised after fabrication to BS 729.

The integral 4-Point mounting feet allow the unit to be mounted easily to the ceiling.

■ Motors

Motors are totally enclosed airstream cooled, metric frame protected to IP55.

Motors have Class H insulation and are rated for normal continuous duty at 40°C and once only emergency operation in smoke conditions of 300°C for 2 hours

■ Quality Management

Units are designed and manufactured with procedures as defined in BS EN ISO 9001: 2015.

All Jet Vent units are tested at elevated temperatures in accordance with the requirements of the European standard EN12101-3:2015.

Performance & Electrical data

Flanged Units

Motors shown below are suitable for the following:-

- A) General use at temperatures (ambient) +40°C
- B) One off high temperature use of 300°C for 2 hours
- C) 415Volt / 3 Phase / 50Hz Electrical Supply
- D) All thrust figures are measured under test conditions.
- E) Volume flow and velocity figures shown may have been calculated in accordance with test requirements.
- F) All the test data shown has been prepared in accordance with AMCA 250 & 300 testing.

Jet Vent - Uni Directional - High Thrust

Product Code	Thrust Newtons	Volume Flow Rate m ³ /s	Velocity m/s	Sound Power LwA	Sound Pressure dBA @ 3m	FEI as per AMCA 208-18
LCS 315-CPU 2/4-3	29/8	1.38/0.71	18.17/9.32	81/66	61/46	0.58/1.28
LCS 355-CPU 2/4-3	52/13	2.08/1.02	21.40/10.50	87/70	67/50	0.56/1.12
LCS 400-CPU 2/4-3	72/18	2.74/1.37	22.30/11.20	87/72	67/52	0.65/1.47

Product Code	Speed r/min	Motor Power kW	FLC Amps	SC Amps	Motor Input Power kW
LCS 315-CPU 2/4-3	2905/1482	1.30/0.28	3.0/0.93	18.0/5.58	1.50/0.234
LCS 355-CPU 2/4-3	2913/1458	2.20/0.44	4.8/1.20	33.60/7.20	2.73/0.377
LCS 400-CPU 2/4-3	2875/1459	2.20/0.44	4.8/1.20	33.60/7.20	3.13/0.375

NOTES:-

A) The above test results are at standard Air Density as per AMCA 250 & AMCA 300 testing standards and performance certified is for installation Type E: free inlet & free outlet without partition. The AMCA certified Ratings Seal applies to thrust at free delivery only. Speed (rpm) shown is nominal. Performance is based on actual speed of test. Performance ratings include the effect of inlet guard, inlet and outlet silencers.

B) Values shown are for total LwA sound power levels for installation type E: free inlet & free outlet without partition. The A-weighted sound ratings shown have been calculated per AMCA International Standard 301.

C) All dBA sound pressure levels at 3m shown are free field sound pressure levels (Q=1) at inlet/outlet and are not licensed by AMCA International.

D) The above Jet Fan Thrust and sound performances are without an outlet deflector.

E) All starting currents shown are direct online (DOL).

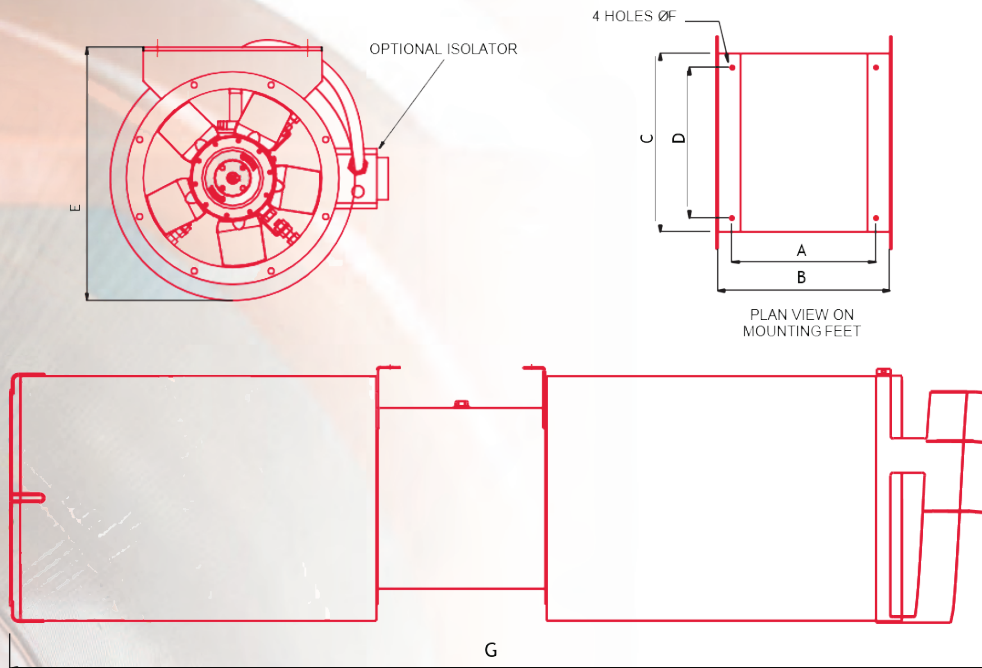


Elta Fans India Pvt. Ltd. certifies that the LCS Series shown herein are licensed to bear the AMCA seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and AMCA Publication 311 and comply with the requirements of the AMCA Certified Ratings Program.

The AMCA Certified Ratings Program seal applies to the FEI for LCS Model Jet Fan Series only. Certified by BSI which is a leading international organization has tested and certified LCS series in accordance with EN-12101-3:2015

Dimensional Data - Jetvent axial

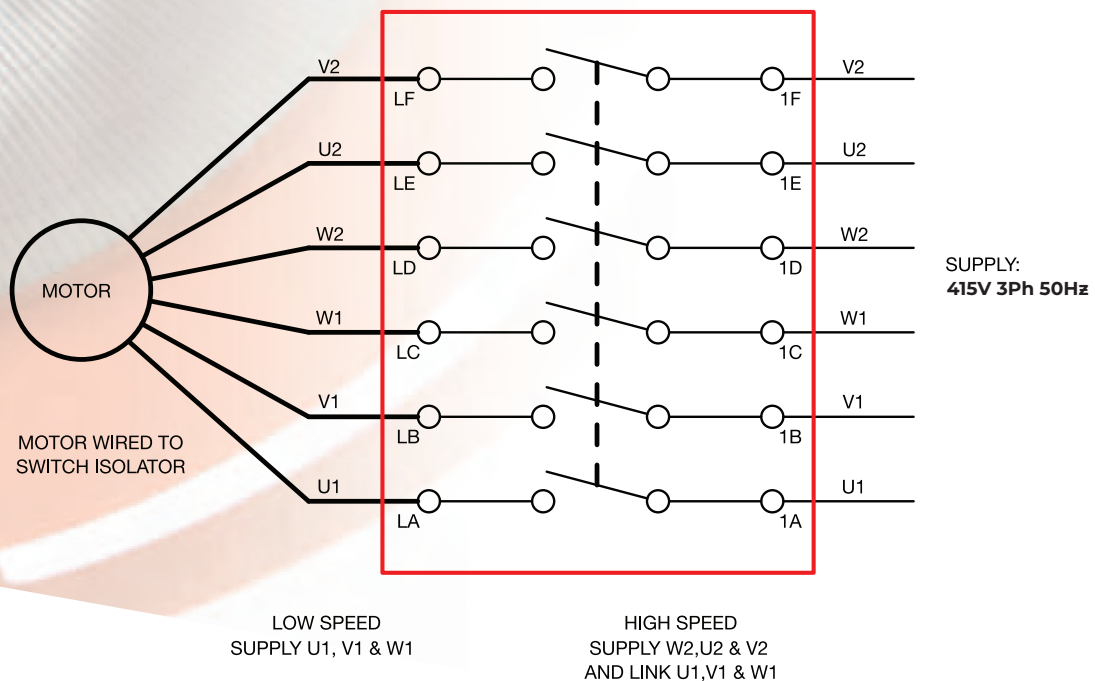
Uni Directional



Product Code	A	B	C	D	E	F	G	Weight Kg (Approx.)
LCS 315-CPU 2/4-3	200	250	315	265	440	9	1700(Max)	51
LCS 355-CPU 2/4-3	210	265	355	305	440	9	1704(Max)	60
LCS 400-CPU 2/4-3	210	265	400	350	520	9	2188(Max)	72

*Fan outlet Deflector is an optional accessory and G dimension is provided with deflector length.

Wiring Diagram

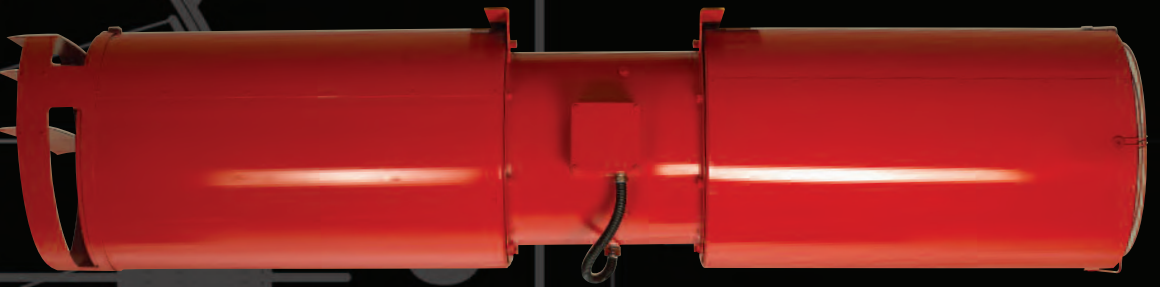


Market Applications

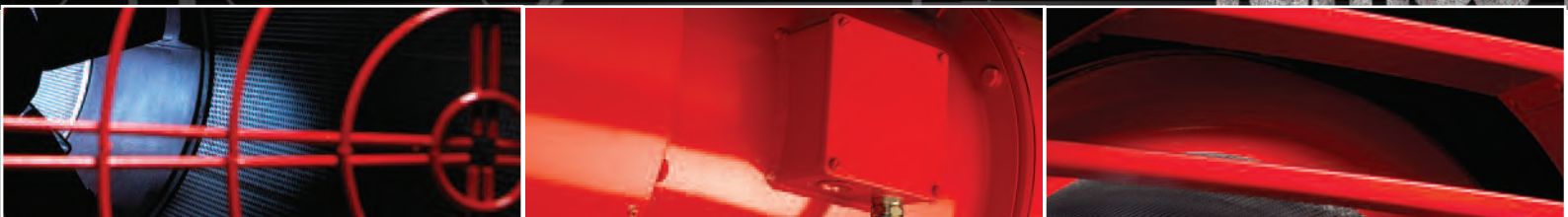
Elta Fans has a wealth of experience and knowledge dedicated to understanding your particular and specific needs. Whether your criteria include optimising space, specific performance characteristics, low noise level or a high specification finish, the JetVent Axial range continues to enhance Elta's reputation in the design and supply of specialist ventilation products.

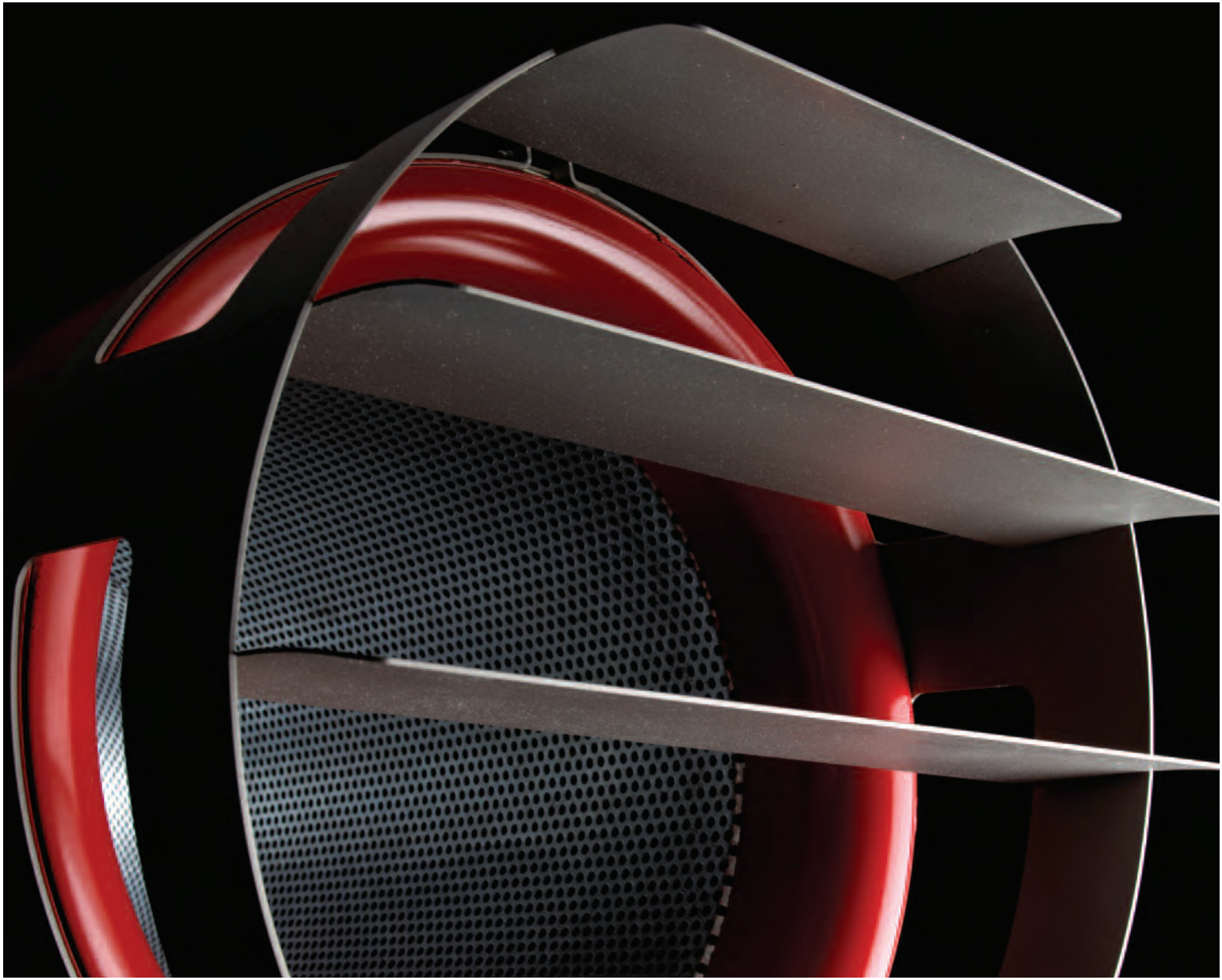
JetVent is designed to meet the requirements for general ventilation and smoke extract of fully enclosed or open sided car parks, as well as vehicle bays, metro stations and other applications such as distribution warehouses. By bringing fresh air in and thoroughly mixing the air, JetVent extracts harmful pollutants, namely carbon monoxide, nitrous oxides, fumes from vehicle fluids, oil and other fuels, whilst enhancing visibility by removing smoke haze created by diesel exhaust fumes.

Of equal importance is the need for ventilation in the event of a fire itself. JetVent Axial contributes to safeguarding lives by providing smoke clearance for occupants to escape, whilst enabling access for fire fighters to control the fire.



carbon monoxide, nitrous oxide
fumes





Innovation, Application, Determination

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