Woods
AIR MOVEMENT

CAR PARK SYSTEMS

Efficient pollution and smoke control

The Centre of Expertise for your car park ventilation projects

from day-to-day pollution clearance to complete smoke control

Traditional car park ventilation system designs are based on duct runs with high and low level extract, or more simplistic designs based on extract and natural supply points (such as ramps), generally result in very poor/insufficient air distribution. By contrast, the modern solution from Woods Air Movement removes the need for any ducting by using Jet Fans to distribute the air.

We are ready to support your project from design and CFD simulations, to demonstrating the wide range of benefits to client and user alike, with regard to energy efficiency, ROI calculations and all relevant safety standards.

Woods Air Movement has the widest range of car park fans available in today's market: from the largest Induction Thrust Fan; through to compact, lightweight Jet Thrust Fan models to meet any installation requirement. That means we can deliver all the air movement functions, capacity, performance and fire safety criteria that any type of car park requires – whatever its size and purpose.

At Woods Air Movement, we have the know-how, product technology and experience to always give you the correct combination, whatever the application. In short, we have the solution you need.

We take a complete life-cycle approach for optimal safety, efficiency & cost.

SYSTEM DESIGNS

We offer the greatest value to our clients when we are involved at the design stage. Our in-house team of designers and CFD experts are able to optimise the system to ensure the best design based on your specifications using our market leading products.

ENERGY EFFICIENCY

We have a wide range of class leading JTv Fans with ultra high thrust and efficiencies. Modern energy efficient motors and advanced control systems make for a cost efficient car park installation with top performance and safety levels.

COMMISSIONING & MAINTENANCE

We have local partners across the world that we can ensure your system is successfully commissioned and properly maintained and operates as designed in line with local applicable codes and standards.

TOTAL AIR MOVEMENT SOLUTIONS

The ideal air movement equipment will satisfy the correct combination of several factors, applying to your specific car park:

Function: Including air supply or extraction; heat transfer and recovery; and, in the event of fire, emergency management of smoke and toxic fumes

Flow: Required air volume capacity and speed

Energy efficiency: Less energy consumed to achieve the desired result

Controllability: Allowing performance to match demand – no more, no less

Sound: Quiet operation to avoid noise distraction

Space availability: Fitting the space or location available

The Complete Solution to Car Park Ventilation

Ducted systems are the traditional approach to enclosed car park ventilation, with fresh air levels based on a given number of air changes per hour. Constant running of a ventilation system, even in extended periods of low, or even no traffic or ventilation requirement, results in high day to day running costs.

The better solution is to incorporate a Thrust Fan System. Ventilation can be designed using a CO and/or NO_x monitoring system, so that selected fans run only when necessary. Additional savings are made due to lower pressure main extract fans being used as they do not have to cope with system resistances found in ducted systems.

All our designs will be prepared to the customer's requirements, taking into account any regulations that apply. If required, the Thrust Fan System can be designed on a traditional volumetric air change rate, and/or using CO, LPG and NO_x monitoring systems. Emergency ventilation can be designed using volumetric or design fire calculations.

Woods Air Movement realises the importance and possible life saving function of our Thrust Fan System and offers full Computational Fluid Dynamics (CFD) modelling to every customer, on every project. With over a 99% uptake by our customers, they too realise the importance of getting it right. CFD ensures system optimisation and, more importantly, that the occupants safety is not compromised.

We can avoid the poor design or 'guesstimates' used by some, by employing best practice CFD modelling methods. This avoids making a project unnecessarily expensive by using too many fans, or an under performing system by specifying too few.

A MODERN APPROACH

Thrust Fan Systems are one of the most cost effective ways to ventilate, both in terms of installation cost and long term running costs

The Woods Air Movement Thrust Fan System is one of the most efficient and cost effective car park ventilation systems available on the market today.

Both day-to-day pollution and emergency smoke are safely and effectively ventilated. Designed to the highest standards and meeting the most stringent criteria to ensure all design requirements are met.

- **HIGH SYSTEM PERFORMANCE**
- **LOW INSTALLATION COSTS**
- **LOW RUNNING COSTS**
- **OPTIMISES CAR PARK SPACE**
- **CFD SYSTEM DESIGN**

Although the Woods Air Movement Thrust Fan System works on surprisingly simple principles, highly qualified engineers utilise Computational Fluid Dynamics (CFD) to optimise each design and ensure a state of the art end product.

This systematic approach to design, paired with Woods Air Movement high-tech and efficient product design, ensures an optimised high performance car park system.

POLLUTION CLEARANCE

The Thrust Fan System is an efficient and reliable ventilation system, providing fresh air and removing harmful emissions to ensure the safety of car park occupants. It is designed as a duct-free system, relying on a series of strategically placed jet fans, to control and distribute air around the car park. Main extract fans, take the contaminated air out of the space, with fresh make up air supplied from entrance/exit ramps, or through supply fans if required.

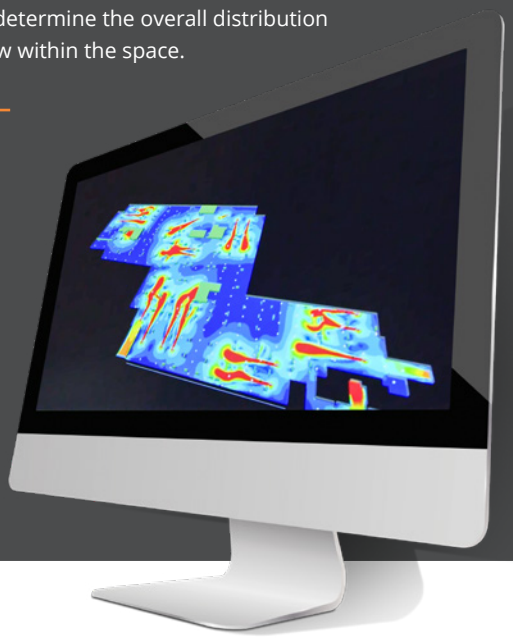
Choice in fan sizes and profiles, operating systems and detection systems allows versatility in the Thrust Fan System design, allowing the most efficient design to meet the car park requirements. Extract rates can be varied by constant pollution monitoring. Sensors placed at optimum points around the car park, allowing the control system to regulate which fans operate to dilute and/or extract the contaminated air.

The system's high flexibility allows the most favorable operation both in terms of safety, economy and efficiency.

Computational Fluid Dynamics
Expertise and Support

Manual calculation methods, used by many, are extremely limited in their ability. Manual calculation is usually inaccurate, which is why we offers full CFD analysis to customers on all projects. Our CFD Engineers are highly qualified and experienced, using their knowledge and expertise to design the system with the correct number and positioning of Thrust Fans.

Design is verified by using industry recognised, highly accurate, CFD modelling software. The system is then adjusted and recalculated if required. CFD software allows the creation of visualisation planes, which intersect points of interest in the model, where contours and vectors of any stored variable, such as air velocity, pressure, temperature, etc., can be displayed. A range of parameters are considered in the analysis, including velocities, mass flow rates and pressure, to help determine the overall distribution of airflow within the space.



MAIN FEATURES:

- Complex geometry modelling of any environment
- Advanced meshing techniques
- Steady state and transient analysis
- Pollution and Emergency ventilation simulation and analysis
- Advanced state of the art design fire modelling and simulation including both inert and combustion modelling techniques.
- Iso-surfaces of smoke and temperature
- Local Mean Age of air (LMA) – used to access ventilation performance and quickly compare design solutions
- Graphical outputs for analysis include:
  - *Air speed profiles*
  - *Streamline animations*
  - *Contaminant and/or toxicity profiles*
  - *Temperature profiles*
  - *Visibility profiles*
  - *Smoke visualisation*

Airflow behavior is difficult and complicated to predict. Accurate calculation is paramount in order to create an effective car park ventilation system. Our modelling is backed up with both lab test research and smoke test commissioning in real car parks to ensure accuracy.

CFD PROCESS STAGES:

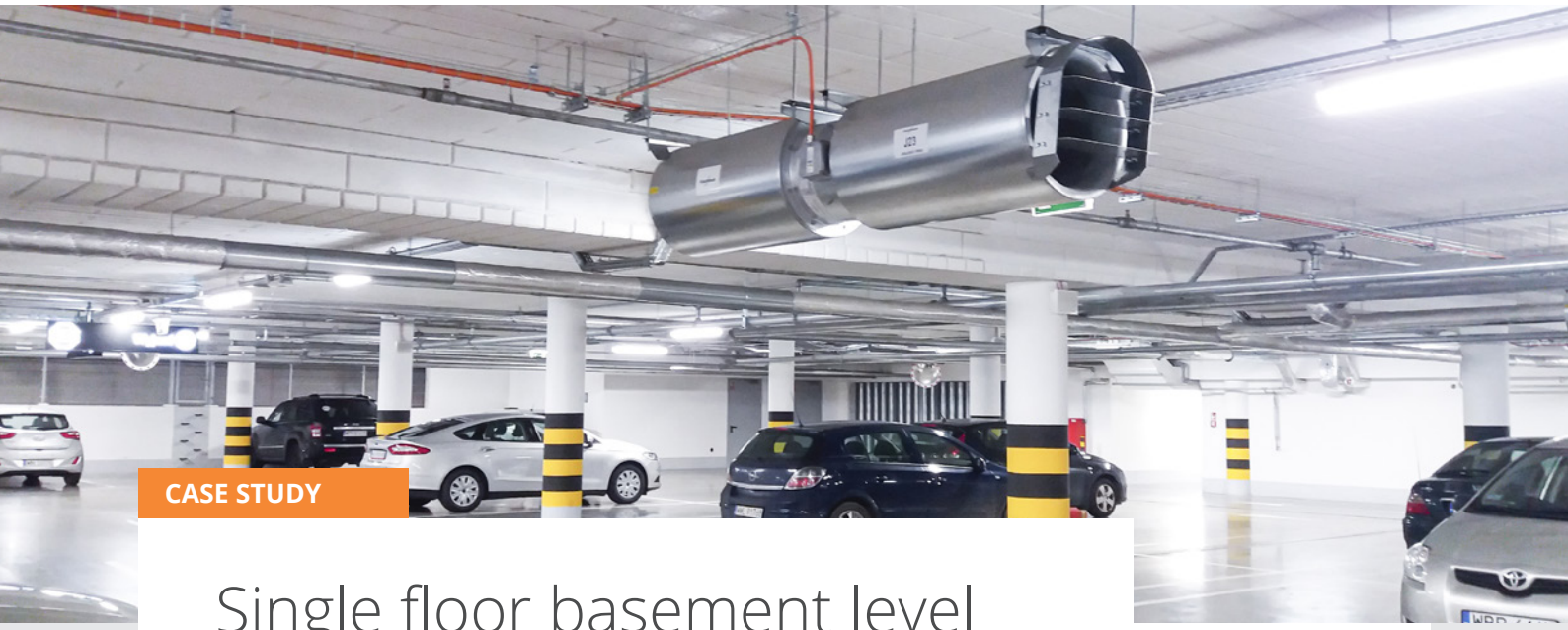
1
A computer model of the layout of the car park is created. 3-D plots are sent to the customer for approval.

2
Once approved, the design layout of the car park and model geometry will be frozen, and detailed analysis undertaken.

3
The model is initially run with only the main fans operating. This identifies the main bulk airflow paths from the supply to the extract points and any areas of re-circulation within the space.

4
Thrust Fans are added to the model and positioned to distribute the airflow to all of the areas of the car park, ensuring removal of any stagnant areas of air.

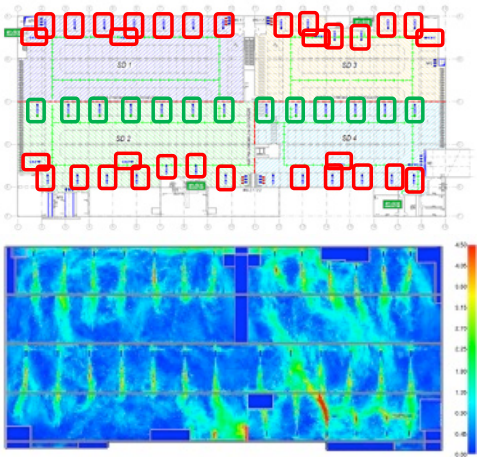
5
A detailed report of the results is produced for each project with appropriate air speed plots, velocity profiles and particle animations.



CASE STUDY

Single floor basement level retail store car park

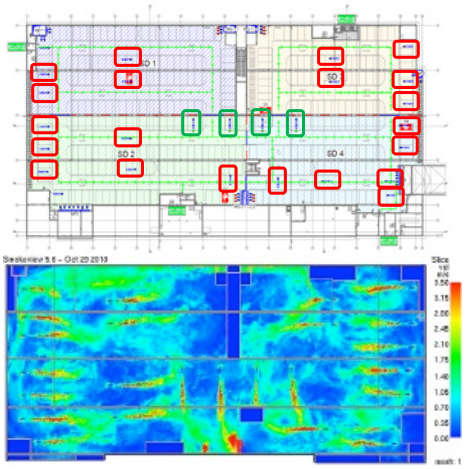
Using traditional Jet Fans:



- **34** unidirectional Jet Fans
- **13** Reversible Jet Fans

- Smoke Exhaust: 160,000 m³/h
- Mechanical Airflow: 100,000 m³/h
- Total Power Consumption: **52 kW**

Using JTv Jet Fans:



- **23** unidirectional Jet Fans
- **4** Reversible Jet Fans

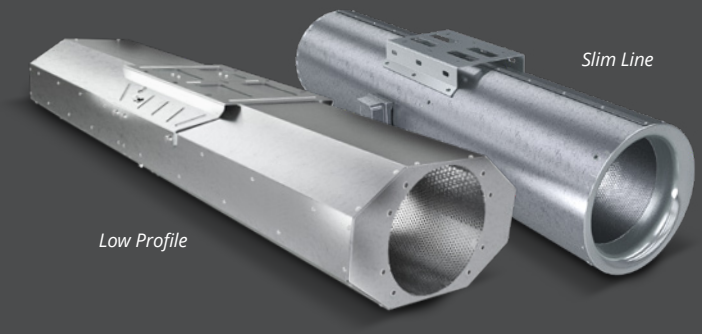
- Smoke Exhaust: 160,000 m³/h
- Mechanical Airflow: 100,000 m³/h
- Total Power Consumption: **34 kW**

42.6% fewer fans

34.6% power saving

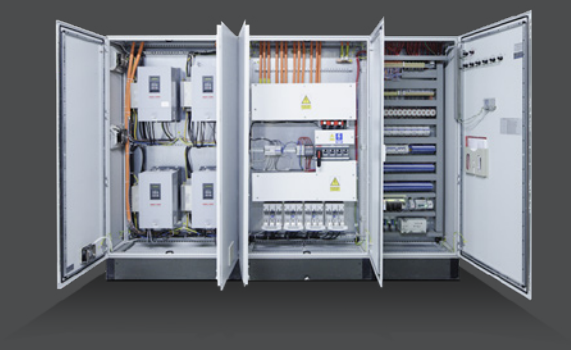
Due to the improved JTv performance (in thrust and efficiency) the investor was able to significantly reduce the quantity of fans needed to achieve the consultants specification.

Downstream cost savings:
- **Cabling cost**
- **Installation & commissioning cost**
- **Control panel cost**
- **Back up power supply cost**



JTv JET THRUST FAN

- Low Profile: compact design to accommodate lower ceilings, combined with lower noise levels
- Slim Line: Modern, streamlined look, higher performance
- 3 sizes available; 315 mm, 355 mm and 400 mm. Integrated mounting bracket included
- 50 Hz Uni-Directional JTv Performance: 33–77 N (Max Thrust 91 N)
- 60 Hz Uni-Directional JTv Performance: 40–71 N (Max Thrust 88 N)
- 2 Speed or inverter controlled motors
- Choice of high temperature electrical isolator or terminal box
- Can be supplied with either guards or deflector vanes

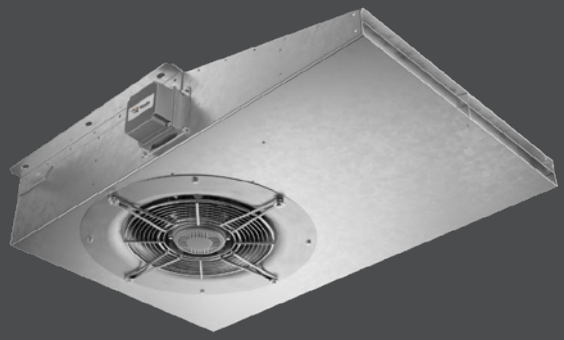


CONTROLS

- Control panels designed and built to local requirements by our distribution partners
- Gas detection sensors
- Commissioning
- Installation
- Smoke tests
- Long term maintenance and service

EC INDUCTION THRUST FAN

- Dual centrifugal impellers
- Energy efficient dual EC motors
- 1 phase with both 50/60 Hz usage
- Maximum operating temperature of 60 °C (140 °F)
- 100% speed controllable
- Low sound level of 64 dB(A) at 3 m
- Light weight fan, 15 kg only



INDUCTION THRUST FAN

- Low profile solution to optimise installation space requirements
- Performance: 50 N, 75 N and 100 N
- 2 Speed motors (Invertor controllable in standard ambient conditions)
- Integrated mounting feet
- High temperature isolator
- Isolator and terminal box options available

A complete fan range from Woods Air Movement

We manufacture the most reliable and best quality air movement and ventilation products for various applications and industries. To ensure you receive the best quality, we run various tests on our fans before they are delivered to your doorstep.

Most of our product range are available as standard or high temperature, please contact one of our sales team members to find out more technical information on our products. If any of products do not meet your requirements then we have in-house capabilities to assist with designing, engineering and manufacturing the perfect solution for you.

ENSURING THE BEST POSSIBLE QUALITY IN EVERY DETAIL

- All impeller parts are X-ray inspected in accorance with ASTM E155.
- We ensure our products follow the ISO1940 Balance standards and Vibration BS848 pt 7 ISO14694.
- Our fans endure impeller strain gauge tests of speed over 125% for 15min.

> **WOODSAIRMOVEMENT.COM**

PRODUCT SELECTION AND CONFIGURATION HAS NEVER BEEN EASIER – OR MORE POWERFUL

We always try to make the selection of our products as easy, accurate and fast as possible. With the brand new release of our Fan Selector we have taken a huge step forward and we hope that you will enjoy the many new features and functions – including web-based multi-platform accessibility with touch interface and interactive performance charts.

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AIR MOVEMENT

Woods Air Movement delivers smart and energy efficient Air Movement and Fire Safety solutions to support every application area. We offer our customers innovative technologies, high quality and outstanding performance. The widest range of Air Movement and Ventilation products in the market, and strong market presence with over 100 years of experience and manufacturing of products, guarantees that we are always by your side, ready to deliver Excellence in Solutions.

Contact our friendly sales team today for more information

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