Ventilation of Parking Garages Using JETFAN Systems

Howden is a world leader in the technology of air movement. Our knowledge and experience with ventilation systems is now being used to produce an innovative solution for enclosed parking facilities.

Enclosed or underground parking garages are ventilated primarily to remove harmful vehicle emissions and other pollutants by providing fresh air for customer and employees. Ventilation is also a requirement in the event of a fire to remove hot smoke, facilitate escape and to provide a clear access for fire fighters. Ventilation rates for parking facilities can be calculated based on air changes, volume per parking space, or the amount of air required to dilute pollutants to a certain level. These criteria are specified in the relevant national and local building codes and regulations and will vary between general ventilation for pollution control and emergency ventilation for smoke control.

Traditional parking facility ventilation systems use exhaust (and sometimes supply) fans in conjunction with ductwork to distribute air around the facility, providing a common system for both pollution and smoke control. Unfortunately, the positioning of exhaust grilles or louvers within the system is not always ideal. With this system fresh air is sometimes exhausted before it becomes contaminated with pollutants, or conversely, it becomes excessively contaminated. This system can also result in fresh air being exhausted during emergency operation rather than being distributed throughout the parking facility.

Howden’s innovative parking garage ventilation system uses JETFAN fan technology together with the main supply and exhaust fans eliminating most of the problems associated with conventional ducted systems. The Howden system is based on the operation of small JETFAN units installed in the ceiling of the parking facility. They are positioned to control the distribution of the air within the structure. They can be used to create a flow of air at both high and low levels within the facility, effectively using the same air twice, resulting in a more efficient use of air than conventional ducted systems. JETFAN units act in a similar way to traditional ducted systems, pulling air into the fan inlet (i.e., a grille/louver) and discharging at a high level towards the exhaust locations (i.e., a duct/louver/fan). A typical system includes the main exhaust fans; supply fans (if required) JETFAN units, detection system for pollution, CFD analysis, control panels and associated wiring. This enables the system to be designed around the specific requirements of each facility and insures that the system operates as designed.

Howden JETFFAN System Benefits

Eliminates the need for ductwork
Our parking facility ventilation system uniquely positions JETFANS and exhaust fans, so they remove the contaminated air to the exhaust points. This eliminates the need for expensive ductwork and its installation costs.
Reduced System Resistance

With the elimination of ductwork, the system resistance is significantly reduced, therefore, the main supply and exhaust fans can be selected at lower a speed, which reduces the power absorption and overall operating costs and permits lower noise levels.

Space Optimization
Our system reduces obstructions within the facility, which increases the space available for parking and building rental. This eases the installation of other services such as utilities and equipment.

Reduced Design/Installation Costs
With our system, there are no complicated duct systems to design and install, therefore the installation cost of the complete system is reduced.

Optimized System Design
Our system uses Computerized Fluid Dynamics (CFD) analysis to plan and optimize the complete ventilation system.

Reduced Operating Costs
Our system monitors air quality (pollution levels) therefore the ventilation system is operated only on demand, further reducing operating costs.

Our Tailored Solution
Our system is a more detailed approach to the parking facility ventilation system, based on the project-specific requirements.

Howden JETFAN System Overview

Main Supply/Exhaust Fans
Howden’s JM axial flow fans are ideal for supply and exhaust purposes. Supply fans are sometimes used to provide fresh air into the parking facility, plus provide air to ramps and inlet grilles/louvers. Our fans are designed and independently certified by UL for normal operating temperatures and or high temperatures up to 500°F for 4 hours. The JM-series is available up to 1600mm diameter with a wide range of accessories. Reversible flow JM fans are also available and can be ordered to provide more flexibility when controlling smoke and pollution. For further information contact your local representative.

JETFAN Units
Howden’s JETFAN units are custom-designed for parking garage applications and are available in sizes from 315mm to 450mm. Units incorporate a temperature rated and certified axial flow fan, complete with integral inlet and outlet silencers, low loss guards and a mounting assembly and cylindrical silencers are standard. Units are made for a variety of temperature/time ratings and motor options, to suit specific requirements.
Computational Fluid Dynamics (CFD)
Our CFD software is used to model and analyze airflow in complex systems. Our software is able to calculate solutions for velocity, pressure and temperature. Our analysis of a parking facility design using CFD is an effective way of ensuring that the distribution of the air is sufficient to effectively ventilate the structure. CFD can also be used to model both the general ventilation (pollution) and emergency (smoke) cases. Rather than simply complying with regulations, CFD offers the opportunity to provide an engineered solution to parking garage ventilation.

Control and Detection Equipment
Carbon Monoxide (CO) is the major pollutant in parking facilities. The concentration of other pollutants such as nitric oxides and soot are considered less critical. (CO is a colorless odorless poisonous gas produced from the incomplete combustion of carbon-based fuels.)

Smoke Detection
Our smoke detectors are located throughout the parking facility to ensure prompt detection of fires. Upon detection the alarm sounds and the ventilation system switches into emergency smoke exhaust mode, assisting in escape and providing access to fire fighters.

Controls
Our integrated control system insures that the ventilation system performs as designed. The type of control and complexity required is matched to the specific details of the project.

Commissioning
Our factory-approved inspection team will perform a “walk down”, perform functional testing and provide a final report to assure proper installation.

Complete Package
Howden provides a comprehensive package, including Supply and Exhaust Fans, JETFAN units, CFD Analysis, Controls and commissioning to ensure that the system works as designed.

Howden Induction Fan System Overview

The Induction Fan System is made up of three principle parts: Main Supply and Exhaust fans (as note in the JETFAN System) to provide the air flow through the parking facility (supply may be natural or assisted as required), Induction Fans to distribute and control air flow in the facility, and the control systems (as noted in the JETFAN System) to optimize the air flow to suit the installed requirements.

The Induction Fan takes air from below, accelerates it through the centrifugal induction fan, and supplies a high thrust air stream to induce air movement through the parking facility. Careful design and the positioning of fans using our CFD software, allows for optimum air movement to be induced across the whole car park, providing efficient ventilation.
Howden’s Induction Fan allows individual project requirements to be met. An appropriate number of Induction Fans are selected and carefully positioned to ensure an even distribution and movement of air. The controls philosophy will depend on the individual project and can range from a simple timed system, to a full CO sensing multistage system, with the ability to optimize efficiency and provide effective compliant solutions. The type and specification of system is determined by customer project requirements and the application of local ventilation standard.
At the heart of your operations

Howden American Fan people live to improve our products and services and for over 40 years our world has revolved around our customers. This dedication means our air and gas handling equipment add maximum value to your operations. We have innovation in our hearts and every day we focus on providing you with the best solutions for your vital operations.