

DIRIVENT[®]

The design, engineering, installation and support of complete high velocity induction air systems for manufacturing, logistics and specialist buildings. Delivering the right solutions for your needs.



Environmental Climate Systems Ltd
SPECIALIST VENTILATION • AIR CONDITIONING
BUILDING • SERVICES CONTRACTORS

DIRIVENT® is an extremely versatile solution for today's heating, ventilation and air conditioning requirements. Many years of development and use all over the world means we can offer truly global technology with UK resources.



DIRIVENT® offers

Control of the environment

Provides full control over temperature and air flow in all types of buildings from low bay air conditioning to high bay heating. The key element in achieving the correct working environment, is to create evenness of air temperature throughout the occupied space; **DIRIVENT** can provide this as all the room air is continually entrained and mixed by the nozzle air jets.

Destratification

One of the most effective systems available for the reduction of air stratification in high Buildings. The installation of a **DIRIVENT** enables temperature differences as low as 0.2°C/m to be achieved.

Reduced operating costs

The **DIRIVENT** air jet technique uses efficient air jets, which reduce the total volumetric air flow rate required to condition a building environment. This means:

- smaller air handling plants
- reduction in motor power.

These factors are complemented by the low stratification and entrainment of free heat from lights and other energy sources, reducing operating costs to less than other systems.

The right air to the right place

Strategically placed **DIRIVENT** nozzles transport the air to wherever it is needed, eliminating large ducts, which interfere with other high level services. **DIRIVENT** has virtually limitless ability to transport air across large premises when combined with multiple systems.

Utilising any heating and cooling medium

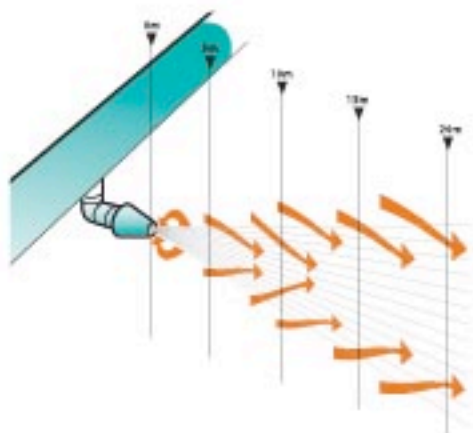
Can be used with all heating and cooling mediums from Indirect and Direct gas fired, oil fired, LPHW, MPHw, HPHW and steam coils or with chilled water or DX refrigerant.

Heat recovery

Compatible with all conventional methods of heat recovery and can utilise heat from any available energy source.

A versatile solution

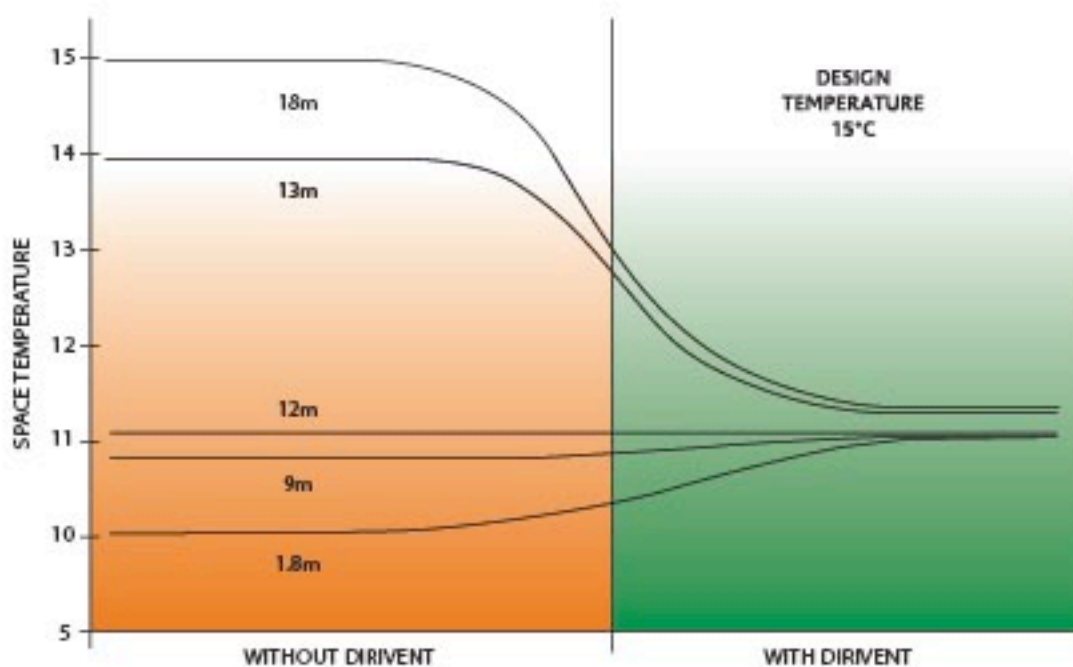
Offers the most economic solution to many complicated heating, ventilation and air conditioning problems. There are currently over 5000 **DIRIVENT** installations in the world in sport arenas, production facilities, distribution centres, aircraft hangers, retail outlets and underground car parks.



DIRIVENT nozzles work by entraining surrounding air into the jet stream. Each nozzle can induce over 60 times its own air flow at a distance of 10 metres.



DIRIVENT® fighting pollution



This diagram shows the temperature differences between the floor and roof of an aircraft hanger, with and without **DIRIVENT** in operation.

DIRIVENT's efficient induction rate reduces the local concentration of dust, smoke, odour and other unpleasant elements before they reach dangerous levels.

DIRIVENT® Air Heating

Where heating is the major requirement and ventilation needs are low, it is possible to install a primary **DIRIVENT** system with the conditioned air entering the space through the jet nozzles.

The air handling unit incorporates the heater which can be direct or indirect fuel-burning, or a heater battery served by hot water or steam. Distribution of the heated air is achieved via ductwork to strategically positioned jet nozzles, which can be vertical or angled. Destratification is achieved by thorough mixing of the air within the space.

The **DIRIVENT** system keeps local air change rates within the space high so that concentrations of heat or fumes will be effectively dissipated. Fresh air can be introduced by the addition of a mixing box to the central air-handling unit.

The **DIRIVENT** has the advantage of small diameter light-weight ductwork which is easily routed and supported in congested roof spaces. Centralised plant, handling relatively small volumes of air, can be conveniently serviced.

DIRIVENT® Air Cooling

Many premises require the environment to be controlled by introducing either cool or fresh air. The **DIRIVENT** system consists of an air handling unit supplying, conditioned air to a plenum duct with outlet supply grilles. Jet nozzles are placed at predetermined distances from the duct to transport the supply air horizontally and vertically over the working area.

DIRIVENT nozzles impart momentum to the surrounding air which drives it forward. As the air velocity reduces, increasing volumes are mixed and transported in the desired direction. All the air is eventually set in motion to distribute cooling or heating and dilute fumes giving uniform temperature between upper and lower levels.

DIRIVENT® Forced Displacement

Design guidelines stipulate, such as underground car parks are equipped with ventilation systems with an input of fresh air and extraction of polluted air at a rate of six to ten air changes per hour. The actual ventilation rate should also satisfy

Health and Safety threshold limits for contaminants. Ventilation should therefore be installed so that grilles for air supply and extraction can disperse to as many locations as possible. There are however many structural and financial constraints in achieving this.

The use of **DIRIVENT** as a forced displacement air system is the answer. The high velocity air flow from the small nozzles of the **DIRIVENT** system, entrains fresh air to enter and circulate to every area of the car park. **DIRIVENT** nozzles are placed at pre-determined intervals in the direction of primary airflow towards exhaust outlets.

For areas separated by partitions, **DIRIVENT** nozzles can be placed to mix still air. This layout prevents stagnation and forces fresh air in, thereby ensuring the ventilation rate is totally effective.

The duct diameter of the **DIRIVENT** system is small enough to pass through large beams, thereby making the installation of a **DIRIVENT** system simple compared to conventional types.

DIRIVENT® Air Destratification/Transportation

High buildings such as hangars, atriums and other buildings with inefficient heating systems suffer from air stratification leaving the valuable heated air at roof level. The **DIRIVENT** air destratification system will combat the problem. The nozzle system provides the function of destratification operating on a fully recirculating basis to assist the conventional air heating system. The nozzles are installed on small diameter lightweight spiral wound ductwork, more easily installed at high level. Vertical nozzles will provide maximum destratification with minimum nozzle pressure and as the supply air volumes are small, the centralised plant can be located in the roof space of the area served.

Where Cooling or High Ventilation rate are of key importance, the **DIRIVENT** air Transportation system is the ideal solution. The space will be supplied from low velocity plenum ductwork with strategically positioned supply grilles. Horizontal and vertical jet nozzles are positioned at pre-determined distances from the supply grilles to capture and mix the air, transporting it horizontally and vertically to all areas of the building.



JJB SPORTS WIGAN



BARNESLEY METRODOME

Benefits of the *DIRIVENT*[®] System

1. Improved space utilisation

Racking can be utilised to the maximum as no high temperature zones exist at the top of the building.

2. Rapid time to temperature

DIRIVENT directly heats the air providing a more responsive system than alternative methods, which rely on surface heating.

3. A more pleasant environment

Better air quality within the space as a proportion of fresh air is always being supplied.

4. Prevention of dust and dirt ingress

Cleaner environment within the space as the building is pressurised by the *DIRIVENT* system thus reducing the rate of infiltration of unfiltered outside air.

5. Free cooling with fresh air

Option to provide free cooling by switching to 100% ventilation during summer.

6. Reduced maintenance

Maintenance greatly reduced with a centralised air handling unit as opposed to numerous separate heating units within the spaces which are often difficult to access.

7. Reduced risk of roof leakage

A greatly reduced number of roof penetrations with a centralised *DIRIVENT* installation as opposed to multiple locations on other systems.

8. Rapid fume dilution

Fumes are diluted by the entraining effect of *DIRIVENT* which sets all the air within the controlled environment in motion. Fumes not captured by local extract systems will be re-distributed and further diluted throughout the space.

9. Reduced gas demand

Many competing systems have limited capabilities in delivering satisfactory heat at floor level. As a result gas consumption is wasteful compared to that of a *DIRIVENT* system.

10. Designed for purpose

Rather than combining multiple units from a standard product range, each *DIRIVENT* system is designed specifically to meet the needs of the customer.

DIRIVENT[®] Hybrids

Over the many years *DIRIVENT*[®] has been in use, numerous applications have been applied with the Dirivent nozzle being the focal point of the design. Below are some of these applications.

Air Curtains

A *DIRIVENT* Air Curtain is the ideal solution to protect large loading bay doors from ingress of outside air. A series of vertical or horizontal *DIRIVENT* nozzles are installed above or to the side. Using nozzle design, a higher velocity across the face of the door is achieved to provide a protective curtain of air.

Spot Cooling

If process heat gains are too great to consider cooling of the working area then the installation of a *DIRIVENT* spot cooling system is the solution.

Vertical *DIRIVENT* nozzles are installed directly above the area to provide a higher velocity at floor level than normally associated with comfort levels. The air velocity provides cooling to the personnel within the nozzle jet stream.

Accelerated Cooling

DIRIVENT may be used to assist a conventional blast cooling refrigeration plant in reducing product cooling times. *DIRIVENT* nozzles are installed directly between the stored product to provide highly turbulent airflows around the racking. An accelerated rate of heat

transfer from the product to the air will reduce the cooling time of temperature sensitive products.

Anti Condensation

DIRIVENT protects large glazed areas from damaging condensation. *DIRIVENT* nozzles would be installed to discharge heated air at high velocity over the internal face of the glass to raise the surface temperature above the dew point of the space. The high velocity air assists in disrupting the internal air boundary layer of the glass to maintain the surface temperature.

DIRIVENT® Air Handling Units



The Air Handling Units serving the *DIRIVENT*® systems are designed for optimum energy efficiency, long operational life and minimal maintenance. Each unit can be supplied pre wired to interface with site BMS systems or may be supplied with stand alone Trend BMS controllers.

Indirect Fired Gas Units

Tested and CE certified to EN1020 the units comprise of single or multi stage gas fired heating coils with a choice of high low or fully modulating control with thermal efficiencies up to 92% based on net CV.

Direct Gas Fired Units

Tested and CE certified to EN 525 direct fired units provide optimum comfort and fuel economy for applications where ventilation is a requirement, the units offer a patented CE approved variable ventilation control to match ventilation rates to changing building requirements. Direct gas fired units are supplied as standard with fully modulating burner control with turn down ratios up to 20:1

Oil Fired Units

Indirect oil fired units suitable for use with 35 seconds oil incorporate an all stainless steel drum and tube type heat exchanger complete with pressure jet burner. Depending on the output, burners may be on/off, high low or modulating.

Enhanced Capital Allowances

Gas fired units are Energy Technology Listed and are eligible for Enhanced Capital Allowance applications. The Enhanced Capital Allowance scheme is a Government sponsored initiative designed to promote the use of higher efficiency appliances and allows end users to offset 100% of the cost of the appliance plus associated installation costs against Corporation Tax Liabilities in the first 12 months thereby providing significant capital savings and reduced annual running costs.



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