Established in

1974

The Natural Ventilation, Daylight & Cooling Specialists

DESIGNED & MANUFACTURED IN BRITAIN

We are a Living Wage Employer

INVESTORS IN PEOPLE | Accredited Until 2019

Monodraught®

engineering delivered. naturally

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Engineering delivered naturally

We design, manufacture and install natural lighting, ventilation and cooling systems to **create low energy, low carbon and sustainable buildings.**

Monodraught has been at the forefront of designing and manufacturing low energy, low carbon, and sustainable solutions for over 40 years. Our company is focused around three product sets in which we are recognised as market leaders: natural and hybrid lighting, natural cooling and natural and hybrid ventilation.

Our products can be found anywhere from a residential build looking to increase its natural light through to a high impact architectural building such as the Copperbox Arena (formerly the Olympics Handball stadium). A key sector for Monodraught is in Education where our products can deliver real dividends in terms of lower energy and carbon footprint and improved environments for students and teachers..

We design, manufacture, install and maintain natural ventilation, natural lighting and natural cooling systems to create low energy, low carbon and sustainable buildings for healthier and more productive occupants.

From R&D to Maintenance

Monodraught is proud of our history of developing products from R&D right through to installation and maintenance, all here in the UK and where possible using suppliers local to our head office base.

Our experience in installation means we can support your project wherever the location. With our own health & safety accredited installation personnel we are able to provide a complete package including commissioning and maintenance. We also have the experience to offer support and advice on installations to be carried out.

Manufacture

The large R&D team are continually challenging the boundaries developing new products to ensure customers continue to receive the market leading products for which Monodraught are renowned. These products are all manufactured within our High Wycombe factory and as R&D is in the same location as production then the highest levels of quality can be ensured.

Installation

We have a team of contract managers who will work with you and your clients from order creation through to delivery and beyond to maintenance if required. Our own team of installers work across England with partner agencies installing in Scotland, Ireland and worldwide. We will visit your site ahead of installation to ensure that all the details are covered and ensure that everything goes smoothly.

Building Simulation

To help architects and consultants deliver low maintenance, energy efficient designs within the built environment, Monodraught and building performance analysis specialist IES have developed Performance Components – a revolutionary way of modelling natural ventilation systems using the Virtual Environment Suite.

Our Project Design Engineers are able to work with you to create the right design for your building.

Maintenance

We can provide on-going service and maintenance of our installed products and this helps provide performance data for our customers and structured feedback that can assist product development, resulting in a system running at optimum performance and costs that are kept to a minimum.

Recognised as Industry Leaders

Monodraught are widely recognised as market leaders in sustainable low energy and low carbon solutions in natural ventilation, natural lighting and natural cooling. We are proud of our accreditations from prestigious independent organisations such as CIBSE and Ashden amongst others.

The Buckinghamshire Business Awards Company of the Year 2016

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bsi. making excellence a habit™

best business AWARDS Winner 2016 Best Small to Medium Sized Business

CIBSE BUILDING PERFORMANCE AWARDS 2012 WINNER RECOGNISING EXCELLENCE IN MAKING BUILDINGS WORK

Ashden Award winner 2013

QMS International plc ISO 14001 REGISTERED — SCB ASCB Accreditation Services Worldwide

QMS International plc ISO 9001 REGISTERED — SCB ASCB Accreditation Services Worldwide

Awards & Accreditations

- *CIBSE Building Performance Awards 2017 Shortlist- COOL-PHASE Hybrid*
- *Best Product/Service Range Category at the 2016 Best Business Awards*
- *Company of the Year 2016 Award – Buckinghamshire Business First*
- *Best Business in Wycombe District 2016 Award – Buckinghamshire Business First*
- *LUX, FX Design and Edie Awards 2015 shortlist - Sunpipe LuxLoop*
- *The Energy Awards 2015 finalist - Sunpipe LuxLoop*
- *Investors in People – The Standard for People Management*
- *Ashden – Award for Energy Innovation for COOL-PHASE*
- *ISO 9001 and ISO 14001: Established quality management and environmental management certificates.*
- *BSI (British Standards Institute) Members*
- *CIBSE Building Performance Award 2012 - COOL-PHASE*

Corporate Citizenship

Monodraught are committed to working in an ethical and responsible manner. Our products and services are low-carbon and low-energy solutions, which help people be in a healthier natural built environment, and as such, we are also keen to extend these strong ethical credentials into ways to contribute to our local and wider community.

Monodraught: A place that benefits people

Our staff are one of our biggest assets and in 2015 we became a Living Wage Accredited Employer. This means that every member of our staff in our organisation earns not just the minimum wage but the Living Wage. We are always looking at ways to improve our impact on employee wellbeing and how we can help in our local community.

Community Relationships are vital and we are pleased to build on our relationship with Bucks Mind and support them in targeted strategic activities. We continue to source our materials within a 100 mile radius of High Wycombe, with 60% of our suppliers within a 50 mile radius, thereby investing in the local economy and supporting employment opportunities.

More skills, more opportunities

Our main focus in this area is in attracting, developing and retaining people through investment in skills. The Investors in People accreditation is a good example of this. Our Research and Development team also have close links with UK Universities, in particular Brunel University and Coventry University and we look forward to working with more placement students this summer.

Positive Environment

Our product set can help our customers create a more positive environment through reduced energy usage and carbon footprint. Across all our product sets we continue to look at ways to innovate and improve the built environment.

Natural Lighting

Why Choose Natural Lighting?

The most compelling reason for using SUNPIPE® systems is to introduce natural daylight to areas that don't have windows

Natural Daylight allows healthier, more productive, happier occupants and reduces carbon emissions

Education

In the Education sector, Natural Lighting is proven to:

- **Increase achievement rates**
- **Reduce fatigue**
- **Improve health and attendance**
- **Enhance general development**

Although most classrooms are now lit by natural means, the most common method for doing this is by using large vertical windows at the back of a classroom.

With the use of Monodraught's SUNPIPE, a classroom will provide 3 times more light, meet the daylight requirements, have a much lower internal temperature, and make a saving of 75% on daytime lighting costs.

Health Care

Nurses commonly mention that fluorescent lighting on wards is tiring, so Natural Lighting can have a positive effect on both staff and patients.

- Typical payback period of 5-6 years
- Alleviates symptoms of Seasonal Affective Disorder (SAD)
- No maintenance - No Disruption

Offices

Productivity in offices served by Natural Lighting shows a **20% increase in output** from office employees along with reduced absences because of sickness.

It is considered that Natural Lighting systems have a marked effect on the reduction of the incidence of Sick Building Syndrome (SBS) and provide a stress-free, soothing, and far healthier office ambience by eliminating the glare and conflict of electric lighting and computer screens.

Retail

Tests have been carried out in stores which are lit mainly by natural means.

The key finding of the study was that natural daylight was found to significantly correlate to higher sales.

An average non-daylit retail chain store monitored for this study had 40% higher sales with the addition of Natural Lighting.

During the study, customers commented:

"This store feels cleaner"
"It feels more spacious, more open"
"I specifically travel to this store because I prefer the way it feels"

Improve Health

Exposure to Natural Lighting is believed to have the following benefits by boosting the production of vitamins and hormones:

- **Maintains the Circadian Rhythm**
- **Reduces depression**
- **Alleviates pain**
- **Improves sleep pattern and mood**

CIC Zero Carbon Building Hong Kong - *SUNPIPE*

SUNPIPE: Beacon Barracks Stafford - Autumn 2015

- **Beacon Barracks MOD base**
- **Sector:** Government
- **Contractor:** Jones & Woolman UK (Ltd) and Britannia Site Solutions
- **Location:** Beacon Barracks, Stafford
- **Product installed:** SUNPIPE
  - 17 x 450 mm Diamond Dome SUNPIPE
  - 3 x 750 mm Diamond Dome SUNPIPE
  - 5 x 530 mm Diamond Dome SUNPIPE

A major redevelopment of MoD Stafford has recently been completed. The work included six new living accommodation blocks for single soldiers and unaccompanied personnel, a Mess, operations room for the maintenance of Falcon armoured vehicles, workshops, offices and garages, as well as new leisure and retail, including a coffee shop and grocery shop.

For Monodraught specifically, SUNPIPES were installed on a pitched roof with a Kingspan composite roof panel. Steve Smith from Jones and Woolman, a specialist installer of weathering systems for all types of openings in roof and wall cladding, who installed the SUNPIPES at Beacon Barracks stated:

"Monodraught SUNPIPES are easy to mount onto all roof types".

The SUNPIPE natural daylight system directs sunlight into a room from roof level. The SUNPIPE collects daylight using a patented Diamond Dome, using a silverised PVD coated mirror-finished aluminium tube to transfer light to a room, with a ceiling diffuser evenly distributing the light around the room.

The benefits of SUNPIPES are:

- **Cost effective** – energy costs can be saved as the need for electric lighting during daytime hours is minimised by as much as 75%.
- **Healthier** – studies have shown that people work better under a natural daylight environment and natural daylight is known to combat Seasonal Affective Disorder (SAD).
- **Sustainable energy in action** – not only can SUNPIPE reduce energy usage it also leads to a considerable reduction in CO_2 emissions.

The practical benefits of the product are that they easily fits between joists and rafters, no maintenance is required and top domes are self-cleaning due to their shape, eliminating condensation problems. Low maintenance is also a great driver for the building owner.

Want to know more? Click Here

Find out how Monodraught systems can help you achieve healthier, cost-effective and more productive environments: info@monodraught.com, 01494897700

SUNPIPE:
Sainsbury's Whitchurch

- **Building Name:** Sainsbury's supermarket
- **Building Location**
  - City: Whitchurch
  - County: Shropshire
  - Country: United Kingdom
- **Building Type:** Supermarket
- **Market Sector:** Retail
- **Architects:** Chetwood Architects
- **Installation Date:** Completed December 2012

Located on a designated greenfield site Sainsbury's opened their new 30,000 square foot store in Whitchurch, Shropshire in December 2012. In line with Sainsbury's strict environmental policies the project specified SUNPIPE® natural daylight systems to provide daylight within the main shopping areas, customer café and staff facilities within the store.

For the main sales area, the specification called for 1200 Lux lighting level at one meter above the floor which was achieved by installing 90 x 1000 mm diameter SUNPIPE. A further 6 x 530 mm diameter SUNPIPE® met the 500 Lux specification for the customer café. SUNPIPE® were also installed within corridors and in the staff areas.

The relatively small footprint for SUNPIPE on the roof allowed the spare space to be used for PV panels and other plant items.

Key benefits

- 1200 Lux level achieved
- Daylight sensors provide integration with electrical lighting to optimise energy use
- In-store metering confirms a 15% saving on the store's lighting load
- Lower CO_2 emissions
- Low U-Values & G-Values
- Low maintenance, long life
- Relatively small footprint compared to traditional roof-lights

SUNPIPE: The Copper Box

- **Building Name:** The Copper Box
- **Building Location**
  - City: London
  - Country: United Kingdom
- **Building Type:** Sports Arena
- **Market Sector:** Leisure
- **Architects:** Make Architects
- **Consulting Engineers:** ARUP
- **Installation Date:** Completed March 2011

Originally named the Handball Arena, the Copper Box was built to be the goal ball venue for London 2012 Olympics & Paralympics. As one of the legacy buildings of the Olympics, the Copper Box will be adapted to become a multi-sport arena for local community use, athlete training and other multi-use events.

Make Architects, responsible for the design set out a strict environmental criteria for the project of sustainable energy. Along with rainwater harvesting, the use of natural daylight would assist in reducing carbon and energy costs. Having used the SUNPIPE® natural daylight systems on previous projects Make Architects entered in to discussions with Monodraught Ltd in May 2008 to investigate the possibilities of using this technology on the project. Make Architects specified a system that could deliver a 4% daylight factor.

Working with ARUP the Consulting Engineer, Monodraught presented a scheme that included 88 number 1500 mm diameter light pipes positioned strategically around the field of play. The systems also needed to be adaptable for when lower light levels were required so light shut off dampers were included along with special acoustic laminated glass.

Due to the nature of the project and the amount of congestion expected near the Olympic site, the systems were manufactured off site and delivered in sections ready to be installed on site.

Key benefits

- Estimated annual savings of 40% against electrical lighting costs
- Double glazed, high impact resistant glass
- Low U & G values
- Automatic damper controls to regulate sunlight
- Low maintenance, long life systems
- 4% daylight factor achieved
- Offsite pre-fabrication

Images are used with the kind permission of Mr Hugo A. Sanchez:
hugo.al.sanchez@gmail.com

http://www.behance.net/robtiksabotage

SUNPIPE: Poole Hospital

Dorset

The new Sandbanks ward at Poole Hospital includes a greater number of single rooms to improve patient privacy. The refurbishment concentrated on bringing a brighter, more modern environment for people who have to undergo a hospital stay.

SUNPIPE: Basildon Hospital

Basildon

Direct Installation for Facilities Team, Estates Department.

Our SUNPIPE® natural daylight systems were chosen to replace ageing roof lights which originally provided daylight to internal corridors. The original skylights had aged considerably and provided little or no daylight but provided huge amounts of heat loss during winter periods. As part of a ward refurbishment project, the skylights were replaced with a composite weathering skirt to fit over the existing skylight upstands, minimising additional roofing requirements. The SUNPIPE systems were then fitted down to the new ceiling level. The works were carried out with the minimum of disruption to the areas being served.

SUNPIPE: New Brentwood Resource Centre

- **Client:** South Essex Partnership NHS Trust
- **Architect:** Ingleton Wood
- **Contractor:** Hutton Construction

The new centre is a modern purpose built facility, which houses mental health outpatient, day care and therapy services for adult and older people in the Brentwood Locality. The completion of the resource centre has brought together a number of services which previously were operating in various buildings around the High Wood Hospital site.

Natural daylight was considered of primal importance on this new build development with the SUNPIPE® natural daylight systems utilised on the central corridors and to several of the treatment centres to increase the level of natural daylight over the level provided purely by the windows. In addition to the SUNPIPE systems further daylight is provided by VELUX roof windows and lantern lights.

SUNPIPE: Frenchay Hospital

- **Location:** East Ham
- **Client:** North Bristol NHS Trust
- **Architect:** Arturus Architects
- **Contractor:** ER Hemmings Ltd

SUNPIPE® natural daylight systems were chosen to provide natural daylight to the land locked internal spaces and deep plan on the new build consulting and therapy unit at Frenchay hospital. A series of SUNPIPES to the rear of the areas ensure that an even level of daylight is provided and washes the internal rooms with a high quality of light.

SUNPIPE: Waitrose Altrincham

Altrincham

Monodraught has worked in partnership with supermarket Waitrose to develop a new retail lighting unit featuring a SUNPIPE® integrated into an artificial light fitting. The new system, a Composite SUNPIPE Assembly (CSA), is designed to maximise the use of natural daylight, while controlling and balancing it with artificial light.

In addition, Waitrose has now decided to extend the development of the SUNPIPE CSA to introduce similar solutions into the main selling environment.

SUNPIPE: Sainsbury's Gloucester Quays

Gloucester Quays

Sainsbury's new 50,000 sq ft Gloucester Quays eco-store extends the lead taken by the supermarket chain's Dartmouth store by installing Monodraught SUNPIPE® natural daylighting systems throughout the building. As electricity reduction is a high priority at Gloucester Quays, Sainsbury has ensured maximum use of natural daylight by installing a total of 146, 750 SUNPIPES in the roof.

SUNPIPE: Asda Bootle

- **Location:** Bootle
- **Architect:** Ardas Architects

Supermarket group ASDA has a comprehensive energy efficiency programme that includes identifying sustainable and renewable sources of energy for all its stores and depots.

Its flagship energy efficient store model, opened in Bootle, Merseyside features innovations such as a main structural frame built entirely from sustainably sourced timber, a recycled aluminium roof, and extensive use of natural lighting including Monodraught SUNPIPES® and translucent walls.

The Monodraught SUNPIPE systems are used to introduce natural daylight into a wide area of the first floor mezzanine area that includes a customer restaurant overlooking the sales floor and staff facilities including their restaurant and cafeteria, a communal changing room, a meeting room and offices.

Monodraught worked closely with ASDA's M&E contractor SIAS on the specification and installation of our 750 mm SUNPIPE systems, which are designed to produce approximately 1000 lux at floor level, making them ideal for buildings of more than 7 m in height.

SUNPIPE: Sainsbury's Dartmouth

- **Location:** Darmouth
- **Architect:** Stride Treglown

Sixty-four 750 mm diameter SUNPIPES® provide natural daylight for the shop floor with a further sixteen 750 mm diameter units fitted in the offices, and five 300 mm diameter units in other areas of the store.

Sainsbury's aim was to be one of the first supermarkets to achieve a BREEAM 'Excellent' rating for its commitment to sustainable construction.

SUNPIPE: Jack Tizzard School

- **Location:** London
- **Architect:** Clarke Kidwell Architects

Jack Tizzard School in Ealing, West London was a Special Needs School and it was considered that the soothing and calming effect afforded by SUNPIPES® creates the ideal environment for children with special needs. A high level of security is desirable. The absence of distraction created by view out from windows and the absence of stress caused by fluorescent lighting all contribute to a far healthier and more friendly environment.

SUNPIPE: Domestic Case study: Beaconsfield House Re-development

Sustainable home-building, using Monodraught SUNPIPE's to bring natural light indoors

- **Sector:** Domestic
- **Contact:** EAB Construction
- **Location:** Beaconsfield, Buckinghamshire
- **Product installed:**
  - 2 N° 300 mm SUNPIPE® system

A multi-million pound property has recently been completed on the outskirts of Beaconsfield, Buckinghamshire by EAB Construction. EAB Construction are a company that specialises in offering a bespoke, award winning service, ranging from specification builds for private individuals through to their own uniquely designed and luxuriously appointed developments. Their client wanted to increase the amount of natural light available in two bathrooms and simultaneously reduce energy usage. They opted to install 2 Monodraught SUNPIPE systems in their pitched slate roof with vaulted ceiling.

The SUNPIPE natural daylight system directs sunlight into a room from roof level. The SUNPIPE collects daylight using a patented Diamond dome, using a silverised PVD coated mirror-finished aluminium tube to transfer light to a room, with a ceiling diffuser evenly distributing the light around the room.

The Monodraught natural lighting solution brings the below benefits to the end-user:

- **Cost effective** – energy costs can be saved as the need for electric lighting during daytime hours is minimised by as much as 75%.
- **Healthier** – natural daylight is known to combat Seasonal Affective Disorder (SAD).
- **Sustainable energy in action** – not only can SUNPIPE reduce energy usage it also leads to a considerable reduction in CO_2 emissions.

The practical benefits of the product are that they easily fit between joists and rafters, no maintenance is required and top domes are self-cleaning due to their shape, eliminating condensation problems, particularly useful in this case as it is installed in two bathrooms.

Peter Warren from EAB Construction said "We were happy to work with local business Monodraught to supply the SUNPIPE systems. We were convinced that their high-quality product would provide a great deal of natural light into an otherwise dark space, with no ongoing maintenance required."

Natural Ventilation

Why Choose Natural Ventilation?

Healthier

Natural Ventilation brings a steady supply of fresh air into the building, topping up the oxygen level, whilst at the same time expelling stale air to the atmosphere using the natural buoyancy of thermal forces. Fan noise, often associated with mechanical systems or air conditioning, is eliminated, to the benefit of the occupants.

Long Term Track Record

Our Victorian forefathers used Natural Ventilation extensively, as indeed did the Persians and Arabians before that. Today's Natural Ventilation systems have all the benefits of sophisticated controls but retain the well-established principles of the origins of **Natural Ventilation**...

...a concept which Monodraught have been utilising for over 40 years.

Sustainable Energy in Action

By maximising the use of wind pressure and the natural stack effect of thermal buoyancy, Natural Ventilation does not use any fossil fuelled energy. Instead it relies on harnessing wind power and the thermal rise of warm air, using it in a controlled way.

Cost Effective

In today's current climate with energy costs escalating at an unprecedented rate, there is no telling what energy costs will be in 5 or 10 years' time! Once Natural Ventilation is installed, there are...

no running costs ever

...for the life of the building.

More than Just Passive Stack

Early Naturally Ventilated buildings relied purely on a passive stack approach to act like a 'chimney stack'. The limitation of such an arrangement is that to work effectively, the temperature in the passive stack has to be some 10°C above the ambient temperature in the room, which in summer months may lead to overheating.

Monodraught systems overcome this problem by incorporating wind driven air intakes to generate a positive pressure in the room below, and combined with temperature differentials, this assists the passive stack element to exhaust the stale air.

No Maintenance

Since Natural Ventilation systems essentially have no moving parts, there is nothing to wear out, break down, corrode or indeed require replacement.

"Monodraught WINDCATCHER® systems have proved to be the most effective method of providing Natural Ventilation to any commercial building."

- National Green Specification

Best in Class

Monodraught Natural Ventilation systems have achieved an enviable reputation although there have been some companies that have attempted to copy the Monodraught systems and indeed, many Engineers and Designers have designed their own bespoke Natural Ventilation systems.

The fact cannot be ignored however that over the last 10 years, Monodraught's systems have proved to be consistently effective and reliable and have performed in accordance with the initial design criteria. It is the constant 'fine tuning' and feedback to Monodraught's dedicated Design Teams which enables our products to be improved in their manufacture, aesthetics, and performance. The 'acid test' of the effectiveness of Monodraught's systems has perhaps been best demonstrated during the hot summer of 2006, where daytime temperatures as high as 36°C were recorded and yet, throughout this unprecedented and extensive 'hot spell', schools and offices where WINDCATCHER systems were fitted experienced a high satisfaction rate – with no reports of any failures or overheating. No-one knows what future summers hold in store, but if 2006 was anything to go by Monodraught are confident that their systems will continue to provide a completely reliable and effective method of providing energy free Natural Ventilation.

No Leak Guarantee - X-Air Systems

Monoraughts patented **WINDCATCHER® X-AIR** Natural Ventilation system is now offered with a...

...10 year No Leak Guarantee

This unrivalled level of weather protection for a roof mounted ventilation system guarantees that **WINDCATCHER X-AIR** units will not leak for ten years from the date of installation/commissioning thanks to three unique layers of ACTIVLOUVRE weather protection.

First, Monodraught's patented modulating louvre technology allows the weather resistance of the external louvre blade to be increased dependent on weather conditions, even when closed at roof level to prevent snow being blown through its open louvre arrangement. Second, the ACTIVLOUVRE uses a weather resistant double-step louvre profile that provides **25% more ventilation** than a conventional Classic louvre profile. And third, WINDCATCHER X-AIR units now feature a computer designed, profiled internal rain trap louvre fitted as standard.

WINDCATCHER X-AIR systems carry a 10-year installation guarantee with the systems' control actuators guaranteed for five years.

SOLA-BOOST: Hazeley School

- **City:** Milton Keynes
- **Country:** United Kingdom
- **Architect:** Architecture MK

Milton Keynes were one of the first Authorities to implement the SOLA-BOOST throughout on new school development in conjunction with SUNPIPES to serve every classroom. Over the last 15 years, WINDCATCHERS have proved to be so successful in eliminating the need for air conditioning in classrooms, the SOLA-BOOST system seemed a natural step for the Architects to further improve and enhance the natural ventilation capabilities. Each classroom is served by a separate SOLA-BOOST system to both the first floor and ground floor classrooms and SUNPIPES are similarly used to bring daylight down into the rear of the ground floor classrooms.

WINDCATCHER: Kidderminster College

- **Location:** Kidderminster
- **Architect:** GVA Grimley

1000 mm diameter WINDCATCHER® systems were used to ventilate a series of classrooms on the top floor of this new College. Traditionally it is the classrooms on the top floor that suffer the most from solar gain, so this is where natural ventilation is at its most effective.

WINDCACHER & VENTSAIR: Wycombe Sport Centre

- Construction of Wycombe Sports Centre at the Handy X Hub
- **Sector:** Leisure
- **Main Contractor:** Willmott Dixon
- **Location:** High Wycombe, Buckinghamshire
- **Products installed (November 2015):**
  - 13 x WINDCATCHER X-AIR 200 Natural Ventilation System
  - 1 x WINDCATCHER X-AIR 140 Natural Ventilation System
  - 6 x 3000 mm x 1000 mm VENTSAIR Wall mounted natural ventilation systems
  - 3 x iNVent 2 controls system
  - Over 250 AIR-PRECISION grilles, diffusers and Louvres supplied

Monodraught are pleased to be part of a major local construction project, the Handy Cross re-development scheme. The £150m Handy X Hub development is based on an exercise well, eat well, and work well mix. In addition to a new state of the art Leisure Centre and a full size Waitrose, the development includes a new purpose-built coachway park and ride and the potential to provide fast coach services to Heathrow, London and other national connections.

The leisure centre opened at the beginning of January 2016 and has been very well received by the public. Users of the centre have commented on how bright and airy the building feels.

The leisure centre includes:

- An eight lane 50 m pool with moveable floor and sub-aqua dive pit
- 20 x 8 m learner pool with moving floor
- Splash zone for toddlers
- Climbing wall
- 150 station gym
- Dance studios
- 12 court sports hall
- Four rink bowls hall
- Steam room and sauna
- 2 x squash courts
- 2 x party or meeting rooms
- Café

The Monodraught WINDCATCHER® X-AIR is the latest generation of Natural Ventilation that follows in the footsteps of the successful WINDCATCHER Classic systems. This is an energy free Natural Ventilation system encompassing the benefits of both top-down and passive stack ventilation. The simple, but effective design of the system provides fresh air during the daytime as well as night-time cooling.

The main advantages Monodraught systems have over other forms of Natural Ventilation are:

- It doesn't matter which way the wind blows, the louvres on one side will always entrain the prevailing wind and turn that air movement down through 90°.
- WINDCATCHER X-AIR natural ventilation systems are guaranteed not to leak from the date of commissioning. Monodraught backs up this promise with a full 10 -year product guarantee.
- ACTIVLOUVRE® modulating louvre technology allows the weather resistance of the external louvre blade to be increased dependent on weather conditions and even closed at roof level to prevent snow being blown through an open louvre arrangement.
- ACTIVLOUVRE uses a weather resistant double step louvre profile whilst providing 25% greater levels of ventilation than a conventional Classic louvre profile.
- Computer generated design of profiled internal rain trap louvre is fitted as standard.

The VENTSAIR® wall mounted natural ventilation system is a high specification small format louvre system. The system has been used extensively in education facilities, health facilities as well as retail schemes.

Andrew McCubbin, Managing Director of Monodraught said "Monodraught's whole team pulled together to ensure we were part of this landmark development. We are delighted to have installed our WINDCATCHER and VENTSAIR products for the benefit of Leisure Centre users right here on our doorstep."

We look forward to continuing to support this development with further product installations as the construction is completed. Check back for further updates!

WINDCATCHER: Tesco Corby

- **Building Name:** Tesco Supermarket
- **City:** Corby
- **County:** Northampton
- **Country:** United Kingdom
- **Market Sector:** Retail
- **Architect:** Woods Hardwick
- **Instalation Date:** Completed January 2013

Monodraught has supplied and installed twelve of its WINDCATCHER® X-Air systems to provide natural ventilation for the 82,500 square foot sales area of Tesco's newest and largest Eco Store, which opened in Corby, Northamptonshire in January 2013.

The tried and tested WINDCATCHER X-AIR systems are on the Tesco approved list for its Eco Stores and have been specified previously on successful installations by architects Woods Hardwick, the project's master planners and designers.

The Eco Store was built by developer Mulberry to Tesco's specification on the St. James Industrial Estate, and is the largest Eco Store built to date. The 7.8 hectare site, which is located on one of the primary approaches to the town, has been landscaped and includes cycle routes and displays of public art. It also features a special, dynamically-designed canopy for its petrol station.

Commenting for Woods Hardwick, commercial director Karl Myhill says that in response to updated building regulations Tesco has included energy saving and sustainable initiatives to go beyond the standard requirement of 50% carbon reduction and ensure that the store is as sustainable and energy efficient as possible.

As one of the key suppliers, Monodraught was involved early in the planning stage, later supplying twelve oval WINDCATCHER X-AIR systems aerodynamically-designed to deliver the optimum ventilation rate to extract warm, stale air from the vast main sales area of the store and introduce fresh, naturally-ventilated air.

Defining features of the WINDCATCHER X-AIR include distinctive styling and patented LED architectural lighting, which create a unique presence on the roof of a building – day and night. For the Corby store, Monodraught also designed a unique terminal, which is now a distinctive feature of new Eco Stores and an integral part of the corporate image of the buildings.

Complementing the distinctive design are other innovative features that significantly improve the WINDCATCHER X-AIR's performance and create a new standard in natural ventilation systems. These include Monodraught's ACTIVLOUVRE modulating aerofoil technology featuring specially-designed louvre blades to minimise resistance and maximise airflow while providing significantly smoother internal airflow. Together they optimise ventilation control and ultimate weather protection. The X-Air units, which are constructed from fully-recyclable materials, are also fitted with composite insulated upstands to achieve low U-values and high air tightness. They also make installation much quicker and easier.

Other significant environmental features of the building include a timber frame, sustainable cladding and a rain water harvesting system.

Summing up, Karl Myhill says: "We were proud to have designed-in such sustainable features at the start and worked with Corby Council, which was involved in enhancing the environmental credentials of Tesco's largest environmental-format store, providing electric car charging points and a number of other initiatives." He adds that the practice is also proud that the building has achieved a BREEAM 'Very Good' rating without having to resort to retro-fit solutions such as photovoltaic cells and wind turbines.

The Corby Eco Store is expected to become a benchmark for future Tesco Eco Stores.

Key benefits

- Included as part of Tesco's drive to reduce carbon emissions by over 50%
- Reduced energy
- Composite insulated upstands improve installation time and air tightness
- Low maintenance, long life
- BREEAM 'Very Good' rating

Images are used with the kind permission of Woods Hardwick Architects and Development Consultants

WINDCATCHER:
Tranent North Primary School

- **Location:** East Lothian
- **Specifier:** East Lothian Council, Community Housing & Property Management

Monodraught WINDCATCHERS® have proved extremely popular in Scotland being specified and installed now on more than 60 schools in the Scottish region. This is all under the direction of Monodraught's Agents in Scotland, JRF Services of Glenrothes in Fife.

BESPOKE WINDCATCHER:
Tesco Stores - Cheetham Hill

- **Location:** Cheetham Hill
- **Consultant:** Scott Wilson

Tesco, the UK's leading supermarket chain set itself a target to reduce by 50% the carbon emissions from all its stores by 2020 as compared to a baseline of 2006.

Remarkably they exceeded this ambitious target when they opened their first major new Eco-store at Cheetham Hill, Manchester, reducing the carbon footprint by 70% compared to an equivalent sized store built just over two years ago.

The 52,000 sq ft Cheetham Hill store, located in a redevelopment area near Manchester, is built to an Environmental Format that will provide a "low carbon blueprint" for future Tesco stores built in the UK.

"The environmental impact of the store is absolutely amazing. There's a real nice feel about the whole store... the fresh air that comes in makes for a better working environment. All the staff and customers like it, it's not like working in a normal supermarket."

Bill Moss, Community Champion

BESPOKE WINDCATCHER: St Josephs College

- **Location:** Ipswich
- **Architect:** Wincer Kievenvaar
- **Consultant:** Johns, Slater & Haward

A state-of-the-art Infants and Junior School characterised by the use of bold organic forms, natural light and bright colours designed to inspire its young pupils, provides a clear statement of environmental intent by naturally ventilating the 125 square metre hall, a circular library and a series of interlinked shared spaces. Greg Allen, Facilities Manager at St Joseph's College says, "The systems have regulated the internal temperatures without any outside assistance".

Architects can have fun!

Using the fairly dominant appearance of WINDCATCHER systems, an Architect can have a field day on some very striking designs for their school building! Colours as well as shapes can be used to great effect.

SOLA-BOOST: Kentish Town Healthcare

- **Location:** Croydon
- **Client:** Camden PCT & James Wigg Practice
- **Main Contractor:** Morgan Ashurst
- **Services Engineer:** Peter Deer Associates

Kentish Town Health Centre (KTHC) is a new health building in central London, combining a large GP clinic and a wide range of health facilities. Delivered through the LIFT procurement programme the building was designed to provide a new standard for modern healthcare facilities.

The project was initiated by a project champion with a vision for integrating medicine, health and art within a community building. These views were embraced by the Architects, Allford Hall Monaghan Morris and the partnership with Camden & Islington Community Solutions has set an award winning standard for the future generation of NHS development.

Awards:

- Civic Trust Award 2010
- Building Magazine: Public Building of the Year 2009
- RIBA Stirling Prize-Shortlist
- RIBA Award for Architecture 2009
- LIFT Award for best Design for Healthcare Project 2009

WINDCATCHER: Blackberry Hill Hospital

- **Location:** Bristol
- **Concept Architect:** Devereux Architects
- **Implementation Architect:** Frederick Gibberd Partnership
- **Services Engineer:** Hurleypalmerflatt
- **Contractor:** Rydon Construction
- **Client:** Avon and Wiltshire Mental Health

Over 40 WINDCATCHER® natural ventilation systems were specified on the project, with most sited in the ward corridors, the central hub and the Main building. The WINDCATCHER natural ventilation systems are designed to catch the wind from any direction using a series of external louvres linked to quadrants and internal turning vanes. The captured fresh air is brought down into the building via a damper system, which controls the rate of flow. At the same time, the warm internal air is expelled through the same route as a form of displacement ventilation. Among the advantages of the system is that it can be designed and sized to meet the exact ventilation needs of the spaces without relying on external elements, such as rooflights or opening vents, which in this case would have presented a security risk.

WINDCATCHER: Royal Chelsea Hospital

- **Location:** London
- **Architect:** Steffian Bradley Architects (SBA)
- **Facade:** Quinlan & Francis Terry Architects
- **Consultant:** Delap & Waller

Monodraught WINDCATCHER® natural ventilation systems were selected to provide energy-free fresh air throughout the new three storey flagship care home. The fifteen systems were cleverly adapted by Monodraught to complement the architectural style of the new infirmary, which is in context with original Wren and Soane buildings. The units were clad in clay pantiles to ensure a perfect blend with the architectural style. CFD analysis was carried out using Monodraught's own development team and then verified using external specialists to optimise the architectural cladding.

WINDCATCHER:
Cranbrook Primary School

- **Location:** Ilford
- **The London Borough of Redbridge**

A total of 28N° GRP circular WINDCATCHER systems serving Classrooms and Halls were provided to this school. Seventeen of the systems has specially designed twin duct arrangements so that a room on each floor can be served by a single system. This allowed for a total of 34 rooms to be served in addition to the two Main Halls as well as four other classroom areas.

WINDCATCHER:
Sir William Ramsay School

- **Location:** Hazlemere, Bucks
- **Architect:** Jacobs UK Ltd

Twelve Monodraught WINDCATCHERS were installed at the Performing Arts Block of the Hazlemere based Sir William Ramsay School, to provide natural ventilation for its 600-seat Main Hall and adjacent Dance and Performance areas. Their business manager Richard Mapp says: “Monodraught’s WINDCATCHERS were the ideal solution and the entire facility now stays cool and refreshed, even when full of students letting off steam”. He adds “that once installed, WINDCATCHERS maximise the use of wind pressure and the natural stack effect of thermal buoyancy, which means schools reap all the benefits of sustainable energy and incur no running costs.

WINDCATCHER: Peckham Academy

- **Location:** London
- **Architect:** Curl La Tourelle Architects
- **Consultant:** Halcrow Group Ltd

The £23 m Academy in central London consists of 3-storey buildings, where it was necessary to provide natural ventilation not only to the top floor but also to the two floors below. Monodraught WINDCATCHERS were used to provide a sustainable solution to achieve ventilation to deep plan classrooms on multiple floors. The top floor classrooms are served by 800 mm units, positioned in the centre of each room, whereas ground and first floors are served by rectangular units measuring 1300 mm x 450 mm, connected up to internal blockwork ventilation shafts formed in the walls of the central corridors.

WINDCATCHER: Imperial College

- **Location:** London
- **Architect:** Gatehouse Architectural Consultants

The Library is on the top floor, with full height glazing and suffered for many years from chronic overheating in the summer months. However, the WINDCATCHER natural ventilation systems were the chosen strategy due to their energy saving features. Another major benefit and consideration for the College was the improved health and comfort aspects of natural ventilation systems, which have proved to provide a more calm and stress-free working and studying environment.

Phil Evans, Energy Manager says, “We are all aware how difficult it is to study and work in a stuffy and warm environment and this was one of the key factors in the College’s decision. After all, what could be more energy efficient than ‘free fresh air’.”

WINDCATCHER:
Addey & Stanhope School

- **Location:** Deptford, London
- **Architect:** Barron and Smith Architects
- **Consultant:** Environmental Engineering Partnership

Thirteen ‘top down’ Monodraught WINDCATCHER® natural ventilation systems were installed in a major extension to the school, which is next to the busy A2 trunk road in Deptford. The Architect, Guy Shackle said, “I was impressed with the simplicity of the WINDCATCHER technology. The roof mounted units are located well above the heavy pollutants on the A2 allowing fresh air to be drawn into the heart of the building. Acoustic lining in the ducts of the WINDCATCHERS has reduced noise ingress to 38 dBa, which is well within the noise design limits set by the Acoustic Consultants.” A variety of automatic controls related to temperature and air quality sensors were also provided by Monodraught.

WINDCATCHER:
Queensmead Primary School

- **Location:** Braunstone, Leicester
- **Consultants:** Silcock Dawson & Partners

A total of 18N° WINDCATCHER systems serving the Classrooms and 3N° GRP 1000 square systems serving the Main Hall. The systems not only look in keeping with the building exterior but they also maximise the use of cross ventilation from perimeter windows to give the best of both worlds for natural ventilation.

WINDCATCHER X-AIR & iNVENT CONTROLS:
Paulton's Park harnesses natural environment to reduce carbon footprint

- **Project Name:** Paulton's Family Theme Park
- **Sector:** Retail
- **Architect:** HPW Architecture
- **Consultant:** Zero Emission, Birmingham
- **Location:** Paulton's Family Theme Park, Hampshire
- **Products Installed (2014):**
  - 17 No. WINDCATCHER® X-Air 200 natural ventilation systems
  - 2 No. Invent Control Panels

Monodraught were pleased to be specified for a second time in the natural ventilation strategy for Paulton's Family Theme Park entrance and café which went into operation in 2014. Monodraught provided 17 No. WINDCATCHER X-AIR systems as part of a wider focus on operational costs and sustainability. Monodraught's solution met the needs of the customer with virtually no energy usage. The product is UK designed and manufactured. By installing a natural ventilation solution, Paulton's Park were able to negate the need for mechanical ventilation by harnessing the natural environment for the full 12 months of the year in the entrance area and café.

This work builds upon the existing development work already completed at Paulton's Park. In 2011, we installed 7 No GRP SOLA-BOOST Windcatcher Natural ventilation systems in the iconic PeppaPig World grass-roof building & play-area.

Both installations allow the attraction to minimise its impact on the environment by using virtually no energy to ventilate the buildings, benefitting both the local environment and reducing long-term running costs for the business.

The WINDCATCHER X-Air is a 2nd generation natural ventilation system featuring the patented ACTIVLOUVRE® modulating aerofoil louvre technology. The system consists of an external static louvre and internal active louvre arrangement, which varies the opening and free area through the louvre face. In addition to the ACTIVLOUVRE arrangement, the system also incorporates external air catchment fins to provide greater area at the louvre improving performance in relation to wind speed. Pressure release vanes at the fins provide a means to reduce face pressure under high winds.

When coupled with Monodraught's iNVent control system, the system is capable of providing temperature and CO_2 demand controlled ventilation, by means of energy efficient motorised volume control dampers.

WINDCATCHER: Goldsmiths DMC Building

- **Location:** SE London
- **Sector:** Education
- **Systems Installed:** Windcatchers

WINDCATCHER: Bluewater, Dartford

- **Location:** Dartford, Kent
- **Sector:** Retail
- **System Installed:** Windcatchers

Proven high quality low-carbon ventilation selected for Arboretum

- **National Memorial Arboretum: WINDCATCHER® Classic and iNVent 2 Control Panel**
- **Sector:** Other
- **Architect:** Glen Howells Architects
- **Building Contractor :** Stepnell
- **M&E Contractor:** Daly Engineering Services Ltd
- **Location:** Alrewas, Staffordshire
- **Product installed (2016):**
  - » 5 No. WINDCATCHER Classic 185 natural ventilation systems c/w 24V Boost fan
  - » 3 No. WINDCATCHER Classic rectangular 2000 mm x 1000 mm natural ventilation systems c/w 24V Boost fan
  - » 1 No. Monodraught iNVent2 Control Panel c/w PV Optimiser

Monodraught were selected as a natural ventilation solution for the expansion of the National Memorial Arboretum in Staffordshire.

The National Memorial Arboretum is the UK's year-round centre of Remembrance; a spiritually uplifting place which honours the fallen, recognises service and sacrifice, and fosters pride in our country.

With 30,000 maturing trees and over 300 memorials, it is a beautiful and lasting tribute to those who serve their country, die in conflict or have a special reason for being remembered.

It seems fitting that a site that uses nature as a way to remember the fallen has also chosen a solution for ventilation which harnesses the environment for building ventilation. Monodraught have a long-term track record and have been utilising natural ventilation in their solutions for over 40 years.

The WINDCATCHER encompasses the benefits of both top-down and passive stack ventilation. The system consists of an external louvre protected internally by Trilayer Weather Protection and is internally divided. The simple but effective design of the system provides fresh air during the daytime as well as night-time cooling.

When coupled with Monodraught's iNVent 2 BMS controls, the system is capable of providing temperature and CO_2 demand controlled ventilation. The system requires little maintenance which is ideal for the Arboretum as it relies heavily on regular visitor numbers to maintain voluntary donation contributions so needs to remain available to the public as much as possible.

The £15.7m development will be completed by late 2016 and will allow the arboretum to host up to 500,000 visitors a year. The improvements will include a new Remembrance Centre with dedicated education facilities that will enable the Arboretum to expand its engagement from 10,000 schoolchildren a year to 25,000. Improvements will also be made to the reception area, restaurant, café and shop.

The natural ventilation system will allow the Arboretum to have a minimal impact on its environment in terms of carbon footprint and by circulating fresh air within the building, it will allow staff and visitors to benefit from fresh air to remain alert and able to enjoy their day at the centre.

To find out which of our solutions are applicable for your building development please look at other projects we have worked on or contact our friendly sales team.

Fresh air, low-carbon solution for Macmillan Cancer Care Centre

- **End-user & Product:** East Surrey Macmillan Cancer Support Centre, Circular ABS 550 WINDCATCHER® Systems
- **Sector:** Healthcare
- **Construction:** Buxton Building Contractors
- **M&E Engineers:** Axis M&E Consulting Engineers
- **Product installed 2015:**
  - » 4 No. Circular ABS 550 WINDCATCHER natural ventilation systems
  - » 1 No. Monodraught iNVent 2 fully automatic control system with night time cooling facility

The East Surrey Macmillan Cancer Support Centre was developed through a partnership between Surrey and Sussex Healthcare NHS Trust and Macmillan Cancer Support. It was opened in February 2016 by a previous patient. The cancer support centre offers those affected by cancer additional holistic care in a friendly, informal and non-clinical environment.

The Circular ABS 550 WINDCATCHER systems were installed in 2 therapy rooms and 2 quiet rooms and will provide natural ventilation for staff, patients and visitors. The Circular ABS 550 WINDCATCHER is an energy free natural ventilation system encompassing the benefits of both top-down and passive stack ventilation. The system consists of an external louvre bank protected internally by an anti-bird mesh and internally divided. The simple, but effective design of the system provides fresh air during the daytime as well as night-time cooling.

There are a number of benefits for the Macmillan Cancer Support centre of using this system. By using a natural ventilation system the centre is able to reduce CO_2 levels by expelling stale air and also maintaining a comfortable fresh environment.

Natural ventilation ensures that the system will not be affected by changing energy costs and low maintenance means there are is little need for disturbing the calm environment at the centre. The cost effective and low maintenance system means that funds can be focused on supporting staff and patients.

Monodraught are committed to working in an ethical and responsible manner. Our products and services are low-carbon and low-energy solutions which help people be in a healthier natural built environment. We are always keen to extend these strong ethical credentials into ways to contribute to our local and wider community. On 10th October we hosted our own MacMillan coffee morning for the second year. Staff competed for best baker and best decorated cake. We will update our social channels with fundraising totals and of course the winning cake!

Hybrid Thermal Mixing Ventilation

HTM Systems

Following the release of the Facilities Output Specification for the Priority Schools Building Programme, Monodraught have utilised their extensive knowledge, product testing, and building simulation skills to develop low energy ventilation systems which meet the Facilities Output Specification requirements in a cost efficient manner.

Hybrid Thermal Mixing (HTM) systems are designed to provide natural ventilation and hybrid ventilation incorporating mixed tempered air for winter periods. In addition, the systems have the ability to provide secure night time cooling, and boosted levels of ventilation during summer. The HTM systems are designed to work in conjunction with natural ventilation and can be used in single sided or cross flow ventilation strategies.

The HTM system is comprised of an intelligent and fully automatic control system coupled with a low energy ventilation system which switches between operational modes dependant on season, external/internal temperature conditions and indoor air quality (IAQ).

The Monodraught® HTM systems have exceptionally low specific fan powers and feature an intelligent control system, which is supplied as standard, with full data logging facility, temperature control and CO_2 control. With the optional BACnet module, each unit has the ability to output key performance data to a central BMS.

Image reproduced courtesy of the Education Funding Agency

Why Choose Hybrid Thermal Mixing?

Ideal Environment

- The HTM system is able to provide the ideal environment to school classrooms/ areas.
- The HTM system is designed to provide mixed tempered air during winter, boosted levels of ventilation during summer and secure night time cooling.
- The HTM system works in conjunction with natural ventilation provided by manual or automatic windows/louvres.
- The HTM system can be used in single sided or cross flow ventilation strategies.

Exceptionally Low Power Consumption

- The HTM system has an exceptionally low specific fan power.
- The HTM system comprises an intelligent and fully automatic control system coupled with a low energy ventilation system which switches between operational modes dependant on season, external/internal temperature conditions and indoor air quality (IAQ).
- The HTM control system is supplied as standard with full data logging facility, temperature and CO_2 controls. With an optional BACnet module, each unit has the ability to output key performance data to a central BMS.

CFD analysis and site verification have demonstrated compliance with PSBP criteria with one HTM system per classroom.

Typical Classroom Ventilation

HTM Case Study

Thomas Hickman School

- System installed on 02/09/2014 and data logged until 02/03/2015
- Classroom is approximately 5 m x 9 m (area = 45 m^2)
- Ceiling height 3.2 m (volume = 144 m^3)
- East facing glazing approximately 7 m x 2 m which cannot be opened due to external noise
- Occupancy of 30 children and 2 adults

On a winter day:

Data	Max	Min	Average
Room Temperature	23 °C	21 °C	22 °C
External Temperature	7 °C	0 °C	5 °C
Mixed Air Temperature	25 °C	15 °C	19 °C
CO_2	1780 ppm	435 ppm	1300 ppm

Results between 8:30 - 15:30

On a spring day:

Data	Max	Min	Average
Room Temperature	24 °C	21 °C	23 °C
External Temperature	17 °C	6 °C	13 °C
Mixed Air Temperature	24 °C	13 °C	20 °C
CO_2	1580 ppm	505 ppm	1145 ppm

Results between 8:30 - 15:30

Mechanical Ventilation Heat Recovery (MVHR)

MVHR is a high quality and low maintenance technology that drives down building energy costs and reduces their CO_2 emissions

Monodraught's MVHR systems are designed to simultaneously supply tempered fresh air to any built space ensuring the correct oxygen levels are maintained whilst expelling stale air.

By simultaneously recovering heating or cooling energy to temper incoming air, the systems are able to significantly reduce power consumption and associated building running costs.

The system is designed to automatically provide trickle ventilation, heat recovery ventilation and secure night time cooling. It also boosts levels of ventilation during summer or during periods of high CO_2. The MVHR system can complement natural ventilation provided by being integrated with manual or automatic windows/louvres, either via a single sided or cross flow ventilation strategy.

The system comprises an intelligent and fully automatic control system which switches between operational modes dependant on external/ internal temperature conditions and indoor air quality (IAQ).

Monodraught provides a Mitsubishi Lossnay heat exchanger core with or without a high quality acoustic shroud. As a result, the MVHR system can be installed in a range of exposed or concealed locations, such as direct façade or ducted applications.

For more information, please request our MVHR Brochure

COOL-PHASE®

The COOL-PHASE system is able to reliably meet requirements for thermal comfort, energy efficiency, and ventilation, even in the toughest of scenarios

Modular Design

The COOL-PHASE system can be installed in modular spaces or large open plan offices, above a false ceiling or suspended below to suit a range of environments. It can also be installed and integrated with new or existing mechanical ventilation and cooling schemes to offer local decentralised ventilation whilst taking over some of the cooling duty, thus improving air quality and lowering running costs.

No External Units

COOL-PHASE does not require any external units. This makes COOL-PHASE particularly suitable in applications where access to outside space or planning constraints are an issue and has a positive impact in terms of external acoustics.

Low Running Costs

The system has low servicing, maintenance and energy costs, combined with a long life that provides an impressive payback on the capital cost of the system and enables building owners and occupants to significantly reduce their carbon footprint.

Why Choose COOL-PHASE?

Healthy and Productive

The COOL-PHASE system creates a healthy and productive environment by monitoring internal air quality and ensuring there is a supply of fresh air.

Energy and Carbon Saving

The COOL-PHASE system uses an energy efficient variable speed fan with no compressors, pumps or other energy intensive components. A 5A single phase mains supply is all that is required.

No Refrigerants

The COOL-PHASE system does not use the coolants often found in conventional cooling approaches. Therefore regulations controlling the use and disposal of refrigerants do not apply to COOL-PHASE.

20 YEAR DESIGN LIFE

5 YEAR WARRANTY

Provides customers with the reassurance that they have a long term solution to their cooling and ventilation needs

COOL-PHASE: Bournemouth University

- **Location:** Bournemouth
- **Contact:** Steve Cox, Bournemouth University
- **Systems:** COOL-PHASE® system
- **Sector:** Education

Science Lecture Room Served by COOL-PHASE: The Science Lecture Room at Bournemouth University was fitted with two new COOL-PHASE units discreetly positioned within the ceiling void to provide natural cooling within the room.

Scenario: Two Monodraught COOL-PHASE systems were specified to serve the Science Lecture Room at the University to provide intelligently controlled low energy ventilation and natural cooling via thermal batteries to the area to maintain thermal comfort and air quality levels throughout the year.

Detail: The design team at Monodraught carried out dynamic thermal modelling which were able to predict that 2N° 8 KWhr COOL-PHASE systems would fully dissipate the heat gains within all the areas of the building where the COOL-PHASE was to be installed.

The installation was carried out by Monodraught's installation team and commissioning of the systems was completed in April 2012.

Results: The COOL-PHASE system monitors and records temperatures, CO_2 levels and energy use. The results below are based on data collected by the units installed in the room between 20th April 2012 and 24th June 2013.

Temperature Comparison: The following table shows the overall average daily temperatures for the room. It is clear from the table that the COOL-PHASE systems have kept the temperature within a very comfortable band.

The other table shows the percentage of time that the internal temperature has spent at over 25°C , 28°C and 32°C during the logged period.

The COOL-PHASE system has maintained an ideal temperature within the rooms of less than 25°C across the logged period for the majority of the time. With only a very small percentage of time being monitored at over 25°C and at no point exceeding 28°C, this more than meets the target for overheating in terms of either CIBSE guide A or BB101.

Daily Temperatures (°C) Science Lecture Room		
Average	Min Average	Max Average
20.6 °C	19.0 °C	21.9 °C

Max Temperatures (%) Science Lecture Room		
>25°C	>28°C	>32°C
0.01%	0%	0%

CO_2 Levels: Background or atmospheric CO_2 level is approximately 400 parts per million (ppm) and 1500 ppm or above would be considered a high level.

CO_2 Levels Science Lecture Room		
> 1000 ppm	> 1200 ppm	> 1500 ppm
0%	0%	0%

Energy Use: As shown in this table the two COOL-PHASE units installed in the Science Lecture Room used a combined 138.5 KWHs of energy across the logged period.

Assuming 0.11 £/KWh that amounts to £15.24 or an average of £0.25p a week.

Energy Used Science Lecture Room - 61 Weeks			
Cost in £'s (Assumed 0.11£/KWh)	138.5 KWhs	£15.24 Total	£0.25p Wk

Conclusion

The Monodraught COOL-PHASE system has shown that it meets the design criteria and specification that the client requested. A requirement for fresh air and to ensure that CO_2 levels remain within acceptable boundaries, which the results above have proven is the case. The solution has also been shown to meet the overheating criteria, keeping temperatures within an acceptable level. This has been achieved with very low energy use and equally low running costs.

Low Energy Ventilation and Cooling: Anglia Ruskin University

- **Location:** Cambridge
- **Contact:** Andy Lefley, Assistant Director Building Services
- **Systems:** COOL-PHASE® system
- **Sector:** Education

Bryant Building Computer Room: In January 2013 a computer room used by the Faculty of Science and Technology at Anglia Ruskin University in Cambridge had its aging air conditioning system replaced with two COOL-PHASE low energy cooling and ventilation systems. The units were fitted discreetly within the existing ceiling void.

'I am very excited by this technology and the opportunity to improve student comfort without increasing the energy burden to Anglia Ruskin', said Andy Lefley, Assistant Director of Building Services, Estates & Facilities.

Scenario: In an effort to reduce their energy consumption, Anglia Ruskin University were keen to explore low energy alternatives to conventional air conditioning technologies. Two Monodraught COOL-PHASE systems were specified to serve the Science & Technology classroom, replacing the existing end of life air conditioning system that provided comfort cooling but no ventilation. The COOL-PHASE system provides intelligently controlled ventilation and naturally cools the area through the use of phase change material housed in thermal battery modules. The systems maintain thermally comfortable conditions and good air quality levels throughout the year.

Design: Monodraught's design engineers carried out dynamic thermal modelling, the results of which determined that 2N° 8 KWhr COOL-PHASE systems were required to ventilate and cool the space.

As is often the case with retrofit projects, the installation was rather challenging. At the Anglia Ruskin site the conventional wall louvre assembly for supply and exhaust air had to be reconfigured due to the existing building construction. The design team engineered a solution that utilised a roof mounted supply and exhaust system to serve the two COOL-PHASE units.

The installation was carried out by Monodraught's installation team in January 2013 to prevent disruption to teaching commitments.

Clients' Comments: 'I am grateful to the department for allowing us to trial this equipment in Bryant. We will be monitoring it closely to see if it has the impact we hope it will. If the trial is successful, the Estates & Facilities team will consider a range of further applications across the Cambridge and Peterborough campuses.'

Results: Each COOL-PHASE system continually monitors and records temperature, CO_2 concentration and energy usage. The results displayed below are based on data collected by the units installed in Room 016 from 25th January 2013 to 2nd September 2013.

Internal Temperature: Table 1 shows the average daily temperatures for the Science & Technology computer room. The readings clearly demonstrate that the COOL-PHASE systems have consistently maintained the internal temperature within a comfortable band.

Table 1 : Daily Temperatures (°C) 25/01/13 - 01/09/13		
Average	Min Average	Max Average
22.7 °C	20.9 °C	23.8 °C

Table 2 shows the percentage of time that the internal temperature has exceeded 25°C, 28°C and 32°C during the data logging period.

Table 2: Max Temperatures (%) 25/01/13 - 01/09/13		
>25°C	>28°C	>32°C
3%	0%	0%

The COOL-PHASE systems have maintained an ideal temperature within the room of less than 25°C for 97% of the occupied hours across the thirty one week period. At no point has the room exceeded either 28°C or 32°C. This level of performance far exceeds the target overheating criteria stipulated by both CIBSE Guide A and BB101.

CO_2 Levels: The typical background or atmospheric CO_2 concentration is recognized as approximately 400 parts per million (ppm). In education facilities CO_2 levels should ideally remain below 1500 ppm, with levels above 1500 ppm considered high.

Table 3 shows that the CO_2 concentration in Room 016 where the two COOL-PHASE units are installed is consistently maintained below the threshold level.

Table 3: CO_2 Levels 25th Jan 13 to 2nd Sep 13		
> 1000 ppm	> 1200 ppm	> 1500 ppm
11%	3%	0%

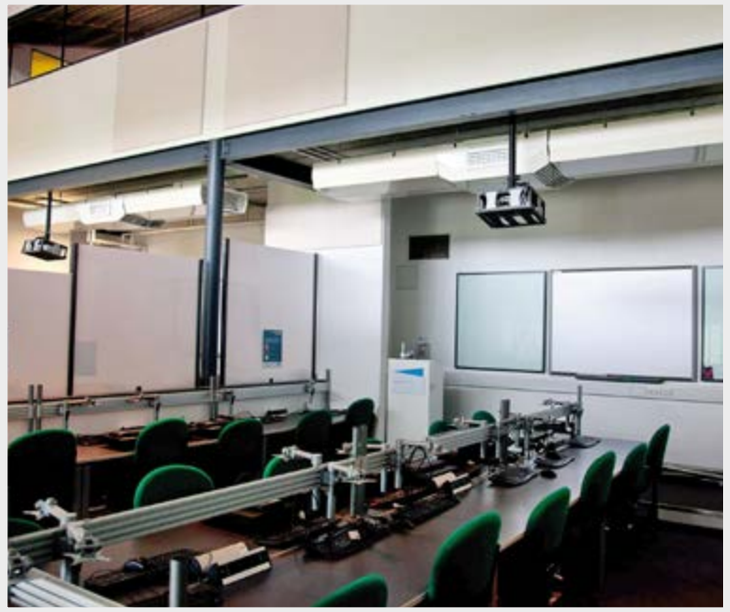
Energy Consumption: Table 4 shows the energy consumption of the two COOL-PHASE units installed in the Bryant building. The combined usage was 197.6 KWh of electricity across the thirty one week data logging period. Assuming a standard electricity tariff of 0.11£/KWh, that amounts to total energy costs of £21.74, or just 70 p a week for the two COOL-PHASE units.

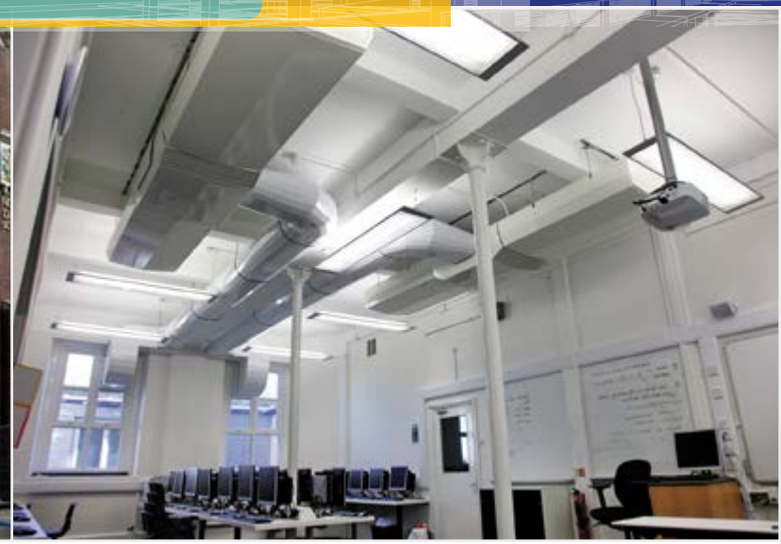
Table 4: Energy Used 25th Jan 13 to 2nd Sep 13	
Master Unit	100.2 KWhs
Slave Unit	97.4 KWhs
Combined Units	197.6 KWhs
Cost in £'s (Assumed 0.11£/KWh)	£21.74

Conclusion: Monodraught has demonstrated that the COOL-PHASE systems meet the design criteria and specification that the client requested, that being the requirement for comfort cooling to maintain internal temperatures within an acceptable temperature band and for the provision of fresh air such that CO_2 levels remain within acceptable boundaries. The results displayed in this case study show that the solution has complied with the overheating and air quality criteria, keeping temperatures and CO_2 concentrations within acceptable levels. This has been achieved with very low energy usage and equally low running and maintenance costs.

COOL-PHASE: University of East London

Monodraught COOL-PHASE® units were installed in three computer suites at the Stratford Campus to reduce high heat gains from IT equipment and people.





COOL-PHASE: Notre Dame, London

Two COOL-PHASE® systems were installed in an IT classroom in April 2011. The classroom (approx. 70 m^2) has high internal heat gains through IT equipment and glazing.

First COOL-PHASE New Generation Install

The first COOL-PHASE® New Generation install was at Avondale Park Primary School on August 20th 2013.

If you would like more details please email us: cool-phase@monodraught.com or vist our COOL-PHASE website for more information.

COOL-PHASE Hybrid - University of West England

The University of the West of England has continued to demonstrate its commitment to sustainable building management by installing two COOL-PHASE Hybrid systems in its Estates Management Office. Monodraught and UWE have a long-standing relationship having previously installed several of our original COOL-PHASE systems at the university. The latest innovation from Monodraught allows staff to enjoy more accurate control of comfortable temperatures whilst permitting the university to reduce its impact on the environment. As the system has minimal energy usage it is also possible to keep control of associated running costs.

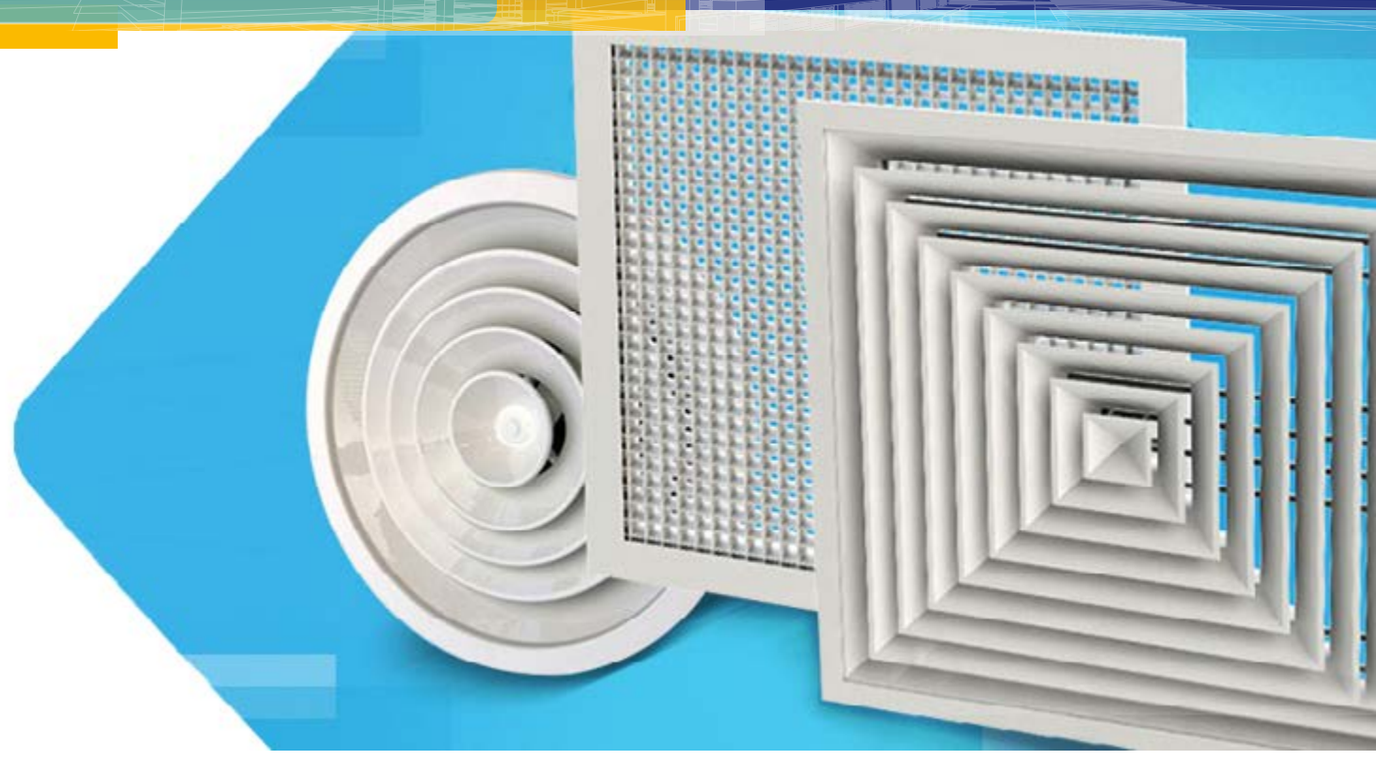
Initial monitoring has shown positive results. Data from May-July 2016 has shown that maximum internal temperatures experienced within occupied hours is 26°C. There was an average internal temperature of 23°C. Further to this only 2% of the hours were over 25°C with no hours exceeding 28°C.

The system also logged CO_2 concentration within the room. The peak concentration level was 1190 ppm with an average level of 657 ppm, satisfying CIBSE Guide A and demonstrating that that 10 l/s per person ventilation rate has been met.

The UWE is committed to building a sustainable facility and is aiming to make a carbon reduction of 22.5% by 2020 as well as a 50% reduction in energy usage. COOL-PHASE has been shown to use up to 90% less energy than traditional A/c systems. In 2015, we estimated that the COOL-PHASE systems installed globally saved the equivalent of 272 double-decker buses of CO_2.

Air-Precision

A recent addition to the Monodraught portfolio is an extensive range of Air-Precision products – Grilles, Diffusers, External Louvers and Volume Control Campers.



Why choose Air-Precision?

Market leading quality includes AA5 anodisation (ISO7599) and Belimo actuators used throughout.Bespoke manufacturing can be provided with any standard RAL colour within 5 days.This range is supported with £1m of stock and a full 10 year guarantee. The products can be bought directly from the Air-Precision online shop or it is possible to call the sales team for advice.

Product Range

Grilles

Diffusers

External Louvres

Volume Control Dampers

Ancillaries

SUNPIPE, SUNCATCHER & WINDCATCHER: Tesco Express - Hinkley

Natural Lighting and Ventilation

This new-build Tesco Express store, opened in June 2008, was the first Tesco convenience store to be built in their Environmental Format.

Monodraught WINDCATCHER® natural ventilation systems were specified by the Tesco Express design team to counter heat gains by introducing fresh air into the building and expelling stale warm air from the underside of the roof level of the building.

Four GRP 1000 Square WINDCATCHERS were installed in the main sales area of the store and 350 mm Monodraught SUNCATCHER® systems combining natural ventilation and SUNPIPES®, were fitted in the staff toilet facilities. In addition, three 300 Monodraught SUNPIPES were installed in the staff room, store room and bakery preparation area.

SUNPIPE & SOLA-BOOST: Norwich & Norfolk University Hospital

Natural Lighting and Ventilation

- **Angiography Suite 3**
- **Client:** NNUH
- **Architect:** LSI Architects
- **Contractor:** Eyre Electrical

This new part refurbishment and part new build centre was opened in June 2010 and the Architects chose Monodraught SOLA-BOOST® solar assisted natural ventilation and SUNPIPE® natural daylight systems to provide ventilation to the internal office spaces and resource rooms.

SUNPIPE & SUNCATCHER: Primark

Natural Lighting and Ventilation

- **Location:** East Ham
- **Architect:** IDL Architects

Three WINDCATCHER® systems were installed within the canteen and stockroom with a further 42 SUNPIPE® system to back of house areas and 17 SUNCATCHER® systems to internal office areas.

SUNPIPE & SUNCATCHER: Marks and Spencers

Natural Lighting and Ventilation

- **Location:** Galasheils
- **Architect:** GVA Grimley

The 9,000 sq ft Galashiels store features 12 SUNPIPE® systems and three GRP 800 Square SUNCATCHERS® among 'eco-features' that significantly reduce its carbon footprint and improve its energy efficiency.

M&S claims the store uses up to 25% less energy and emits up to 95% less carbon dioxide than an average Simply Food store.

The Galashiels store has been a test bed for developing new initiatives that have since been rolled out in other Simply Food stores across the UK.

SUNPIPE & SOLA-BOOST: MT Vernon Treatment Centre

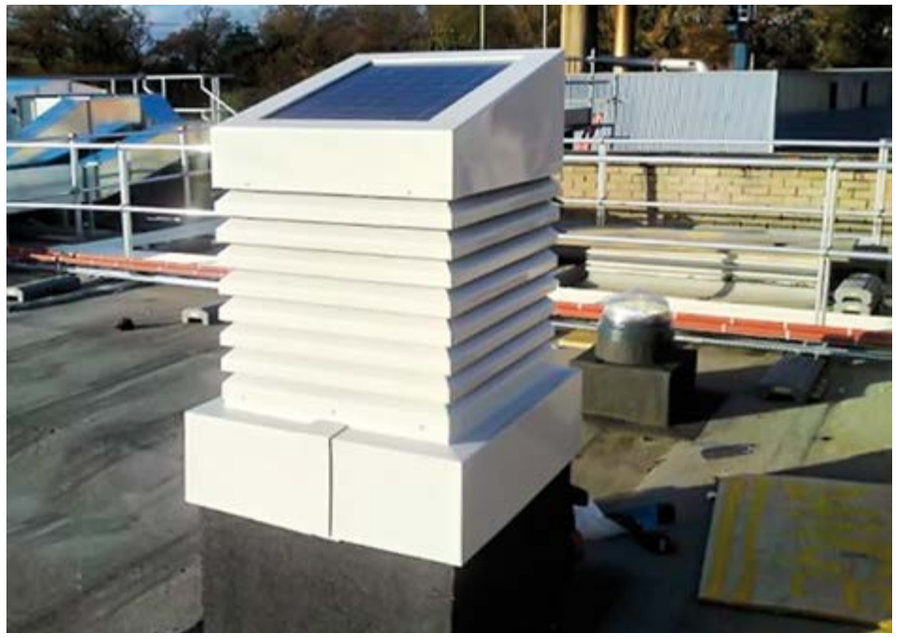
Natural Lighting and Ventilation

- **Location:** Northwood
- **Client:** East & North Hertfordshire NHS Trust
- **Architect:** AD Architects
- **Contractor:** T & E Neville

This new extension to the present chemotherapy suite comprises of a ‘link-building’ which joins the existing waiting area and new treatment building, and a new larger treatment space. This treatment area accommodates chemotherapy treatment and clinical cancer trial areas.

The architects approach for the building was to design a bright and spacious environment which is intended to be both uplifting for both staff and patients and the therapeutic value of a link to the outside.

The Chemotherapy unit uses SOLA-BOOST® solar assisted natural ventilation systems to provide energy free and maintenance free ventilation to the office spaces, counselling and PICC rooms. SUNPIPE® natural daylight systems were used to supplement the natural daylight, with the systems dropping through the first floor to provide natural daylight to deep plan and land locked areas on the ground floor.



SUNPIPE & WINDCATCHER: Trinity & St Nicholas Primary Schools

Natural Lighting and Ventilation

- **Location:** Radstock
- **Consultant:** King Shaw Associates

Trinity School in North Radstock and St Nicholas School in South Radstock are jointly known as the Renaissance Project. They are part of a rationalization programme undertaken by Bath and North East Somerset Council and are bristling with new innovative and sustainable ideas. Tim Goodwin, the Senior Partner of Architects, King Shaw Associates explained, “We take the view that a holistic approach to engineering design results in more complete and fully integrated solutions, which apply to an entire building. We decided to replace many of the conventional skylights originally proposed by using Monodraught SUNPIPES® because of the many advantages that these SUNPIPE systems provide. We considered that WINDCATCHERS were an excellent way to ensure good natural air distribution and to meet the brief of providing a cost effective natural ventilation system within the building envelope budget.”

SUNPIPE, WINDCATCHER & MONOVENT: Penryn College

Natural Lighting and Ventilation

- **Location:** Cornwall
- **Architect:** Poynton Bradbury Wynter Cole

Cornwall’s BSF Pathfinder project opened a year ahead of any other projects in this funding group – the £20m scheme provides some 8500 square metres of new accommodation for 1150 pupils aged 11-18 and achieved a BREEAM ‘Excellent’ rating. The demand for outstanding environmental performance was achieved with an Architectural design approach with daylighting and natural ventilation and cooling prioritised. A total of 42N° Monodraught WINDCATCHERS®, SUNPIPES®, and MONOVENTS, were used throughout the Project, the largest units being some 3.3 m x 2 m on plan. Some of the smaller units were used on a green roof design.

SUNPIPE & SOLA-BOOT: Seaside School

Natural Lighting and Ventilation

- **Location:** Lancing
- **Architect:** R H Partnership

Twenty Monodraught SUNPIPES® and eight SOLA-BOOST® natural ventilation units with an 8 - zone iNVent natural ventilation control system that monitors and controls the SOLA-BOOST units have been installed. The SOLA-BOOST systems were chosen as part of a thermal model for the building, to work in tandem with the underfloor heating. If sensors detect that temperatures and/or CO_2 levels in the classrooms have exceeded maximum pre-determined settings, the SOLA-BOOST units automatically respond by bringing in fresh, natural air from the outside.

WINDCATCHER, SUNPIPE, VENTSAIR & SOLAVENT: Battersea Dogs and Cats Home Tealby

Natural Lighting and Ventilation

- **Sector:** Charity
- **Architect:** Jonathan Clark
- **Consultants:** Mendick Waring
- **Electrical and Mechanical Engineers:** Crestmount UK
- **Construction:** Lakehouse
- **Location:** Battersea, London
- **Product installed (Spring 2015):**
  - 8 N° WINDCATCHER X-AIR 170 systems
  - 4 N° WINDCATCHER X-AIR 140 systems
  - 30 N° SUNPIPE 530 mm systems
  - 1 N° SOLAVENT systems
  - 48 N° 800 x 400 VENTSAIR Wall-mounted systems
  - 8 N° 1120 x 400 VENTSAIR Wall-mounted systems
  - 3 N° 800 x 600 VENTSAIR Wall-mounted Systems
  - 56 N° 480 x 590 external wall louvres

Monodraught are pleased to have been part of the re-development at Battersea Dog and Cats home to create a state-of-the-art facility for vulnerable animals in the city of London. A range of our systems were installed in the Tealby building which was opened by Her Majesty the Queen, a patron of the charity last year.

The £4.9m project allowed the charity to have new kennels built, making dogs more comfortable including such measures as; not allowing the dogs to see each other, avoiding intimidation, plus its own outdoor area and underfloor heating.

Monodraught were able to supply SUNPIPE systems to bring natural light into the corridor area. The SUNPIPE natural daylight system directs sunlight into the corridor from roof level. The SUNPIPE collects daylight using a patented Diamond dome, using a silverised PVD coated mirror-finished aluminium tube to transfer light to the kennels, with a ceiling diffuser evenly distributing the light around the kennels.

A WINDCATCHER system was installed in each of the 8 blocks of 7 kennels including Monodraught's patented "No-Leak guarantee" active Louvre modulating aerofoil louvre technology.

By installing a variety of sustainability measures including Monodraught's own natural ventilation system, as well as Solar control, high thermal mass, air source heat pumps and a long, photovoltaic canopy the building was granted a top BREEAM accreditation.

There are many benefits to installing a natural ventilation system including the economic benefit of using natural energy thus being sustainable energy in action by using wind pressure and the natural stack effect of thermal buoyancy, natural ventilation does not use any fossil fuelled energy but relies on harnessing wind power and the thermal rise of warm air to be used in a controlled and sophisticated way.

It's also healthier; natural ventilation brings in a steady supply of fresh air into the building, topping up the oxygen level, whilst at the same time expelling stale air to atmosphere using the natural buoyancy of thermal forces.

SUNPIPE & WINDCATCHER: Oakley Park Combined School

Natural Lighting and Ventilation

- **Location:** Milton Keynes
- **Architect:** Architecture MK

It is most appropriate that Milton Keynes Development Corporation have been one of the first to recognise the advantages of natural ventilation and indeed, natural lighting from SUNPIPES for the benefit of children's health and development. To date 16 schools in the Milton Keynes area have now been completed using these systems. Architects like the clean lines of the Monodraught systems but also recognise they are making a major contribution to reducing energy costs and maintenance costs in their school budget programme.

SUNCATCHER: BMW Building

Natural Lighting and Ventilation

- **Location:** Oxford
- **Systems Installed:** SUNCATCHERS

WINDCATCHER: Haute Vallee School

Natural Lighting and Ventilation

- **Location:** St Helier, Jersey
- **Architect:** Architecture PLB, Winchester

This was one of the first major Projects for Monodraught WINDCATCHERS® completed more than 10 years ago in January 1998. Building Simulation carried out extensive modelling and top Environmental Consultants, Battle McCarthy undertook the original design concepts.

This was a new £12 million school, at the time the largest Contract being undertaken in Jersey and demonstrates how classrooms both on the top and ground floor can be served by the Monodraught systems ducted down through the first floor classrooms. The project shows that a particularly striking application of natural ventilation systems can be achieved with a totally energy free use of natural ventilation operating under extreme conditions due to the extensive use of full height glazing.

Monodraught supports natural ventilation and lighting strategy for Barrow-in-Furness police station

Natural Lighting and Ventilation

- **Sector:** Public Sector
- **Architect:** Unwin Jones Partnership
- **Services Engineer:** QED
- **Contractor:** Thomas Armstrong (Construction) Ltd
- **Location:** Barrow-in-Furness, Cumbria
- **Product installed:**
  - 18 N° 530 SUNPIPE systems and 9 N° 300 SUNPIPE systems
  - 4 N° WINDCATCHER Classic systems

A new state of the art police station was recently opened in Barrow-in-Furness. The new station became operational in October 2015 and was successfully shortlisted as a finalist in the Commercial Build Section of the Northern Design Awards for 2015.

Barrow-in-Furness is a town which has been built on iron and steel production, ship building and maritime industries. The building celebrates both Barrow's history and its 21st century capabilities with a contemporary design that has clear maritime influences.

Central to the building is an atrium which allows the building to be naturally ventilated and lit. It varies along its length with the wider areas forming informal meeting and seating areas. The three storey atrium helps to create a building that is light, airy, spacious and enjoyable to work in.

The building is north facing and ventilation to the offices and atrium space is provided by Monodraught's natural ventilation system. There are a series of WINDCATCHERS® at roof level and in addition, there are automatically controlled opening windows. This helps ensure air flow and temperature is controlled throughout the year.

Monodraught supplied 18 N° 530 SUNPIPE® systems and 9 N° 300 SUNPIPE systems to provide a natural lighting solution for the new building, in particular the custody cells. The SUNPIPE natural daylight system directs sunlight into a room from roof level.

Monodraught Sunpipes are:

- **Cost effective** – energy costs can be saved as the need for electric lighting during daytime hours is minimised by as much as 75%.
- **Healthier** – studies have shown that people work better under a natural daylight environment and natural daylight is known to combat the effects of Seasonal Affective Disorder (SAD).
- **Sustainable energy in action** – not only can Sunpipe systems reduce energy usage it also leads to a considerable reduction in CO_2 emissions.

The WINDCATCHER Classic is an energy free natural ventilation system encompassing the benefits of both top-down and passive stack ventilation. The system consists of an external louvre bank protected internally by an anti-bird mesh and internally divided. The simple, but effective design of the system provides fresh air during the daytime as well as night-time cooling.

Monodraught COOL-PHASE® systems specified as part of Harrogate Civic Headquarters construction

Natural Cooling and Ventilation

- **Sector:** Government / Council
- **Architects:** Farrell & Clark
- **Consultants:** Ramboll
- **Construction:** Harry Fairclough Construction Ltd
- **End-customer:** Harrogate Borough Council
- **Location:** Harrogate
- **Products installed:**
  - 30 N° COOL-PHASE systems
  - 2 N° 1800mm WINDCATCHER® CLASSIC bespoke circular GRP systems
  - 1 N° iNVent Control

AA new civic headquarters for Harrogate Borough Council is being built on its Knapping Mount site in Harrogate. The new council offices, which have been designed by Yorkshire based architects Farrell & Clark, aim to enable the council to save in the region of £1 million a year in operating costs. Construction work has already started and the building is planned to be fully operational in the summer of 2017.

An important part of the project is to ensure that it is built to BREEAM Excellent standards. BREEAM sets the standard for best practice in sustainable building design, construction and operation and has become one of the most comprehensive and widely recognised measures of a building's environmental performance, ensuring future running costs are greatly reduced.

Monodraught have been specified to provide natural cooling and ventilation to all areas in an open plan office arrangement, whilst a central atrium space will be ventilated by our bespoke ventilation system. Monodraught will be providing 30 N° COOL-PHASE systems and 2 N° WINDCATCHER Classic bespoke circular GRP systems. Monodraught's COOL-PHASE systems specifically contribute credits towards BREEAM standards for sustainability across a variety of factors, including credits for lifecycle costs, indoor air quality and for the use of low and zero carbon technologies.

COOL-PHASE is a low-energy cooling and ventilation system that creates a thermally comfortable, fresh and healthy indoor environment by monitoring internal air quality and ensuring there is a supply of fresh air. The COOL-PHASE system is energy and carbon saving, it uses an energy efficient variable speed fan with no compressors, pumps or other energy intensive components. A 5A single phase mains supply is all that is required.

Natural ventilation will bring a steady supply of fresh air into the civic headquarters, maintaining CO_2 levels and expelling stale air to the atmosphere using the natural buoyancy of thermal forces.

Monodraught natural ventilation and cooling systems have proved to be consistently effective and reliable over many years. The constant reporting and feedback to Monodraught's dedicated R&D team enables our products to be improved in their manufacture, aesthetics and performance.

To find out more about our natural cooling and ventilation systems and how they can support your building in qualifying for BREEAM call us on 01494897700.

COOL-PHASE & WINDCATCHER: Alderman Knight School

Natural Cooling and Natural Ventilation

One new COOL-PHASE® unit has been installed in the ICT Room at Alderman Knight School to provide natural cooling within the area. The data below shows the performance achieved from the system as an average.

Internal Temperature Results:

Daily Temperatures (°C)			
	Average	Min Average	Max Average
07/06/12 - 31/05/13	21.8 °C	19.6 °C	23.2 °C
31/05/13 - 24/03/14	20.7 °C	18.4 °C	22.1 °C
24/03/14 - 30/03/15	20.8 °C	18.6 °C	22.1 °C

This data was collected from the unit installed between 7th June 2012 and 30th March 2015. The table shows the overall average daily temperatures for each year.

Max Temperatures (%)			
	>25°C	>28°C	>32°C
07/06/12 - 31/05/13	7.3%	0.5%	0%
31/05/13 - 24/03/14	0.4%	0%	0%
24/03/14 - 30/03/15	0%	0%	0%

The table above shows the percentage of time that the internal temperature has spent at over 25°C, 28°C and 32°C during the logged period.

Energy Consumption:

Energy Use over the total installed period: 147 weeks (2 Years 10 months)					
Total Energy Usage since install (based on £0.11 per KWh)	440.9 KWh	£48.50 total	33p per week	5p per day	Approx. £17 year

CO_2 Levels:

CO_2 Levels			
	>1000 ppm	>1200 ppm	>1500 ppm
07/06/12 - 31/05/13	3%	0.5%	0%
31/05/13 - 24/03/14	5.1%	0.7%	0%
24/03/14 - 30/03/15	4.5%	0.6%	0%

Background or atmospheric CO_2 level is approximately 400 parts per million (ppm) and 1500 ppm or above would be considered a high level.

Matt Peplow - Business & Operation Manager at Alderman Knight School said:

"Throughout our school there were very few rooms that suffered with no ventilation. All of our classrooms either have openable north lights or external doors. However we did have an ICT Suite, an Office and a Meeting Room with no external windows so we decided to utilise the Monodraught WINDCATCHER® and COOL-PHASE systems within these spaces. The COOL-PHASE system that we have in the ICT Suite manages the temperature of the room very well and whilst you may lose an element of control that you get with Air-Conditioning, you are reducing the energy consumption that you are using to cool the space. We also had some WINDCATCHER systems installed in the Main Hall which is very useful when the Hall is packed up over a period of time. It makes a big difference in terms of the levels of CO_2 and quality of the air"

Monodraught's largest COOL-PHASE installation at Lambeth College

Natural Cooling and Ventilation

- **Sector:** Education
- **Location:** Lambeth, London
- **Date:** Summer 2015
- **Consultant:** Atkins
- **Construction:** Graham Construction
- **Mechanical and Electrical Engineers:** JBE
- **Products installed:**
  - 38N° COOL-PHASE® Systems
  - 4N° SOLA-BOOST® X-Air Systems
  - 20N° 800 x 300 VENTSAIR® Systems
  - 8N° 800 x 600 VENTSAIR Systems
  - 1N° iNVent Control System

Monodraught recently completed our largest ever COOL-PHASE installation at Lambeth College in London. 38N° COOL-PHASE systems and 28N° VENTSAIR systems were installed in Classrooms and Teaching Spaces, and 4N° SOLA-BOOST X-Air systems were installed in the Sports Hall.

The £12 million pound Lambeth College development programme was opened by Chukka Umunna last summer, with students starting to use the building in the autumn term. The building works comprised new facilities supporting curriculum areas in sport, travel and tourism, uniformed public services, health and early years as well as provision for adult skills, ESOL, English and Maths and LLDD.

Lambeth College has been investing in sustainable buildings and aiming to reduce carbon emissions since the sixth-form building was constructed back in 2009. Monodraught are pleased to provide solutions which can help meet this criteria.

Andrew McCubbin, Managing Director of Monodraught said "We are delighted to have installed our largest ever Cool-Phase solution at Lambeth College. We continue to see strong growth in our award-winning natural cooling products for the Education Sector."

COOL-PHASE is a low-energy cooling and ventilation system that creates a thermally comfortable, fresh and healthy indoor environment by monitoring internal air quality and ensuring there is a supply of fresh air. The COOL-PHASE system is energy and carbon saving, it uses an energy efficient variable speed fan with no compressors, pumps or other energy intensive components. A 5A single phase mains supply is all that is required.

SOLA-BOOST X-Air is the latest generation of natural ventilation featuring our patented ActivLouvre modulating aerofoil technology and DC Solar powered fan. Integrating with the WINDCATCHER X-Air system, it will provide additional ventilation on sunny days whilst maintaining zero running costs.

Natural ventilation brings a steady supply of fresh air into the college, topping up the oxygen level, whilst at the same time expelling stale air to the atmosphere using the natural buoyancy of thermal forces. Fan noise, often associated with mechanical systems or air conditioning, is eliminated, to the benefit of the students. Natural ventilation is sustainable energy in action and harnesses wind power and the thermal rise of warm air in a controlled way.

Monodraught natural ventilation systems have proved to be consistently effective and reliable over many years. The constant reporting and feedback to Monodraught's dedicated R&D team enables our products to be improved in their manufacture, aesthetics and performance.

Monodraught Products Support Cambridge University Low Energy Strategy

Natural Cooling and Ventilation

- **COOL-PHASE®, WINDCATCHER® X-AIR & VENTSAIR®: Greenwich House, University of Cambridge**
- **Sector:** Education
- **Contractor:** Munro Building Services
- **Consultants:** David Bedwell and Partners
- **Location:** Greenwich House, Cambridge, UK
- **Products installed (Dec 15/Jan 16):**
  - 28 N° COOL-PHASE systems
  - 6 N° WINDCATCHER X-Air 170 systems
  - 4 N° 505 x 1440 VENTSAIR systems
  - 2 N° iNVent 2 control panels

The University of Cambridge is committed to reducing its environmental impact, with a dedicated Environment and Energy Section within Estate Management leading on carbon reduction and a range of strategic and operational initiatives.

In January 2014, Monodraught were asked to develop a low energy cooling and ventilation strategy for Greenwich House at Cambridge University, as part of a planned building refurbishment into a modern and efficient collaborative office environment.

Monodraught worked closely with David Bedwell and Partners to engineer a scheme which met not only the performance criteria stipulated by the University's strong sustainability ethos and standards, but also the thermal comfort levels expected by the building occupants.

Human perception of "comfortable" room temperature is subjective. It is based on a number of factors such as; air temperature, radiant temperature, humidity, individual metabolism and clothing. Not everyone will experience "thermal comfort" at 20°C - 22°C and therefore occupants prefer to control their own comfort.

COOL-PHASE is a low energy cooling and ventilation system that creates a comfortable, fresh and healthy indoor environment and also reduces the running costs of buildings. It works upon the principles of adaptive thermal comfort, controlling temperatures within a "thermally comfortable" bandwidth and gives end users more flexibility in controlling their environment.

Monodraught installed the COOL-PHASE systems and WINDCATCHER X-Air in a number of open plan office areas, several conference and meeting rooms, training rooms and a café area.

With the system's ability to record minute by minute data from an integral data logger, plus BACnet connectivity, Monodraught will return to site later in the year to extract this data and provide an audit of performance as part of its post-occupancy analysis service. The reporting system also allows the Estate Management team to track performance on an ongoing basis.

COOL-PHASE uses a thermal energy store utilising a Phase Change Material (PCM) in combination with an intelligently controlled air handling unit to actively ventilate and cool the building. The COOL-PHASE system can radically reduce energy consumption by up to 90%, compared to a conventional cooling system. Unlike conventional cooling approaches, COOL-PHASE uses no refrigerants making it an environmentally sound solution to cooling buildings.

Initial feedback on the installation has been positive and we look forward to working together with our partners on the project to provide performance data and investigate future opportunities to help reduce energy usage and CO_2 emissions.

COOL-PHASE, WINDCATCHER X-AIR & SOLA-BOOST: Prospects College

Natural Cooling and Ventilation

- **Building Name:** Prospects College
- **City:** Basildon
- **Country:** United Kingdom
- **Building Type:** Vocational Skills College
- **Market Sector:** Education
- **Architect:** Ayshford Sansome
- **Consulting Engineer:** Kettridge Consultants Ltd
- **Installation Date:** Completed November 2012

Prospects College is a vocational skills training provider based in the South East of England with sites in Southend, Brentwood and Basildon, providing courses for students aged from 14 years upwards.

Architects Ayshford Sansome have been working with Prospects since 2006 and this is the sixth training facility the practice has worked on for the college. The original aspiration for the Centre was to create a sustainable building featuring sustainable technologies, both in its construction and its detailing.

Prospects College also intended to use the building itself and its various services as a practical education resource within which building services students could actively hone their construction skills. To this end it was envisaged that many of the buildings' services would be exposed and the data provided by monitoring their performance and energy consumption would be displayed within the building and become an integral part of the education process.

Shortly after work started on the new college, changes to the way the funding was provided meant a reduction of one third in the budget for the building. Ayshford Sansome Associate Rob Westbrook: "Obviously, with a significantly reduced budget, we had to look again at everything that was planned for the Centre. Natural ventilation was a key consideration for the sustainability of the building and when the original specification was reviewed Monodraught emerged as the preferred candidate, meeting our brief in terms of cost, sustainability and the potential as an educational source."

The final design included WINDCATCHER® X-AIR, SOLA-BOOST® variants and the low-energy cooling and ventilation system COOL-PHASE® primarily for the ICT suites due to the expected heat gains. Each of the WINDCATCHERs, SOLA-BOOST and COOL-PHASE units were linked to an iNVent controller.

Data from all the Monodraught systems are recorded every half-hour and can be downloaded to enable the latest energy use figures to be used within teaching sessions. This approach is helping to achieve another Prospects ambition: to provide students with practical on-going educational information.

Key benefits

- BREEAM 'Very Good' Certificate achieved
- Budget reductions made a strong case for ventilation & cooling solution
- Installed working systems provide useful training tools
- Low energy, low carbon ventilation & cooling
- No cooling refrigerants
- Low maintenance

Photos are used with the kind permission of Mr Andrew Hatfield.

Construction Industry Council – ZCB Hong Kong

Natural Lighting and Ventilation

- **Sector:** Goverment
- **Distributor:** Delta Pyramax
- **Architects:** Ronald Lu and Partners (Hong Kong) Ltd
- **Consultant:** Ove Arup & Partners Hong Kong Limited
- **Contractor:** Gammon Construction Ltd
- **Location:** Kowloon Bay, HONG KONG
- **Products installed Spring 2012:**
  - 2 N° 450mm SUNPIPE
  - 2 N° WINDCATCHER X-AIR

WINDCATCHER X-Air® and SUNPIPE® were installed on Hong Kong's first zero carbon building (ZCB). Engineered by Arup©, ZCB is a signature project to showcase state-of-the-art eco-building design and technologies to the construction industry both internationally and locally.

To achieve carbon neutrality, an integrated approach was adopted, combining passive design measures with green active systems and on-site generation of renewable energy.

A series of passive strategies, including the cross-ventilated layout and a high-performance façade , were used to improve energy conservation and thus reduce energy consumption by 20%.

Apart from the advanced technologies, efforts were also made to minimise material use and embodied energy through efficient structural design and low carbon construction practices. Recycled materials and sustainable timber were used as much as possible during construction. Excavated soil during construction was used as fill in the urban native woodland to reduce waste.

Overall, the ZCB has been fitted out with more than 90 cutting-edge environmental features. This exemplar project has achieved BEAM Plus Platinum rating, the highest rating for excellence building environmental performance in Hong Kong, and was awarded the Grand Award (New Building) in the Green Building Awards 2012.

Arup© pictures.

Square SUNCATCHER Classic 185 GRP System
University of Canterbury

Natural Lighting and Ventilation

- SUNCATCHER® Classic ordered for new science facility at the University of Canterbury, New Zealand
- **Sector:** Education
- **Architects:** Warren and Mahoney
- **Engineers:** BECA
- **Main Contractor:** Hawkins Construction
- **Location:** Christchurch, New Zealand
- **Products (December 2015):**
  - » 17 x Square SUNCATCHER Classic 185 GRP systems (complete with 450 mm SUNPIPE® systems)

UC UNIVERSITY OF CANTERBURY

Monodraught have recently provided products to the University of Canterbury in Christchurch, New Zealand via our distributor EllisCo.

The products will be installed in the new science facility, the first building of which is due for completion in 2017 and includes specialist teaching and research laboratories for physics, chemistry, geology, geography and biological sciences. Extensive informal areas for learning and study are included in the design, as well as social spaces that provide ideal venues for events and encourage interactions between staff, students and external collaborators and stakeholders.

Our partners in New Zealand, EllisCo supplied the 17 x Square SUNCATCHER Classic 185 GRP systems (complete with 450 mm SUNPIPE systems). Peter Millard said “EllisCo are delighted to be part of this fantastic development for the University of Canterbury. The Monodraught SUNCATCHER system will not only provide sustainable ventilation for the users of the building but also bring in natural daylight which studies have shown can improve health and well-being for students and staff in the building”

The Monodraught SUNCATCHER systems are a method of effectively conveying natural daylight and natural ventilation from roof level down into the building below by combining the principles of the WINDCATCHER natural ventilation system with Monodraught’s SUNPIPE natural daylight system.

Key benefits

- Is sustainable energy in action: Does not use any fossil fuelled energy but relies on harnessing wind power and the thermal rise of warm air
- Healthier system: Brings a steady supply of fresh air into the building, whilst at the same time expelling stale air to the atmosphere.
- Night time cooling: In the summer period the volume control dampers are programmed to open fully at night to utilize the cool air
- Precise control with a range of highly sophisticated control systems
- Evenly diffused natural daylight provided to internal spaces

SUNPIPE: Latifa School for Girls and Rashid School for Boys (Dubai)

Even in Dubai they have seen the benefit of Monodraught SUNPIPES®, not only to counteract the strong power of the Middle East sun but also to bring in the benefits of filtered natural sunlight to school children without the attendant problems of glare and heat gain. By using SUNPIPES, the window blinds can be kept firmly shut and the electric lighting can be kept off! Monodraught's Middle East office provides a complete supply and fix service using our own Dubai based installation teams to provide a fast and highly successful installation service.

SUNPIPE: The British School at Abu Dhabi (1000 mm)

Originally the Architect wanted a series of free form rooflights but such is the intense heat of the sun in the Middle East, the Architect opted for a series of SUNPIPES® arranged not in a uniform pattern but formed part of the interior design by providing quite a spectacle of natural light. 1N° 1000 mm diameter SUNPIPE was installed to the central Library and this in itself forms a focal point of a flood of natural light to this area, which draws comment and praise from many visitors to this rather unique institution in the middle of Abu Dhabi.

WINDCATCHER X-AIR: Vancia School

- **Building Name:** Vancia School
- **City:** Vancia-Crepieux, Lyon, Rhone
- **Country:** France
- **Building Type:** Primary School Extension
- **Market Sector:** Education
- **Architect:** Tekhne Architectes
- **Consulting Engineer:** TRIBU, Lyon
- **Installation Date:** Completed August 2012

Monodraught were asked to provide a natural ventilation solution for a three classroom extension to the existing Vancia-Crepieux School near Lyon. Natural ventilation was to be utilized in conjunction with several other environmental initiatives such as timber cladding, rain water harvesting and high performance glazing with solar shading. Monodraught's WINDCATCHER® X-Air natural ventilation systems were chosen as a means of providing fresh air and heat dissipation from roof level into the classrooms without the use of mechanical fans.

Natural ventilation has traditionally been used in France to achieve summertime thermal comfort through the use of opening windows. However, the objectives of the Consultants in working with natural ventilation was to provide the appropriate ventilation in all seasons from the WINDCATCHER systems. This has been successfully achieved through the integration of Monodraught's fully automatic iNVent control strategy built around external climatic conditions, thermal comfort and air quality.

One WINDCATCHER X-Air 170 system was specified to each of the classroom following dynamic thermal modelling that was used to provide a detailed climatic based analysis of the predicted ventilation performance. Incorporated within the installed iNVent control system is data logging functionality which is being used to provide feedback to the client on the internal air quality in the new classrooms.

Commenting on the installation, Olivier Zanni of Tribu, Lyon "The existing school was naturally ventilated but only by manual windows opening. The WINDCATCHER X-Air system was chosen for the simplicity of its implementation during the construction, its good control system and low maintenance. The feedback from the school is very good regarding ease of use and air quality."

Key benefits

- Energy performance certificate
- Ease of installation
- Dynamic Thermal Modelling provided
- Fully automatic control systems
- Low maintenance, long life span

WINDCATCHER: San Francisco!

Monodraught WINDCATCHER® systems have recently been installed by a local contractor in USA. The building will be used by a world renowned product design company called Fuse Project.

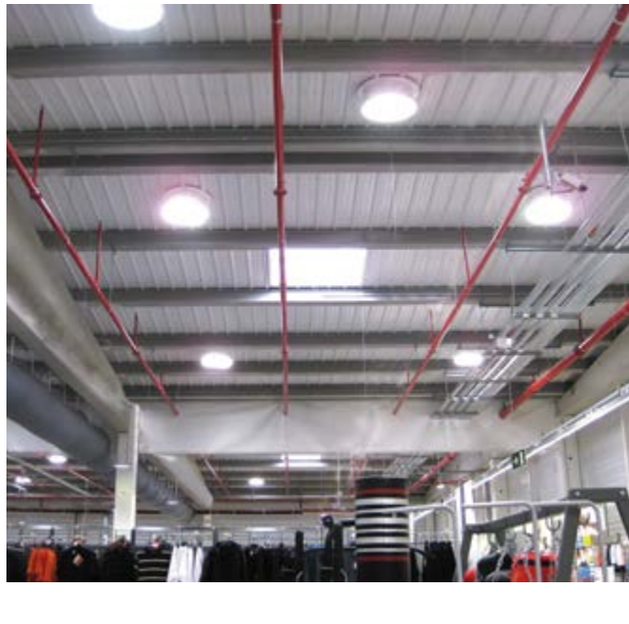
A refurbished industrial building; the offices will house nearly 100 designers who were seeking a low energy alternative to air conditioning. The San Francisco area, also called the Bay Area, has a particular micro climate which makes it almost ideal for natural ventilation. The UK based Consultants, Buro Happold, had recently opened up an office in San Francisco and therefore recommended Monodraught systems as a possible solution.

We have supplied 4N° SOLA-BOOST® X-Air 200 systems and 2N° WINDCATCHER® X-Air 200 systems.

SUNPIPE: Decathlon Portugal

Even in winter most of Portugal enjoys five to six hours of sunshine each day, so it is no surprise that SUNPIPES® are proving so popular. By taking advantage of natural daylight, leading retailers Decathlon, Hipermercados E Leclerc and Intermarche are benefitting from cost and environmental savings.

The three supermarket chains have installed a total of 575 SUNPIPES. Decathlon, for example, has installed 209 SUNPIPES at its store in Cascais, 120 in Santarem, 115 in Castelo Branco and 98 in Torres Vedras.



SUNPIPE:
Future School Project, Al Ain-UAE

Four identical schools (2 boys an 2 girls schools) are modelled the same as Mezyed School. The courtyard is shaded by solar panels, which provide 15% of the schools electricity and the walls are lined with plants, which are used to optimize the oxygen in classrooms. Edison Lighting has installed a total of 889 no. 530 mm SUNPIPES® in all four schools combined with 228 motorised light shut dampers in a record breaking time scale of only 6 weeks.

This is the largest project Monodraught has ever managed and will be a great advertisement to us for the educational sector throughout the Gulf-Region.

WINDCATCHER:
Ormiston Road College, New Zealand

83 Monodraught WINDCATCHER® units have been supplied and installed that will provide integrated natural ventilation and cooling for a public high school under construction in Ormiston Road, central Auckland.

New Zealand is at the forefront of eco-development and with Monodraught providing intrinsic benefits and bottom-line savings to operating costs we expect the technology will be readily adopted as it has been across Europe.

18,000 km: Monodraught specified on the other side of the world

- **Christchurch Bus Exchange**
- **Sector:** Export, Government
- **Distributor:** Ellis Co
- **Architect:** Architectus
- **Consultant:** Aurecon
- **Main Contractor:** Southbase
- **Location:** Christchurch, New Zealand
- Products installed (2015)
  - 9 N° WINDCATCHER® Classic 155 systems

Aftershocks are still taking place following another 7.8 quake near Christchurch earlier in November, which has sadly caused further damage and loss of life.

Many also remember the devastating earthquake in New Zealand that occurred in February 2011 in Christchurch. The earthquake caused widespread damage across the area, killing 185 people. Christchurch's central city and eastern suburbs were badly affected, with damage to buildings and infrastructure already weakened by the magnitude 7.1 Canterbury earthquake of 4 September 2010 and its aftershocks.

As part of the re-building programme the Christchurch Bus Exchange was commissioned by the Christchurch Central Development Unit. This was a considerable construction project with planning for future development taken into consideration.

9 N° WINDCATCHER Classic 155 Monodraught systems were installed to serve the passenger lounge with natural ventilation. The WINDCATCHER Classic introduces natural ventilation into the bus exchange and helps reduce CO_2 levels. This creates a more comfortable working environment for staff and passengers alike. It uses no fossil fuels by maximising the use of wind power and the natural stack effect of thermal buoyancy, combined with night time cooling using "free" cooling to the cool the fabric of the building.

Christchurch now has some of the highest rated sustainable buildings in New Zealand, of which the Bus Exchange is one. This was borne out of a desire from both the local government and residents for the reconstruction work to be built with a greener ethos.

Monodraught were pleased to work with their distribution partner in New Zealand, EllisCo to deliver the solution. Monodraught work with a selection of partners across the globe to deliver low carbon natural and hybrid lighting, ventilation and cooling solutions. We design, manufacture and install our systems to create low energy, low carbon and sustainable buildings. To find out more about which countries we currently distribute to, please visit our worldwide pages on our website.

WINDCATCHER® X-Air and SUNCATCHER® Classic installed in award-winning French school building

Natural Lighting and Ventilation

- **Groupe scolaire maternelle et primaire Simone Veil**
- **Sector:** Education
- **Distributor:** ECODIS SAS
- **Architect:** Tekhne Architects
- **Location:** Nr Lyon, France
- Products installed (2014)
  - » 14 N° WINDCATCHER X-Air 170
  - » 2 N° WINDCATCHER X-Air 140
  - » 2 N° SUNCATCHER Classic 155 with 450 SUNPIPE®
  - » 5 N° iNVent2 Control Panels

A recent export project of ours has been named as winner of a French “Green Buildings” Award from the Construction21 Network for Health and Comfort.

The school, which was built and began to be used in 2014 has around 350 pupils, is located in a re-generated district of Bourgoin Jallieu (France). The Simone Veil nursery and primary school combines a requirement for controlled energy consumption and low carbon emissions with a focus on health and comfort for its pupils and teachers.

The needs of the project were acoustic comfort – essential for student’s attention, generous daylight sources and air quality, a very important matter for this school as it is built on a former industrial site. In addition consideration was required for summer comfort in the building. The school needed to have a maximum temperature of 26°C without any active cooling system during 3 heat-wave days and with 30 students per class.

The WINDCATCHER X-Air is a 2nd generation natural ventilation system featuring the patented ACTIVLOUVRE® modulating aerofoil louvre technology. The system consist of an external static louvre and internal active louvre arrangement, which varies the opening and free area through the louvre face. The variable louvres can provide maximum ventilation rates when fully open or modulated to increase louvre pressure or closed to prevent the ingress of precipitation.

In addition to the ACTIVLOUVRE arrangement, the system also incorporates external air catchment fins to provide greater area at the louvre improving performance in relation to wind speed. Pressure release vanes at the fins provide a means to reduce face pressure under high winds.

The school has been able to adapt to strong climatic variations with nearly no use of energy due to clever architectural design, including using our WINDCATCHER and SUNCATCHER systems. 16 N° WINDCATCHER and 2 N° SUNCATCHER Monodraught products were installed above individual classrooms to create the natural ventilation system. The systems are supported by Monodraught iNVent2 Controls which allow the building to monitor CO_2 levels and also open and close the ventilation units as required. Air quality was important to help students maintain concentration levels. The impact of installing this solution has allowed the school to guarantee a ventilation of 25m³/h/child.

The Monodraught system was selected as the natural ventilation system, it provides free-cooling and it provides a humidity sensitive air handling unit. Natural ventilation is supplied by the Windcatcher units, controlled class by class and by indoor and external temperature sensors plus a CO_2 Sensor. There is also autonomous night ventilation using the cool evening air. The solution requires almost no maintenance compared to mechanical ventilation systems.

Results have shown great indoor air quality and measured CO_2 levels within the various rooms are well below the indoor air guide values. The air renewal rate is 25/m³/h person, higher than the norm. Acoustics tests have also performed well, with WINDCATCHER open=39dB and WINDCATCHER closed =38dB. The acoustic quality of the rooms is critical to pupil’s attention spans. Feedback on the system has also been positive with the school being pleased to have manual controls.

Christian Charignon from Tekhne Architects stated “We selected the innovative Monodraught solution which ensures very efficient ventilation during the day when the children are in class and free-cooling at night. This enables the school to guarantee an ambitious ventilation rate. We were pleased to create a design which uses the environment as a strength rather than a constraint”

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Last Updated July 2017

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