

Reduce **heating costs**  
and **carbon emissions**  
with free solar heated air

The most efficient, cost-effective solar energy systems available

# SolarWall<sup>®</sup>

perforated Transpired Solar Collector and AmbiRad Group Heating Systems



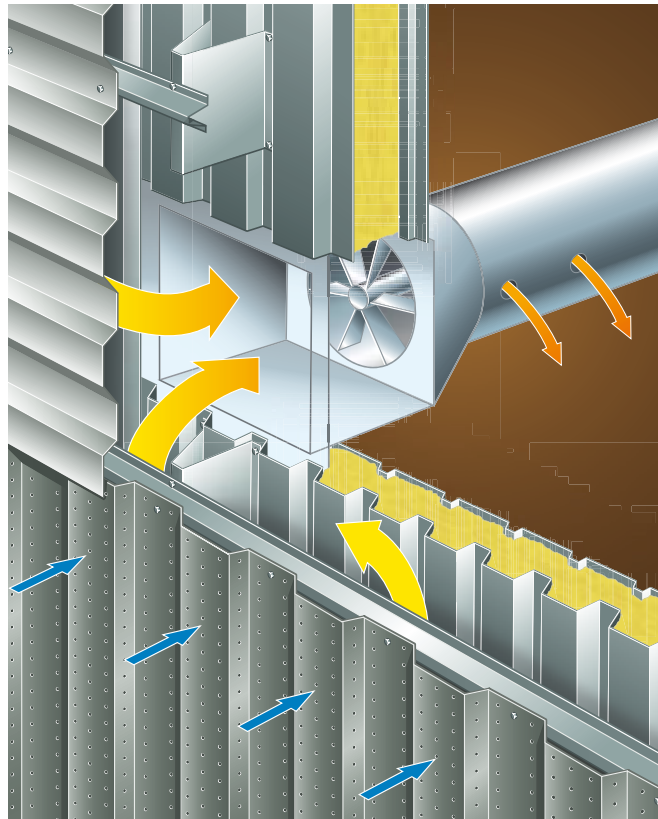
The CA SolarWall® perforated Transpired Solar Collector is an astonishingly simple, effective solution to the demand for CO<sub>2</sub> reduction – and the energy cost savings that accompany it.

The system consists of a perforated, cladding for industrial and commercial buildings that captures the warmth from solar radiation and uses it to both heat and ventilate a building.

Thousands of tiny perforations uniformly spaced across the absorber are crucial to the system's performance and efficiency. As sunlight strikes the surface of the SolarWall® and is absorbed, solar heat conducts to the thermal boundary layer of air which lines the outer surface of the panel. This boundary layer of air is then drawn into a nearby perforation before the heat can escape by convection, virtually eliminating heat loss from the surface of the plate. This simple, yet critical, innovation makes the SolarWall® perforated Transpired Solar Collector by far the most efficient in its field.

#### SolarWall® performance facts

- Simple, low-cost renewable energy technology that has been proven to provide over 20% of a building's total energy requirement
- 'Merton Rule' compliant in the vast majority of cases (delivering 20% contribution to renewables targets)
- Harnesses maximum solar radiation at a fraction of the cost of alternative solar systems
- SolarWall® Collectors available CarbonNeutral with Corus Confidex Sustain®
- Has been proven to reduce heating costs by up to 64%
- Payback as low as 3 years on new build projects
- With no moving parts the transpired solar collector is maintenance-free
- Recovers embodied energy within the first year of operation
- Reduces summer solar heat gain.



*The SolarWall® perforated Transpired Solar Collector is installed as an additional skin to a building's southerly facing elevation, creating an air space (cavity) between the collector and the insulated wall.*

#### A Strong Combination

AmbiRad Group and CA Group have joined forces in a strategic alliance to provide clients with a truly renewable and financially-viable solution in their drive to increase building efficiency, reduce costs and carbon emissions.

The perforated Transpired Solar Collector system unites AmbiRad Group's extensive range of energy efficient space heating equipment with CA Group's SolarWall® metal solar cladding system to create an innovative, fully integrated solution which delivers in both the environment and on the balance sheet.

The SolarWall® and the heating systems work together to harness the solar energy and fulfil the building's heating needs.

Many of the heating products designed for use with the SolarWall® are listed on The Carbon Trust Energy Technology List and eligible for 100% enhanced capital allowances for qualifying users.

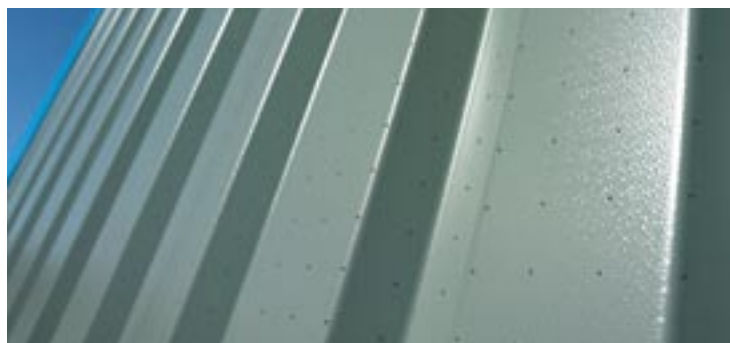
## For free, fresh, heated air and reduced solar gain within the building

By integrating CA's unique SolarWall® with AmbiRad Group heating products under a single control, this partnership can provide a fully integrated environmental solution with the capacity to dramatically reduce both fuel usage and carbon emissions.



*Systems can be matched to applications as diverse as full heating or tempered make-up air, in each case optimising the use of solar heated air produced by the SolarWall®.*

# Harness the benefits of solar energy



**Each system is specifically engineered, combining the technical expertise of CA and AmbiRad Group, to provide a fully integrated heating and ventilation solution delivering reduced energy costs & Carbon emissions, an improved environment and dramatically reduced life cycle costs.**

With installations in over 25 countries, perforated Transpired Solar Collectors have been proven time and time-again throughout the world since their initial introduction in the 1970s.

Their development has dramatically increased solar collection efficiencies beyond those associated with the original, simple 'back-pass' panel collector, which cannot exploit the solar heat on the outside face of the collector.

Research showed that whilst a simple 'back-pass' collector does capture some solar energy, the lack of perforations prevents the capture of the external boundary layer, which has been proven to represent up to 50% of the potential solar heat.

Transpired Solar Collectors, allow this thin boundary layer of heated air to be drawn directly in to the cavity. In addition, drawing the air through the perforations was also found to maximise the amount of heat transferred from the panel to the air.

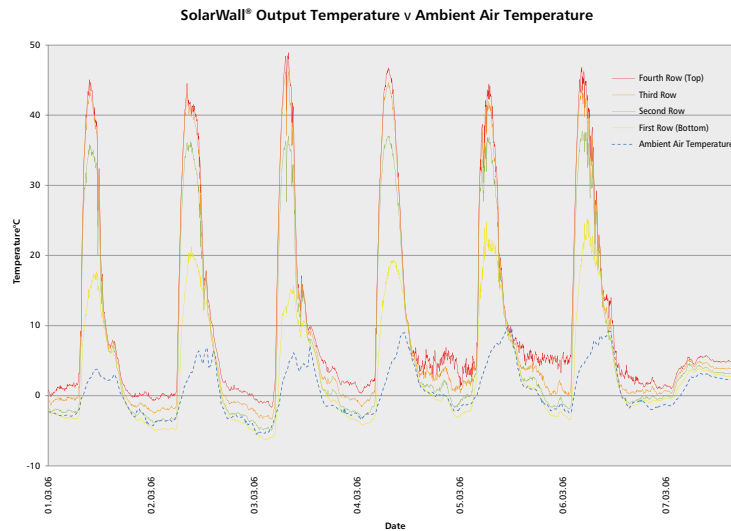
The net result was that the perforations improved the collection of heat from solar radiation by approximately 50%, compared to the original non-perforated back-pass collector. This means that, on a sunny day, the temperature of the air entering the cavity can be raised as much as 30°C before being delivered into the building.

Patented worldwide, SolarWall® perforated Transpired Solar Collectors are available in the UK exclusively from the CA Group.

For standard heating applications, the system introduces solar heated air via micro-processor-controlled dampers and a 'mixing-box'. In this way, the solar heat/fresh air input is balanced and optimised to minimise stratification and random air infiltration. For applications requiring permanently high levels of ventilation, SolarWall® can be used with increased airflows to pre-heat ventilation air through daylight hours.

### Independently tested

BSRIA (the Building Services Research and Information Association) were commissioned to conduct a 12 month monitoring and testing programme on a 410m<sup>2</sup> SolarWall® retrofit installation at CA Group's headquarters in County Durham. The aim of the study was to produce an independent report detailing the performance of the system through a full four-season weather cycle in the UK climate.



Prior to the start of the process, BSRIA established the performance parameters of the existing building via airtightness testing and a full thermographic survey. The SolarWall® was then installed, with a bank of 32 thermocouples inside the cavity and a pyrometer (for measuring the amount of solar radiation) mounted on the surface of the wall. Further temperature sensors were then installed inside the building to measure uniformity of the internal temperature.

The report, available from CA Group, concluded that SolarWall® produced a significant amount of useful heat, with air heated by up to 30°C under certain operating conditions. In fact, on its first day of operation, the system heated the building throughout the day without the need for the conventional gas heater, while the outside air temperature never rose above 6°C.

Throughout the test year, the performance of the SolarWall® was constantly monitored to measure the amount of heat contributed to the building. The results were impressive. After a 'degree day' comparison calculation to ensure that the findings could be accurately compared, SolarWall® delivered a reduction in the gas-fired heating requirement of 303,543kWh, equivalent to 58.9 tonnes of CO<sub>2</sub> – or 50% of the previous years' consumption.

### "Merton Rule" compliant

Perhaps most impressive of all, the study concluded that the heat collected by the SolarWall® and delivered to the building more than satisfies the 10% renewable requirement of the Merton Rule.

## Proven efficiencies with SolarWall®

In independent tests carried out by BSRIA, a UK SolarWall® installation has demonstrated **fuel cost reductions of 50% over 12 months**, saving in the region of 303,000kWh and 58.9 tonnes of CO<sub>2</sub>. This is approximately the equivalent to annual operational costs of over 39 average-sized domestic boilers.



*The area of solar collector is sized to match steady state heat losses under ideal conditions. On large buildings where the total heat loss cannot be met, the maximum area available is utilised in order to optimise use of solar heated air.*

“The transpired solar collector is the most reliable, best performing and lowest cost solar heating system for commercial and industrial buildings available on the market today.”

The United States Department of Energy



## The heating system

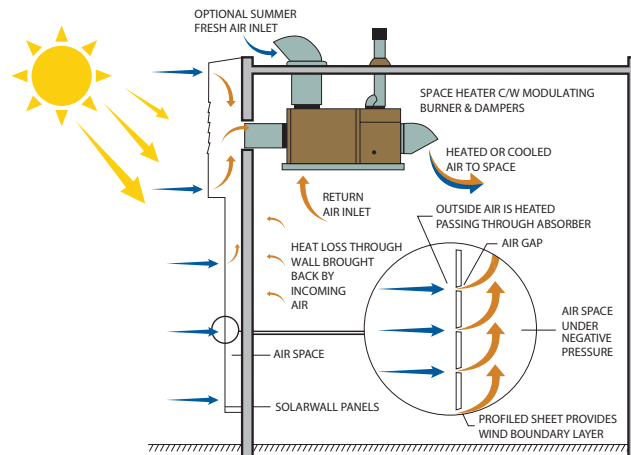
From the extensive range of AmbiRad Group heating products, systems can be designed to suit almost all industrial and commercial applications to take advantage of low-cost renewable energy. Dedicated microprocessor control balances the amount of solar heated air introduced to the building to optimise the utilisation of zero carbon renewable energy whilst maintaining good thermal internal air quality and environmental comfort.

The systems are designed with the SolarWall® Transpired Solar Collectors sized to match the steady state heating load. The solar heated air is then introduced to the building via the heaters.

During periods of low solar exposure, when little or no heat is available from the SolarWall®, the microprocessor control modulates the dampers so that the system makes optimum use of any solar heat available, mixing it with re-circulated air and the modulating burner providing the balance of additional heat required.

As the amount of solar heated air available starts to increase, the dampers reduce the recirculated air and the gas burner input modulates down.

As the temperature of the solar heated air reaches the design requirements, the burner switches off and the heating is then met totally from the renewable energy source.



A negative pressure is created within the air space by means of a ventilation fan which draws the heated thermal boundary layer of air through the tiny perforations within the SolarWall® collector. This heated air is collected within the plenum from where it is distributed within the building.

## System types

- Heaters and ductwork incorporating auto de-stratification
- Free blowing heaters with de-stratification fans
- Combined heating and ventilation units to provide variable fresh air input for minimal occupancy ventilation or summer ventilation for 'free cooling'
- Make-up air for areas requiring permanent ventilation
- SolarWall® fan boxes without heater section for use in conjunction with existing heating systems

## Applications

- Factory heating
- Warehouse heating
- Leisure centres and sports arenas
- Occupancy ventilation for office areas

# Talk about a highly acclaimed system

*"We are very happy with it. The SolarWall® works great. There are no moving parts, the wall is self-maintaining. At 3M, we are looking at reducing our energy consumption. Most of our projects are energy reduction projects where we have looked at using energy more efficiently. The SolarWall® is the only project we have implemented where we have a renewable 'free' ongoing source of energy."*

3M

*"The simplest, most efficient – and least expensive – way to preheat outside air for industrial and commercial applications is through the use of a perforated-plate absorber or a solar air heating system such as the SolarWall®."*

## Bombardier

*"What this wall does is to provide you with tremendous amounts of heated fresh air for free. This is a really cost effective way of improving the work place."*

Ken Rossi, Manager of Plant Engineering, Ford Motor Company

# Talk about a truly cost effective solution

The Government's **Enhanced Capital Allowance** scheme actively encourages industry and commerce to reduce energy consumption by promoting the use of energy efficient equipment. This symbol verifies that the product has been independently assessed and qualifies for the ECA scheme, an upfront tax relief enabling businesses that invest in energy-saving equipment to claim 100% first-year capital allowances against their taxable profits.





TRANSPIRED SOLAR COLLECTOR

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