ADVECO NEWSLETTER

Welcome to Adveco's June 2024 newsletter,

As the Sun does its best to make itself known, now is as good a time as ever to consider the advantages of solar thermal technology as part of a domestic hot water (DHW) application in the commercial built environment. We will be touching on the subject over the coming months, looking at retrofit opportunities and space saving gains. But this month we start by highlighting the drain back vessel and explain why its inclusion is so important in the delivery of cost-effective low-carbon hot water.

Whilst on the topic of humble yet critical vessels in DHW applications, we take a deeper look at stainless steel cylinders and explain why they might be the most important net zero system investment you make.

We also continue the company expansion with a much warranted promotion in the sales department, so do take a minute to get to know Ashleigh Rushton.

Finally take a first look at a new way to integrate FUSION as part of the transition away from gas water heating to a lower-carbon electrical alternative...

Why Use Drain Back In Commercial Solar Thermal Systems?

For consistent, long-term efficient use of flat plate solar collectors drain back is a necessity to overcome the issues resulting from stagnation.

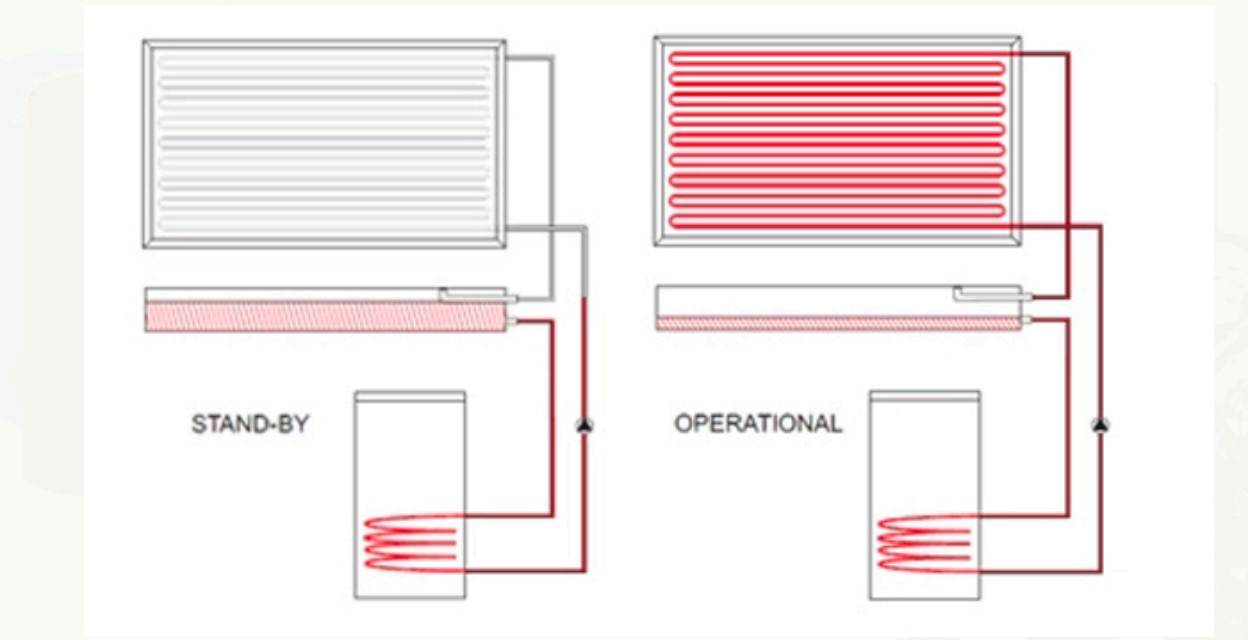
Stagnation is the term applied to a solar system that has shut down as the preheat vessel is up to temperature. Even in a commercial environment, there will be times of low demand. In an office building, for example, outside of working hours while the sun is still up, or a hotel in the middle of the day, between the times people check out and check-in. During stagnation, all solar thermal systems without protection are prone to overheating of the solar fluid (glycol) which can boil, losing its antifreeze properties and become corrosive, attacking panels and components. To avoid overheating the solar fluid its manufacturers recommend preventing exposure to excessive temperatures over long periods, especially during stagnation periods. Under permanent stagnation conditions, the solar fluid will solidify. This is because glycol is essentially a sugar-derived fluid, and like sugar, when it is boiled it transforms into a black sticky treacle-like tar which kills the system's efficiency and can even clog the system rendering it inoperable. This irreversible and costly fluid damage can take place within a matter of just two to three weeks and is hard to get out of the system, even with special cleaners. In particularly bad cases it can even affect some of the ancillaries, such as the pump, which must then also be replaced.

In addition, when fluid boils under stagnant conditions, a cubic inch becomes a cubic foot during the phase change, so there is a pressure issue to also consider. This is especially the case in the commercial built environment where multiple array systems are commonplace. It's critical to ensure fluid is not trapped in the system where it just boils and boils, causing pressure build up. This overpressure will trigger the relief valve to open and discharge the fluid. Studies have previously suggested as many as 30% of sealed systems discharge due to overpressure and it's a number, through our wide experience of solar thermal system installations, that we would agree with.

The only thing that is essential in a solar thermal system then is that you avoid stagnation as it creates too many problems and overcomplicates maintenance. Even under a best-case scenario, if system stagnation occurs and only damages the solar fluid it's still going to need to be changed every two years.

Systems will need to be specified with large more costly and difficult-to-locate tanks or fewer collectors to limit stagnation, but commercial buildings will have a limitation on cylinder size. This curtails heating energy which can be provisioned by the collectors because there's not usually room for a whole day's demand to be stored. That is counterproductive when high demand requires more power out of the system.

So, to avoid stagnation the options are to either use a heat dump or drain back. A heat dump is exactly what it sounds like, and one popular way of doing it is with a fan coil unit (FCU). It is positioned on the roof and dumps heat when the cylinders are unable to accommodate any more heat from the solar collectors. It is an approach which is suitable for both evacuated tubes and flat plates, but it does require parasitic electricity, so we 'lose' that free system energy, which is currently one of the premier reasons for adopting a solar thermal system to deliver commercial grade water heating. The other issue with heat dumps is that they are reliant on working parts, which can obviously fail, and you will only find out about that when the relief valve discharges.



Drain Back, The Answer To Stagnation

Drain back is a system, as the name implies, that drains the fluid out of the collectors when not in use because the cylinder is up to temperature or there is no solar energy available. It's an intrinsically safe way of avoiding stagnation without requiring additional operating electricity. It Prevents boiling, overpressure, and fluid degradation but, it can only be used with flat plate collectors.

The solar thermal system now has a collector, cylinder, and pump, to which is added the intermediate drain back vessel which is partially filled. The system still works in the same way with the temperature in the collector and the cylinder monitored. When there is usable energy, the pump starts, pushing solar fluid up into the collector and short circuits in the drain back vessel to deliver the thermal energy to the cylinder. It will continue to run like that if there is usable energy, and the cylinder is not up to temperature.

When the cylinder is up to temperature or there is no longer usable energy, then the pump will stop. With a connected fluid at two levels and an air bubble in between gravity takes over draining the fluid back out of the collector, through the pump and up into the drain back vessel coming to rest at the starting position with no fluid in the collector. The collector, now empty of fluid, can continue to get hotter and hotter, but it does not affect the system.

The drain back vessels are tubular and hang on the bottom of the collectors. Typical installations will use a ratio of one drain back vessel for every two to four collectors (depending on if the collector plates are installed in a horizontal or vertical orientation). With drain back vessels employed, the system can also leverage more collectors for faster cylinder heat-up and increased provision of heat when demand peaks. With an air gap allowing for the expansion, and no need to make up for the expansion of steam the system also does not require an expansion vessel.

However, all pipework is required to tip back to the cylinder as the system relies on gravity. From an installation perspective, you cannot create traps in the pipework, such as exiting the collector and then running the pipe up over a parapet wall. Once below the roof, it becomes less of a problem because that pipework will always be flooded. Anything above the roof needs to have a continuous fall to allow the system to drain back. This is why we strongly advise that installers working with flat plate collectors and drain back are trained by Adveco. In our experience, things can quickly go wrong and become very costly with delayed assessments or even aborted commissioning visits.

For robust commercial solar thermal application design overheating must be dealt with. With multiple

arrays collecting from an uncontrollable heat source drain back systems provide the simplest necessary management to protect against overheating. Drain back ensures systems always stay safe in times of low use, countering issues found in stagnation periods, most notably protecting against overheat. As a result, glycol fluid used with drain back will typically last five times longer (and in some cases more). With drain back in place the expectation for a system fluid change goes from every two years to every 10 years.

With reduced maintenance and fluid costs added to the offset costs of energy being generated and no parasitic electrical energy demands, solar thermal with drain back represents one of the most proven and cost-effective renewables available to commercial buildings. And, with continuing high grid electricity costs, commercial organisations seeking to transition to low-carbon electric water heating are finding capital investments in solar thermal applications deliver far quicker returns on investment than ever before.

ADVECO SOLAR THERMAL FLAT PLATE COLLECTORS DRAIN BACK FOR SOLAR

Why Stainless Steel Cylinders For Commercial Hot Water?

Cylinders sit at the core of hot water systems which for many commercial establishments – from hotels to high-rise office buildings – provide a business-critical daily service. Cylinders are responsible for the storing and delivery of heated water and there are options when it comes to material choice for these critical components. Stainless steel though is the clear frontrunner for commercial applications. With a lighter weight for the same strength compared to some traditional materials, the use of this alloy can simplify installation and reduce structural load requirements.

Hot water systems operate in a harsh environment. Water, by nature, can be corrosive, especially in areas with softer, high mineral content water. Traditional materials like mild steel or copper, while seemingly cost-effective initially, can succumb to corrosion over time. Rust weakens mild steel, compromising its structural integrity and leading to leaks. Copper, while a good heat conductor, is susceptible to pitting corrosion, creating pinholes that compromise water quality and system efficiency.

The Robust Choice

Stainless steel cylinders, on the other hand, boast exceptional resistance to corrosion. The secret lies in the chromium content. When exposed to air or water, the metal forms a thin, invisible layer of chromium oxide on its surface – a passive film. This film acts as a robust barrier, shielding the underlying metal from further

corrosion. This inherent resistance translates to a longer lifespan for the cylinder, minimising replacement costs and downtime associated with failing equipment.

Modern commercial buildings will also utilise unvented hot water systems as these operate at mains pressure, delivering high-powered hot water flow necessary for large-scale applications like showers, laundry, and dishwashing. However, unvented systems necessitate cylinders that can withstand higher pressure. The alloy's inherent strength makes it the ideal material for unvented cylinders. Unlike traditional materials that may not be able to handle the increased pressures, stainless steel cylinders can be manufactured to withstand significantly higher pressures, ensuring safe and reliable operation for unvented systems.
Unlike some other materials that may harbour bacteria within cracks or crevices, the inherent properties of stainless steel contribute to superior hygiene in the water storage system. The alloy's smooth, non-porous surface inhibits the growth of bacteria and other microorganisms. In commercial settings, hygiene is paramount, making stainless steel cylinders particularly critical for hot water systems used in hospitals, hotels, and food service establishments.

Commercial hot water systems require regular maintenance to ensure optimal performance and hygienic operation. Fortunately, stainless steel cylinders are relatively low-maintenance. Their smooth surface makes them easy to clean, this can help minimise the risk of scale build up and sediment accumulation. If scale formation – resulting from high-intensity heating and hard water – is a recurrent problem on-site Adveco recommends indirect stainless steel cylinders and electric boilers. Available as the packaged FUSION system, limescale build up effectively ceases. Additionally, the corrosion resistance of stainless steel reduces the need for protective coatings, simplifying general maintenance procedures.

Stainless Steel: Versatile & Sustainable

Commercial hot water systems come in a variety of shapes and sizes, catering to diverse needs. Stainless steel offers the versatility needed to create cylinders suitable for various applications. They can be manufactured in different sizes, with varying wall thicknesses to accommodate pressure requirements. Additionally, stainless steel can be seamlessly welded, ensuring leak-proof construction for even large cylinders. The alloy also exhibits good fire resistance, offering an additional layer of resilience for commercial water heating systems.
When a commercial organisation considers how to introduce sustainability in their buildings, the relatively high energy demands of water heating is often identified as a major source of carbon emissions. Addressing water heating is also a relatively easy way to quickly and effectively tackle a building's carbon footprint. Whilst attention typically focuses on renewable heat sources such as heat pumps or solar thermal, wider consideration needs to be given to other core system elements, especially cylinders. Stainless steel, while not the absolute best conductor of heat, offers a good balance between heat transfer and retention. This property ensures that water within the cylinder stays hot for longer periods, minimising the need for frequent reheating cycles. This translates to lower energy consumption and reduced operational costs, contributing to the energy efficiency of the wider hot water system.
For commercially conscious businesses looking to reduce their environmental footprint, stainless steel cylinders also offer sustainable end-of-life as the material is highly recyclable for use as new products, once again minimising environmental impact.

A Sound Investment for Optimal Performance

When it comes to commercial hot water systems, stainless steel cylinders stand out as the clear choice. Their exceptional corrosion resistance translates to a longer lifespan, lower maintenance requirements, and improved hygiene. Additionally, their ability to handle high pressures and operate at elevated temperatures makes them ideal for unvented systems and demanding applications. Stainless steel also has

a sleek, modern appearance, making it a visually appealing choice for exposed locations. The versatility, adaptability, and sustainability profile of stainless steel cylinders further solidify their position as the preferred material for commercial hot water needs. While the initial cost may be higher, the long-term benefits of stainless steel cylinders significantly outweigh the extra investment.

STAINLESS STEEL HOT WATER TANKS

FUSION PACKAGED ELECTRIC WATER HEATERS

ATSX STAINLESS STEEL HOT WATER TANKS

Ashleigh Rushton Promoted to Account Sales Manager

We are pleased to announce the promotion of Ashleigh Rushton to account sales manager for East Anglia and Northern Home Counties.

Prior to joining Adveco's internal sales team in 2021, Ashleigh Rushton held sales roles at New City Heating and Primaflow F&P. With a broad knowledge of plumbing and in-depth experience leading sales of Adveco's latest water heating products her promotion to account sales manager was an obvious choice for the company.

"Expanding the sales team is a key requirement for strengthening the business for long-term growth," says Greg Brushett, Director of Sales, Adveco. "Especially now with the company championing new technologies and extending commercial markets nationwide."

"It's been important to strike a balance between our seasoned sales engineers and new appointments. The former offer unprecedented experience in the commercial water heating market and are perfectly provisioned to nurture this new talent," observes Greg. "The promotion of Ashleigh from internal sales to the position of sales account manager is a perfect case in point. She brings a fresh perspective to opportunities which are driven by a rapidly evolving sales environment that places a focus on attaining net zero in a realistic and cost-effective manner."

Adveco's sales team is ready to offer the most comprehensive range of products and services for customers seeking products for commercial water heating applications. More importantly, customers have the assurance that they will continue to have access to the specialist technical sales knowledge that sets Adveco apart from other suppliers.

For projects in East Anglia or the Northern home counties contact Ashleigh Ruston at arushton@adveco.co or call 07918 161 135.

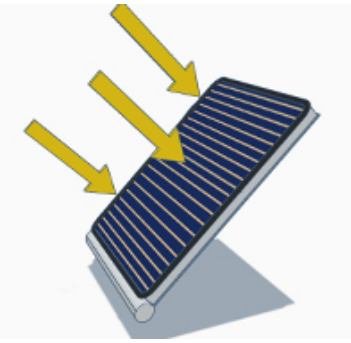
FIND YOUR REGIONAL SALES CONTACT

First Look: FUSION & Solar Thermal

For organisations which are considering, but not ready to commit to a heat pump based system, our FUSION T is available now with an option that delivers a twin-coil stainless steel tank and mounted ARDENT electric boiler and controls without the heat pump preheat. This iteration futureproofs the system or allows for solar thermal to be introduced now into the lower coil as system preheat. FUSION's controls optimise top up heating from the boiler as the pre-heat fluctuates across the year. Stay tuned as we announce more details later this month...

FUSION ELECTRIC WATER HEATING

Sustainable Electric Hot Water



Solar Thermal

A proven and extremely reliable technology, solar thermal offers a

Air Source Heat Pumps

The FPi32 & L70 ranges of commercial Air Source Heat Pumps

ARDENT Electric Boiler

ARDENT is designed to serve as an indirect water heater or heating

clear path to reducing CO_2 emissions and offsetting expensive electric costs for organisations using large amounts of hot water. Adveco's collectors with drain back provide a low maintenance option to help achieve sustainability goals.

FIND OUT MORE

(ASHP) for the provision of preheat in domestic hot water applications. Adveco ASHPs can be supplied as a part of a bespoke hybrid, or all-electric system, as wellas an element of a prefabricated plant room system.

FIND OUT MORE

system. Wall-hung and oorstanding variants for those seeking to avoid a reliance on gas energy supplies. In hard water areas the ARDENT electric boiler can be used to dramatically reduce the costly build up of damaging limescale.

FIND OUT MORE

Adveco 2024 Product Guide

Get our handy reference guide to Adveco's current product portfolio. Don't forget these are just the start of our offering, acting as the buildings blocks for your bespoke hot water systems...

2024 PRODUCT GUIDE

Discover Adveco's expanding range of low carbon and renewable products

Live Metering
Solar Thermal Systems
FPi R32 monobloc Air Source Heat Pump
L70 Air Source Heat Pumps for larger projects
FUSION packaged electric water heaters
Electric Boilers
Hot Water Cylinders, Indirect Water Heaters, Calorifiers & Buffers
Commercial Gas-Fired Water Heaters
Standalone Heat Recovery from Chillers
Offsite Constructed Packaged Plant Rooms

01252 551540
Enquiries@adveco.co