ISSUE 7

HEAT TRANSFER TECHNOLOGY

The latest news and views on heat exchanger technology from BOWMAN®

IN THIS ISSUE

If you go down to the woods today...

...you'll find a hot tub heating revolution!

The range of facilities at UK holiday locations has risen dramatically, driven by the higher expectations of holiday makers and the companies who have risen to the challenge of satisfying those requirements.

One such organisation is Forest Holidays, a 'leading brand' in high quality, low density forest lodge holidays. Currently operating from 9 locations in England and Scotland, Forest Holidays have over 570 lodges and in keeping with customer expectations, 520 cabins have their own exclusive hot tub.

The attraction of hot tubs

Hot tubs have proved to be a major attraction and demand is always high.

Whilst an undoubted benefit in terms of guest appeal, hot tubs can pose a problem for many commercial operators.

One major issue comes at guest change over times. Staff often have just a few hours to service and prepare the tubs prior to new guests arriving. As many tubs are heated electrically, they can take several hours to heat up, so may not be ready for new arrivals.

High energy costs

The other problem is energy costs. Many hot tubs are heated using expensive mains electricity. Consequently energy costs can be in excess of £500 per tub/per year – a significant figure when holiday parks are operating hundreds of hot tubs!

A new direction for hot tub heating

Forest Holidays decided to switch to a more sustainable heating approach. Working in conjunction with their consultants, they researched a range of options, finally selecting an LPG solution. Individual LPG boilers in each lodge will heat both the rooms and the hot tub, using a Bowman EC80-5113-1T heat exchanger to transfer heat from the boiler water circuit to the hot tub water circuit. And with a heat transfer capability of up to 25kW, it was anticipated that the Bowman units would dramatically reduce heat up times.

Results that speak for themselves

Forest Holidays has now completed its conversion of forest lodges at 'Deerpark', in Cornwall. Results are still being monitored, but early indicators suggest a key performance target - to heat their 1400 litre hot tubs from 6°C to 38°C in around 2 hours - has been achieved, together with significant energy cost savings.

Turning food waste into valuable power!

Bowman heat exchangers play a vital role in the success of 'zero waste' recycling centre

Anaerobic digestion (AD) has revolutionised the way that food waste can be handled on a commercial scale. No longer is it lost to landfill, as specialist recycling companies now convert it to energy for homes and businesses.

One such company is Biogen. Its latest recycling centre, near Atherstone, Warwickshire, came on stream just 18 months ago and is already processing 45,000 tons of food waste per year. Over 110 tons of food waste is delivered to the centre every day, where it is bulk loaded into a 'de-packaging' line, to separate the food waste from associated packaging. The food waste then travels through a series of processing operations, to ensure it is the right consistency for the AD process.

Operating at a temperature of 40ºC, each complete digestion cycle runs for 40 days, to ensure the maximum energy value is recovered from the waste material. From the waste food slurry, the AD process produces a combustible gas containing Methane CH_4 (60%) and CO_2 (40%), which is used to power the company's two GE Jenbacher generators.

The electricity produced from the generators is fed into the National Grid and provides enough power for 4,500 homes. Waste heat is also recovered from the generators cooling system and this is transferred through two Bowman FC160-1426-5 heat exchangers to provide hot water for three primary areas – building services, including the underfloor heating system, plus personal hygiene facilities; the waste packaging 'hot wash' process, to remove any remaining food waste and avoid cross contamination; plus jet washing of all commercial vehicles prior to them leaving the site.

'The Bowman heat exchangers perform a vital role within the plant' said site manager Kevin Eagles, 'they not only cool the generator engines, they also provide hot water for process cleaning operations and heat the offices and staff areas'.

Life in the fast lane

Keeping cool when testing race car engines

Sporting & Historic Car Engineers LTD is one of the most successful historic motor sport specialists in the UK. Established nearly 30 years ago, they restore, service and prepare some of the most iconic sports racing cars and road cars in the world.

Engine build and development is a key part of the company's operations for sports racing cars which include Ferrari, Alfa Romeo, Aston Martin and the legendary Ford GT40.

The company prides itself on the quality of its work and to ensure consistently high standards, carries out all engine development work in-house – including testing on its own 'state of the art' test facility.

Bowman header tank heat exchangers are used within the test cell to cool the engine jacket water when testing to simulate race performance. So when the company recently needed to replace one of their heat exchangers after 16 years reliable service, they naturally ordered a Bowman unit to take its place.

"Efficient cooling is vital when testing high performance race engines" said Tim Samways of Sporting & Historic Cars, "they generate significant amounts of heat, which must be controlled to enable the engine to achieve its full performance potential and protect from overheating. In all the years we've used them, we've always found Bowman header tank units to be extremely efficient and reliable in operation."

Where there's muck there's - energy!

A 50kWe combined heat and power system, featuring a Bowman exhaust gas heat exchanger has enabled a Scottish farm to become energy self-sufficient, by converting organic waste into renewable energy!

Located in the beautiful Scottish border country, east of Dumfries, Allerbeck Farm is a productive livestock farm extending to 430 acres with over 1400 head of cattle. The farm recently took the decision to invest in a renewable energy system for both electricity and heating requirements. The proposal being to use organic farm waste to feed a Bio Digester. The Methane gas produced would fuel an engine powered generating set and waste heat recovered from the engines exhaust stream would provide hot water for the farm and its buildings - as well as for the Bio Digester itself.

A highly efficient, combined heat & power solution (CHP) was designed and installed, incorporating full electrical control systems and a Bowman 6-60-3741-8 exhaust gas heat exchanger, capable of recovering up to 101kW of heat energy.

In addition to its own organic waste, Allerbeck also takes waste from local farms for the Bio Digesters feedstock, which creates Biogas with a concentration of 60-70% Methane.

The Bowman exhaust gas unit has proved to be particularly effective as, in addition to providing district heating for the farm and the digester, any unused heat is diverted into a 'heat dump', feeding a kiln to dry wood, which is sold for log burners.

Bio Digester based CHP systems, incorporating Bowman exhaust gas heat recovery, have proved to be popular in agricultural applications, as pay back periods are typically around 18 months.

Come on in, the waters lovely – now!

Bowman solar heat exchangers resolve the problem of a cool pool.

When Martin Durant decided to replace the oil fired heating system in his West Sussex home, he wanted a renewable energy source that would heat both his home and heat his two swimming pools!

Martin's home has an outside pool of 58cu/m plus a 44 cu/m indoor pool. Having researched the available options, he decided on a Kensa ground source heat pump, which proved to be an efficient solution for both hot water and underfloor heating, but less so for the swimming pools, due to the poor heat transfer performance of the two stainless steel heat exchangers installed.

'Unfortunately, at the time of installation, there was little information available on the best choice of heat exchangers for the Kensa system.' said Martin "We had the two units running in parallel and the heat pumps would simply heat the water up to the cut off temperature of 40^{0}C, cool down and then start the cycle all over again. Not enough heat was being transferred through the heat exchangers to heat the pool and it would literally take days to get to anything close to a reasonable temperature.'

Happily, Martin became aware of Bowmans swimming pool heat exchangers and after discussions with Bowman's technical team, he installed two EC160-5113-5S models. These units are designed to operate with solar panels or heat pumps and the improvement was instant and dramatic!

'I have found the new Bowman units to be unbelievably good, with typical temperature gains of around 5^{0}C in just a day.' Said Martin, 'That figure compares very favourably with the previous oil boiler system, but what has really made the difference is the heat pump no longer stops and starts anymore. These two Bowman units really transfer the heat out of the water, keeping it below 40^{0}C at all times, hence the pools are now really warm.'

Now recovering even more heat!

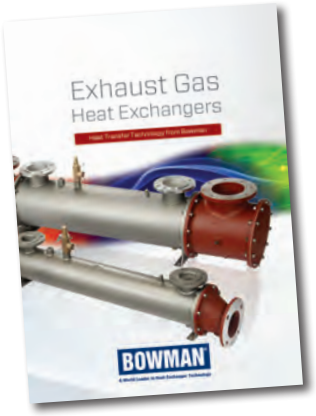
New design and engineering developments put Bowman exhaust gas heat exchangers out in front

Hot off the press is a brand new brochure covering our exhaust gas heat exchanger range. It's compulsory reading for anyone involved in waste heat recovery from diesel or gas powered engines and CHP systems, as it gives the latest improved performance figures for Bowman exhaust gas heat exchangers, following a comprehensive 18 month development programme.

During that time the company has undertaken a thorough review of its exhaust gas programme, which has involved design developments, improvements within the engineering process and comprehensive product testing, carried out in conjunction with the heat transfer faculty of one of the world's leading universities.

In addition to performance and specification data, the brochure now contains useful product information, together with guidance on product selection.

The brochure can be downloaded immediately by visiting **www.ejbowman.co.uk/downloads or alternatively for a printed copy, email info@ejbowman.co.uk** and we will send you a copy.



A perfect fit!

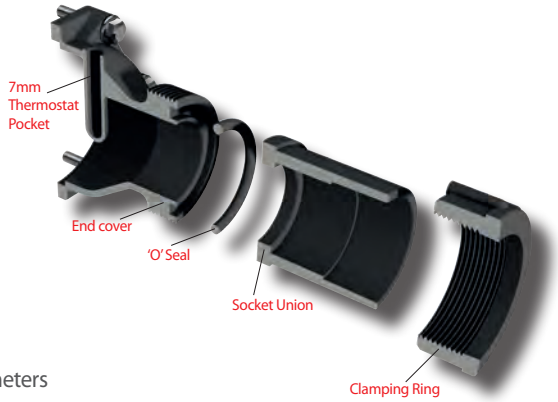
New EC swimming pool end covers gain

Earlier this year Bowman introduced a brand new end cover design for its popular EC range of swimming pool heat exchangers. Known as 'Universal Fit', they marked a big step forward for the product, as the new design made installation even easier and eliminated the need to provide separate connectors for imperial and metric pool pipework.

Previously, EC units were supplied with two alternative diameter connectors, which enabled it to be installed into either imperial 1.5" nominal pipe size (48mm O/D) or metric 50mm O/D pool pipework.

However, the new 'Universal Fit' design eliminates these, as both pipe work diameters can be accommodated in the end cover.

A new 'socket union' component has been developed that fits both imperial and metric pool pipe and by combining both diameters in a single unit, installation time can be reduced and the unused pipe connector is now eliminated, saving on waste material.



The new connectors are installed into the pools pipework in the same way as before, using solvent weld to secure the pipes inside the 'socket union' connector.

See us at:

Holiday Park & Resort Innovation
8 & 9th November 2017
NEC, Birmingham

METS 2017
Marine Equipment Trade Show
14 – 16th November 2017, Amsterdam

SPATEX 2018
30th Jan – 1st Feb 2018,
Ricoh Arena, Coventry

Critical Power & Decentralised Energy
18 & 19th April, 2018,
Ricoh Arena, Coventry

For More Information

If you would like more information on any of the articles contained in this newsletter, or for technical data on any of our heat exchanger ranges, please contact us directly;

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