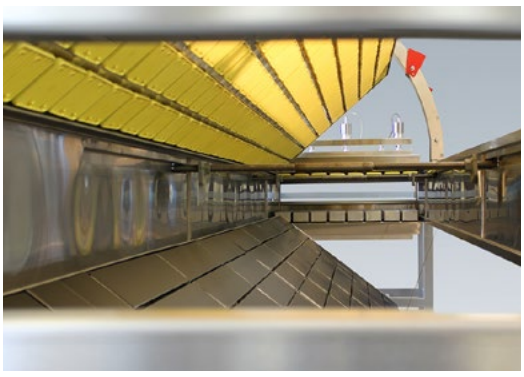
LINPAC slashes carbon footprint even further for EPS packs



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Last year the leading fresh food packaging supplier, LINPAC, won the most improved factory award for its St. Helen's site in the prestigious Britain's Best Factory Awards.

A major part of the work at St Helens - and throughout the group - is the company's continuous focus on improving the environmental performance of its products and services.

In that context a recent programme of machinery refurbishment at LINPAC St Helens and at other LINPAC group sites has ensured a world-first reduction in the energy cost of expanded polystyrene (EPS) packaging, thus slashing the carbon footprint of the products produced even further.

LINPAC produces EPS for a range of foodservice packaging solutions at St. Helens. Lightweight yet robust, the HotPac and EPS tray range keeps food warm, manage portion control and are extremely lightweight; in fact a single pack is 98% air. That being said, LINPAC does not stand still. The company has a focus on improving the environmental performance of all of its product ranges and the opportunity to improve the EPS extrusion and thermoforming processes to further minimise the production carbon footprint had to be investigated.

The reduction in production carbon footprint was achieved by upgrading selected thermoforming product lines from conventional heating systems to Ceramicx infrared-based heating. LINPAC Innovation Director Alan Davey says that 'production innovation is as much a part of our brief as product innovation. EPS packaging is a perfectly fit-for-purpose packaging solution and we are delighted at LINPAC to be reducing its environmental impact even further with these energy saving technologies.'

Infrared (IR) radiation can sometimes be described as 'sunshine without light'. When applied correctly in heat work it can result in substantial improvements in process accuracy and energy saving.

However, IR heat science is still relatively misunderstood and misapplied in many industrial sectors. LINPAC supplier Ceramicx uses proprietary know-how and instrumentation to accurately map the invisible IR heat flux spectrum thus enabling the company to build the lowest energy IR heat source and control.

In order to enable and prove the new IR heat system, a substantial amount of study work was undertaken prior to, and during, the St Helens upgrade process. These studies were commissioned for LINPAC by the IR heating supplier Ceramicx and were conducted at the St Helens site by Dr. Robin Kent of Tangram Technology, who measured the detailed differences in the heat and energy performance between two identical thermoforming lines.

The comparisons between the Ceramicx optimised IR system and the existing IR thermoforming lines were undertaken using identical tools, products and cycle times. Both LINPAC lines manufacture the same EPS packaging products for the food service industries.

Under test, the Ceramicx IR heating systems showed a decrease in the average power drawn from 56.16 kW to 32.85 kW, representing a 41.6% reduction in energy. Figures were also taken that showed a direct comparison between the two oven systems. With the machine base loads removed, the Ceramicx IR-based system then showed a measured energy saving of 45.8%.

Both machines were directly comparable and both are part of two in-line and fast cycling systems at the customer, loaded with the same tools.

David Parker at LINPAC says that 'we wanted to ensure that all the proposed system changes and energy reductions were scientifically measurable and verifiable. This was achieved and we are now scaling up the benefits in similar production work across the LINPAC group.'

Ceramicx owner Frank Wilson says that 'we were delighted to collaborate with LINPAC on this unique project. The best thermoformers in the world are questioning, re-evaluating and moving their heat technology and production efficiency over to designed IR sources.

'Carrying on regardless with the same IR heat legacy issues is neither sensible nor profitable. The key for us is to provide such customers with great IR thermoforming platen build – and to combine that with pin-point accurate electronic and process control.'

In plastics thermoforming production these heating legacy issues to be overcome can often include burn outs, electrical faults and problems with older style and non-directional heating. Tubular and magnesium filled heating solutions; black rod heating and other kinds of non-infrared sources can all make a contribution to inexact systems of thermoforming production, quality issues and – above all – to a waste of energy and electricity cost. And in a completely enclosed system or oven, this kind of heating becomes uncontrollable. Thermoforming operators are being continually forced to ramp up the power and the input electricity in order to try and maintain an even temperature.

Getting new IR heating systems designed and installed for thermoformers typically requires 3-4 days onsite for integration, including a 24 hour runoff. Opportunity is also taken for the new thermoforming control system to provide early warning diagnostic features; the ability to alarm the operator in the event of a single heater loss, a shorted wire or bad fuse.

Replacing an entire thermoforming machine is too big a step for many but an IR oven upgrade can improve the performance of an expensive fixed capital asset and can typically pay for itself within months.

Every thermoforming system, in some way, has its custom features depending on products, materials and cycle time. The Ceramicx belief is that sooner or later most of these will migrate over to design and optimised IR based systems in the coming years.

The St Helens-bound Ceramicx IR-based oven platen and control system was designed and built at the company's manufacturing facility in West Cork, Ireland before being shipped directly to LINPAC. The new oven has a total of eight temperature sensors built into the system. These can be selected individually or grouped for control purposes. Additionally the heaters can be subdivided into as many as 132 separate zones, thus saving further energy and giving a wide range of control options.

The Ceramicx oven system features upper and lower heating platens together with power control systems, enclosures, switchgear, and PLC control.

A total of 420 Ceramicx IR heating elements were used for the St Helens upgrade. Each of these Ceramicx-made elements has its own unique and traceable heating fingerprint, the performance of which is documented and verifiable online.

The oven assembly itself is fitted with pneumatic cylinders which are operated manually via two solenoid valves. The lower platen is used as a counterweight, using steel rope and pulleys. The control systems offer the processor a choice of both open and closed loop control, together with cost-saving procedures in start-up and fault monitoring in addition to inline process energy control.