Penmann
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Case Study: KP Foods, Energy Efficient Displacement Air Conditioning

KP Foods had existing plant serving 2 No. packing halls in excess of 13500m² with a cooling load greater than 1000kW.

The existing system an air sock distribution system had not been able to meet the cooling requirements and also had proved difficult to maintain.

Penmann redesigned the system to operate as a displacement system. The air handling plants were reduced by 50%, any retained units being refurbished. The sock air distribution system was replaced with floor mounted displacement terminals. Some terminals were mounted above production equipment due to floor space restrictions. The refrigeration plant was replaced with a new plant approximately one third the size of the original.

The new system only requires a supply air temperature of 17ºC to maintain 26ºC in the occupied space. This enables the use of free cooling for most of the year. This has added benefit of minimizing the amount of recirculated room air.

The conversion was estimated to reduce electricity costs by more than £70,000 p.a. alone. Service and maintenance costs are also significantly reduced as the removal and laundering of socks is no longer required, filter life is extended and the refrigeration plant is only required to operate for 30% of the year. Staff should also benefit from the improved working environment. The project had a pay back of 2.5 years.

Key Features

- Energy efficient displacement air distribution
- Refrigeration plant reduced by 66%
- Significant reduction in running costs
- Pay back of 2.5 years
- Conversion of existing conventional sock system

For more information, please contact Alison Wheelock at **Verner Wheelock Associates**
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Ventilation Case Study: Soft Drinks Manufacture

The client was suffering from extreme room temperature in a bottle blowing hall resulting from the high discharge temperatures of process air from the bottle blowing machines. The temperature not only affected people, but machinery too.

Penmann designed a solution that collected the hot process air without affecting the existing balance of Bottle Blowing machines, and either removed the air to outside or recovered the waste heat by re-using for heating other areas of the factory during low ambient periods.

This cost effective solution resulted in a large reduction in room temperature and a massive improvement in the operating environment.

"All installation work was performed on time and to a high standard. The installation team, ensured that they worked safely and that the safety of others around the working area was considered at all times"

Michael Clifford - Service Engineer

Key Features

- Removal of heat at source
- Heat recovery option
- Extract canopies removable
- Designed to suit any Bottle Blowing machine

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Product Cooling

Case Study 1

An international biscuit manufacturer had developed a new product that an existing line was unable to cope with in terms of the cooling capacity and product speed.

Penmann undertook to modify and extend the existing tunnel to cater for increased throughput. The 30m extension comprised a direct expansion cold deck with a contra flow air cooled cover. All the existing refrigeration plant and controls were replaced.

A menu based control system was provided to enable easy selection of alternative parameters for different product types.

The project was successfully completed on time and in budget.

Key Features

- Quick Release lightweight covers for ease of access
- Flexible control system to cater for variable product
- Cold decks and air cooling for maximum cooling effect
- Modulating temp control for repeatable performance

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Case Study 2

When Bettys and Taylors of Harrogate, the well-known craft bakers of Yorkshire, had a problem with cake cooling, they called upon the services of Penmann Climatic Systems to design and deliver a turnkey solution.

With increased demand for their Yorkshire Tea Loaf and Ginger Cakes from the main UK retailers, Bettys were faced with the problem of how to rapidly cool their cakes on racks when they exit their Double D Revorack Ovens to enable them to be packed, whilst at the same time not compromising the high quality of their product.

They engaged the services of Penmann Climatic Systems, a company with over 30 years experience of providing cooling solutions to the food industry. They were firstly able to conduct on site product cooling trials using Penmann's mobile product test unit to establish the best cooling regime for each product. Penmann worked closely with Bettys production and quality team to establish the optimum cooling conditions.

Once this was agreed Penmann were able to design a rack cooling system not only to cope with the volume of product being produced but also to fit into the production space available. These were subsequently ordered and successfully installed and commissioned by Penmann. The result being Bettys was able to cope with the increased volume of produce and consistent product throughout the year. The final system had the capacity to cool product to less than 30°C in 45 minutes. The Cooler design can easily be used to cool similar racked product to improve production throughput.

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Case Study 3

Muller Dairy the UK's leading yoghurt manufacturer had a requirement to rapidly cool a whole range of palletized product to a dispatch temperature prior to moving to their cold store.

They called upon Penmann's services, firstly to establish the optimum cooling method by undertaking product trials. They then were able to design and install a fully automated "in line" cooling tunnel to deal with the high levels of production throughput.

Penmann were also able to incorporate a number of key design features that were required by Mullers. Firstly, the tunnels have a narrow footprint to enable them to fit into conventional food production lines saving valuable production space. They were also designed to allow maximum access for ease of maintenance and also to minimize downtime. They were also designed with key mechanical features i.e. index loading of pallets to minimize air gaps and maximize cooling times and hence achieve maximum efficiency.

A second tunnel was soon required to deal with Muller's increasing output and when Mullers built their new factory a further four tunnels were ordered giving them an approximate cooling capacity of 130 pallets per hour.

Stephen Graves, Factory Engineering Manager stated, "We are very happy with the cooling tunnels designed and supplied by Penmann. All projects have been undertaken in an extremely efficient manner and have been delivered on time and on budget, and we have been particularly pleased with the performance of the tunnels".

Key Features

- Narrow footprint saving production space
- Reverse Air Flow to ensure even cooling
- Ease of access for on-line maintenance
- Indexed loading/static pressure cooling to ensure rapid chill time.

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