

Star Refrigeration replaces cheese chill plant during Covid-19 Lockdown to improve operating efficiency by 25% while increasing production throughput

First Milk has future-proofed its rapid cool store by replacing aging R404a cooling system and boosting capacity



First Milk is a wholly British farmer-owned dairy cooperative with a vision to create value for members by delivering long-term prosperity in the form of success, profitability, security and well-being. Last year, the company decided to invest £3.5 million in upgrading the creamery in order to help meet the Net Zero Carbon agenda, including replacing its cooling plant. The refrigeration system was approaching the end of its life and utilised R404a, a synthetic refrigerant with high GWP (global warming potential).

Owned by the family farms that supply it with milk and invest capital in the business, First Milk produce award-winning cheddar, regional cheeses and dairy ingredients, as well as marketing fresh raw milk to many other UK dairy processors. The

British cooperative works together as one team, with a relentless focus on efficiency and quality, to deliver competitive total returns to their farmer members. The company put customers at the heart of their business, creating value through strong, long-term partnerships.

Working in conjunction with First Milk, Star Refrigeration's Newcastle branch were tasked with the large-scale replacement of the cooling equipment and a low charge ammonia Azanechiller 2.0 was recommended to fulfil all the requirements. The job was a sizable investment and as such First Milk were looking at the long-term benefits, and needed a safe, efficient and sustainable option. Star provided the pre-engineered modular air cooled chiller to work in conjunction with the chilling tunnel to enable the creamery to increase its cheese output by just under 30%.

The Azanechiller 2.0 uses the natural refrigerant ammonia, which has zero global potential; this ensures the business is safeguarded against future F-gas legislation. In terms of efficiency, the low charge ammonia Azanechiller has an overall improved operating efficiency of about 25% when compared to new refrigeration systems using HFCs and HFOs. The low charge ammonia aspect addresses any health and safety concerns as the current model has a charge of just 42 kg of ammonia.

Ian Wilson Project Engineer from First Milk said, "We worked with Star Refrigeration on our chill

plants many years ago – going all the way back to 1976. The current cheese chill store which required replacing was installed by Star in 1985, so it's nice to work with them again as they understand our requirements and can inform us of the new technology available since the original install. "Updating our rapid cool store was phase three in our four-phase strategic plan to increase capacity significantly, and Star proposed a safe, efficient and reliable option."

The Dairy Requirements

The existing RCS (Rapid Cool Store) was limited on the number of cheese blocks it could process and has been replaced with a store that meets current and future needs. The cheese enters the RCS with a core temperature of approx. 30 degrees Celsius and is held for 18h to reduce the core temperature to 12 degrees Celsius before being palletised and stored.

First Milk's new Azanechiller 2.0 exceeds the 'Minimum Energy Efficiency Requirements' set by the Ecodesign for Energy-Related Products Regulations- the UK instrument that enacts the European Ecodesign Directive – by an impressive 75.2%. This means that the new installation will have a dramatic impact on cutting First Milk's carbon emissions and will provide massive energy savings for the business.



Ian Wilson said, "The Azanechiller 2.0 boosts the capacity of the chill store plant and offers great efficiency by delivering immediate reductions on our energy costs. This development also helps towards our First4Milk net zero commitments, delivering more efficient and environmentally friendly refrigeration."

The Azanechiller 2.0 is manufactured and run tested at Star's production facilities in Glasgow before being delivered to site charged and ready to commission. Installation is simple, requiring a suitable base concrete/steelwork, connection of secondary pipework and an electrical power supply. First Milk was able to attend one of Star's manufacturing sites in Westway, Scotland in order to check the Azanechiller 2.0 live and see the benefits of investing in first-rate efficient technology.

In addition to the design and installation, First Milk

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have taken a two-year warranty, two-year maintenance plan and dial out service for preventative maintenance, so that Star's aftercare engineering team can remotely interrogate the plant to ensure it is running as expected. In the case of the First Milk Lake District Creamery, service and maintenance support post contract is provided by Star's Newcastle branch, which is approximately 85 miles from site. As well as the branch management and specialist teams, the branch currently employs eight fully qualified industrial refrigeration service and maintenance engineers as well as an apprentice.

Compliance



In order to comply with the Pressure Systems Safety Regulations 2000 and the Provision and Use of Work Equipment Regulations 1998 (PUWER) the user of a refrigeration plant is required to prepare a Written Scheme of Examination for the plant and Star included the preparation of a Written Scheme of Examination for the plant. Star included the preparation of a Written Scheme of Examination for the plant and for the first plant examination. The Written Scheme document incorporated a description of the system including each pressure vessel and safety device, and it provided a detailed inspection schedule for the system. The work was carried out by Star's in-group technical consultancy business Star

Technical Solutions (STS).

This installation was carried out during the most constrictive Covid-19 restrictions. However, the job was not delayed; delivery of the equipment to site was not affected and Star maintained its usual lead times from receipt of order.

Although Covid-19 developments were moving at a rapid pace, Star worked with its suppliers, staff and customers to minimise the effects of the virus and deliver on pre-Covid time frames and with all the necessary health and safety requirements. The 'plug and play' feature of the chiller ensures the onsite installation time is kept to an absolute minimum and the unit is ready for operation as soon as possible.

Michael Younger, Contracts Manager at Star's Newcastle branch said of the project, "We always work flexibly to meet client requirements, which in this case included bespoke manufacturing. We've managed to tick all the boxes for First Milk, delivering a future-proof refrigerant to give peace of mind, and a more efficient chill store with an increased capacity."

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