

spirax sarco

A challenging design brief

When saturated steam gives up its latent heat, a residual amount is retained in the resulting condensate. This is collected in a Condensate Recovery Unit. (CRU) and then pumped back to the system.

Although Spirax Sarco Mk III CRUs had proved extremely popular and reliable for over 25 years, the design, which utilised Amaranth's low NPSH pumps, did not take advantage of the latest technology or materials. The direct on-line motors were limited to just 10 motor starts per hour and so pumping of the condensate would occur only when the tank was full. This meant that condensate could sit in the tank for long periods, losing its energy and therefore requiring more re-heating by the boiler.

The existing range had also expanded to include 59 product options, and so rationalisation was needed.

A team comprising of Spirax and Amaranth staff therefore set about creating a specification for the new CRU. After considering various options, the final design brief was for a system with:

- Small foot print
- Variable speed technology
- Stainless steel tanks
- Simplex pump
- Better performance and greater reliability than competition
- Price competitive
- Low maintenance

The new CRUs had to also fit through a standard door used in industrial buildings so that the old units could be replaced easily and cost effectively.

Amarinth took just 18 months to design and bring the Ci-Nergy range into production. Despite the higher specification, by reducing the number of components the cost of the new units are less than the old ones they replace.

Rationalisation to just eight new products was achieved by using a plug and

play concept with only two tank and pump sizes and eight motors to handle condensate between 500 and 35,000 kg/hour.

Significant energy savings

The pumps in the Ci-Nergy unit were designed to adjust automatically to the level of condensate arriving in the tank. A soft-start control system enables the pumps to be started frequently whilst extending their service life. Computer controlled variable speed technology allows the pumps to operate at between 10 and 50 Hz depending on the amount of condensate to be pumped.

The overall result is a system with a smaller CRU that returns condensate to the boiler much more quickly and therefore hotter (on average 10 deg C) thus saving re-heating costs. This can amount to as much as £10,000 per annum.

Savings in electricity increase exponentially the slower a motor runs (known as the cubed law – running at 30Hz saves 78.5% in power) and so typical electricity savings using the variable speed pumps are a further £1,000+ per annum per unit.

The payback for the new units is between 6 and 9 months, making them an extremely cost effective upgrade to existing units.

Future-proof

The Ci-Nergy units were developed to be cost effectively tailored to meet the needs of individual customers. They can be easily integrated with Business Management Systems so that any alarms can be monitored centrally. In addition, a number of new features have already been identified such as a duplex pump unit.



For over 100 years Spirax Sarco has provided knowledge, service and products to steam users and specifiers for the control and efficient use of steam, thereby improving the performance of their plant and processes.

Founded in 1888 as Sanders Rehders and Company, today Spirax Sarco is the world-leader in their market and the cornerstone of Spirax Sarco Engineering plc, a business with a turnover of some £326M and which employs over 4000 staff worldwide, 1000 of which are in the UK.

Spirax Sarco has 100,000 customers in 51 countries that are supported through its network of 1000 sales and service engineers and 35 training centres.



“Amarinth has done a superb job in bringing this new range of condensate recovery units to market in just 18 months. With their unique and revolutionary variable speed solution, Amaranth has given us a leading edge technology that will enable Spirax Sarco to deliver huge cost savings to our customers. This will ensure that we maintain our position at the forefront of steam systems. It has been a pleasure partnering with Amaranth, both technically and commercially, and we look forward to developing future projects with them.”

Mr Paul Mayoh
Technical Manager