

Compact and reliable BPHEs at Hadeed District Cooling Plant



Located in the Jubail Industry City of Saudi Arabia, the Hadeed District Cooling Plant has replaced all existing chillers and DX units which have previously served individual buildings in the area. Cost-efficient and energy-saving, this system provides cooling through an extensive chilled water reticulation piping network located in and around Hadeed.



BPHE technology has been replacing traditional technologies during the past decades in various applications. Today close to 3.5 million SWEP BPHEs are installed worldwide, every year. With the B649, SWEP makes the BPHE technology available for all district energy applications in which SWEP already has more than 1 million installations worldwide. The system at the Hadeed plant is among the first of its kind to be built for the Saudi Basic Industries Corporation (SABIC) affiliate, and the BPHEs are most likely the first to be used at a district cooling plant in the Middle East.

The Hadeed District Cooling Plant

Since the start-up of the Hadeed plant in 2011, Zamil Industrial Investment Company (Zamil Industrial) has been in charge of its cooling network. The ambitious project, commissioned by SABIC, will help Hadeed becoming the leading producer of steel products in the



region. With a cooling capacity of 40,000 tonnes of refrigeration, the plant uses state-of-the-art equipment and machinery which reduce energy consumption as well as conserves the environment.

The world's first DN150s

Already at the start of the project, Zamil Industrial decided to try BPHEs from SWEP. The first twelve units were delivered in 2010. They were serial/parallel connected, as the capacity of the BPHE technology at the time was limited. "We were very happy with the performance and advantages of the first installations, so we opted for BPHEs again for the extension", says Alessandro Belloni, Operations Manager at Zamil Industrial. Shwan H Lamei, Segment Manager for District Energy at SWEP was able to deliver. "This time around we could offer the truly ground-breaking B649. In one step we tripled the capacity reach of the BPHE technology, making it a superior alternative for all HVAC applications". The two new stand-alone units were delivered in 2013 and Alessandro Belloni is more than satisfied with the results. "The weight and footprint is less than half of the corresponding heat exchanger. It was exceptionally easy to transport and install and easy to fit into ETS rooms with serious height and footprint limitations."

Modular solution for great reliability

The modular solution enables an N+1 design, bringing about unparalleled redundancy at a lower cost. N+1 redundancy for a conventional system usually involves another set of ETS (Energy Transfer Station) equipment of similar capacity. N+1 is simply one more module rather than an additional separate ETS system, making it a much more affordable proposition. In addition, the compartmentalized nature of a modular system significantly reduces the risk of losing control of the load. With the

BPHE technology, it is possible to cost efficiently use smaller modules, and thereby reduce the total installed capacity and at the same time offer required redundancy.

CIP for easy cleaning

Initially, Zamil Industrial had some concerns about cleaning, but those were soon sorted out. With the Cleaning in Place (CIP) method, the heat exchangers, with their closed loop systems, can easily be maintained with a minimum of man power and down time. Already an established method, CIP allows the interior surfaces to be cleaned by a chemical fluid, which circulates in the system. The chemicals and the strong water swirls dissolve deposits on the surfaces without the equipment having to be disassembled. Most of SWEP's BPHEs installed annually are used in water systems, making it a highly reliable and proven technology.

Less maintenance, more reliable performance

"The unit provides the same capacities as those of older technologies, but is much more compact, which saves money on space and transportation," says Shwan H Lamei at SWEP. "Also, as it doesn't have any gaskets, so the wear and tear of parts is minimal. This brings the same superior life cycle cost that we have previously offered for our smaller units." The solution also ensures a stable thermal performance as the plate package is fixed.

Looking ahead

The capacity of the Hadeed plant will gradually be extended during the coming years. "We are completely satisfied with the BPHE technology, and we are planning on using BPHEs for future extensions as well", says Alessandro Belloni at Zamil. Expected to significantly reduce power consumption, while simultaneously lowering the emission of greenhouse gas, the plant might well completely change the view on the use of BPHEs in this area.



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