



## Hallmark Güntner efficiency on the ice rink

At the new outdoor ice rink in Malbun, Liechtenstein, situated 1,600 metres above sea level, L&R Kältetechnik, based in Sundern, relies on a Güntner FLAT Vario condenser to dissipate heat from the machine room. The customised 200 kW capacity refrigeration system only needs half as much energy as “off-the-peg” solutions and hence reduces energy costs by more than CHF 6,000 every year.

Consistently and efficiently cooling an open-air ice skating surface measuring around 600 m<sup>2</sup> located 1,600 metres above sea level is no mean feat. The ice on the rink must be maintained within a tight temperature range of between -2 °C and -4 °C, both in low, frosty temperatures whether or not there is any ice skating taking place and during springlike temperatures of 20°C. The fact that it is located 1,600 metres above sea level also means that the air is thin which places additional requirements on the condenser.

### Aluminium pipe system

The solution devised by cooling engineering company L&R Kältetechnik, based in Sundern, uses an aluminium pipe system in the tray under the ice surface to freeze the water to the required temperature and consistency and maintain the temperature of the existing ice. According to the manufacturer's specifications, this construction uses between 20 % and 40 % less energy in day-to-day operations than conventio-

### Overview

Business line:	Industrial refrigeration
Application:	Sports facilities cooling
Country/Region:	Liechtenstein/Malbun
Fluid:	R134a/propylene glycol
Product:	Güntner FLAT Vario GCHV condenser

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▲ There is an efficient aluminium pipe system in the tray under the ice surface to freeze the water to the required temperature and consistency, and to maintain the temperature of the existing ice.



▲ A Güntner FLAT Vario GCHV condenser dissipates the heat from the primary cooling circuit to the environment.

nal systems which use the rubbery-elastic material EPDM (ethylene propylene diene monomer rubber) or polyethylene.

The energy-saving design of the refrigerating plant construction company L&R Kältetechnik for outdoor ice skating rinks is based on a two-circuit system, which separates the central cooling circuit with the refrigerant R134a in the machine room from the outdoor cooling circuit in the ice rink with the help of a plate heat exchanger. The latter circuit contains the coolant propylene glycol which is not harmful to human health or the environment.

### Flexible cooling technology with Güntner FLAT Vario GCHV

As the ambient temperatures are constantly fluctuating yet the requirements in terms of ice quality are always the same, the cooling technology needs to be able to function with a corresponding degree of flexibility. Conversely that means relying on continuously adjustable, speed-controlled, semi-hermetic screw compressors and frequency-controlled pumps in the machine room, which provide cooling both efficiently and in line with demand in particular in partial load operation. A customary cold water chiller would not be suitable in this context because they are not appropriate for use in conjunction with mountain air or low temperatures.

The central cooling facility provides a total maximum cooling capacity of 200 kW with the refrigerant R134a. A Güntner FLAT Vario GCHV condenser dissipates the heat from the primary cooling circuit to the environment. In addition to its capacity which was tailored exactly to the requirements with, for example, speed-controlled fans, this unit was used because it could be configured with the Güntner Product Calculator GPC and hence customised for this height above sea level. The flat-bed cooler in Malbun was set up on the flat roof of the machine room to save space.

### “Meteo Control System” takes weather data into account

All the cooling equipment is centrally regulated via the “Meteo Control System”, developed and programmed in-house by L&R Kältetechnik, which operates on the basis of forecasts. Various types of weather data (e.g. temperature, wind speed, solar radiation and precipitation) are taken into account in the calculation as important reference variables. As such, the control of the propylene glycol circuit, which is “sluggish” compared to other industrial heat carriers, is always based on demand and highly efficient.

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