

## Case Stories

# Vahterus Ring – An Energy-optimised Ski Tunnel Using Natural Refrigeration

Vahterus Editorial Team

Even if we get a rainy autumn, there will be at least one fully functioning ski track in Uusikaupunki – Vahterus Ring.

The 1 km long Vahterus Ring is the only ski tunnel in the world to use natural refrigerant in the form of carbon dioxide. The result of a snowless winter in Southwest Finland, it was completed in spring 2005.

Refrigeration units on both the north and south sides of the tunnel can be independently adjusted, for example when the spring sun warms the south side to a higher degree than the north. A tube runs 500 metres from each refrigeration unit to a manifold, from which the copper pipes laid underneath the ski track bring the carbon dioxide back to be cooled.



*Vahterus Ring is an excellent example of an energy-optimised sports facility using natural refrigeration.*

In addition to the carbon dioxide circulating through the cooling pipes, ammonia is used in a compressor outside the public facilities. The condensation heat has the capacity to keep an entire football pitch clear of snow and ice, but in this case heats up the adjacent tunnel for runners, cyclists and roller skaters.

Carbon dioxide is safe to use in public facilities, a quality enhanced by the fact that increased levels are easily detected and can be quickly responded to. There are about ten sensors along the track and even the use of a ski-track maker can trigger them and start ventilation if track maintenance has not been pre-programmed into the monitoring devices.

Off season, 5,000 square metres of snow is blasted into a storage facility at the centre of the site, where it can withstand the summer heat covered in peat. Each September, the snow is spread in a 10 cm thick layer to make new tracks, and the ski season is ready to begin again.



*Vahterus Ring is located in Uusikapunki, Finland.*