

Renovation of Tingvalla ice stadium, Karlstad, Sweden



An ecologically and economically sound system well worth investing in



Built in 1967, the Tingvalla ice stadium in Karlstad, Sweden, was completely renovated in 2007. Special emphasis was placed on improving energy efficiency, safe and introducing an environmentally friendly system. Cooling equipment facilities, air conditioning and heating systems were renewed. The aim was to construct an ecologically sound system with economic operating and maintenance costs.

Tingvalla ice stadium has multi-use ice hockey, bandy and skating rinks with a total surface area of 12,400 sq m. It is the largest ice rink in the world with carbon dioxide refrigeration system.

"Carbon dioxide technology combined with copper tubing provides the most energy-efficient refrigeration system for ice rinks, both now and in the future. It's well worth investing in."

Per Hannius, Francks Kylindustri, Norrköping, Sweden

Hundreds of euros saved daily

Previously, up to 15,000 kg of ammonia was needed to freeze the ice surface. Ammonia has been proven to be a health and environmental hazard and was replaced largely by carbon dioxide.

The new system requires only about 1,000 kg of ammonia and 16,000 kg of carbon dioxide.

Energy requirements were greatly reduced, as the pumps and compressors used in the copper tube/carbon dioxide system consume significantly less energy.

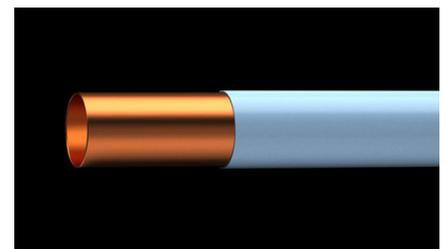
Operating costs of the traditional and new systems were compared and the new system was found to save approx 25.6 MWh, despite only being in use a few months of the year.

Save more with a condensing heat recovery system

At Tingvalla ice stadium, condensed heat is also recovered to warm water, storage areas and air conditioning. This saving will increase considerably once the whole rink is built into an indoor arena.

Benefits of the carbon dioxide system:

- environmentally friendly
- non-toxic
- good heat transfer properties provide constant ice quality and temperature
- by using the combination copper tubes – carbon dioxide, smaller pumps, compressors and tubing can be used
- consistent ice temperature over whole surface gives lower energy consumption
- reduced energy consumption
- low operating and maintenance costs



In conjunction with the Swedish Energy and Refrigeration Centre, Cupori has developed Cupori 240 (Ishol) copper tubing especially for carbon dioxide systems in sport arenas.