



# Saint Petersburg state ice theatre uses Güntner FLAT Vario

The refrigeration system for the Russian mobile ice theatre “the Saint Petersburg State Ballet on Ice” has been operating since August 2017 and can produce a top-quality ice rink in ambient temperatures of up to 35 °C in next to no time. The waste heat from the refrigeration circuit is dissipated via a GCHV-type Güntner FLAT Vario condenser.

Thanks to a new refrigeration system installed in 2017, the Saint Petersburg state ice ballet ensemble is now able to train and perform 365 days a year. As such, the approx. 80 dancers of the world’s only ice ballet group not only benefit from excellent training conditions but also a mobile stage for their tours. When the ice rink in Saint Petersburg isn’t being used for performances or rehearsals, it is open to the local children.

Russian refrigeration system installer AIRCOOL supplied, assembled and commissioned the refrigeration technology for the state ice theatre’s mobile ice rink in a weatherproof monoblock installation. In the summer, when the ice rink measures 26 m x 56 m, the system’s cooling capacity is 360 kW, whereas in the winter, when the surface area of the ice is often twice the size, it increases to 705 kW.

## Overview

Business line:	Industrial refrigeration
Application:	Sports arenas
Country/Region:	Russia/Saint Petersburg
Fluid:	R-507A/ethylene glycol
Product:	GCHV-type Güntner FLAT Vario condenser

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▲ The GCHV-type Güntner FLAT Vario condenser, together with the container solution, forms a structural unit named AIRCOOL monoblock.

## Artificial ice via ICE tubes

The inner workings of the ice rink consist of polyethylene tube elements which are laid on a flat floor on a vapour-tight film and an insulating layer. Cold ethylene glycol is pumped by an AIRCOOL integrated pump station through this tube system so that water sitting on top of the tubes is frozen to create ice with the desired (precision-adjusted) hardness.

Ethylene glycol is cooled from -9 °C to -12 °C in a monoblock refrigeration machine. The AIRCOOL pump station pushes the brine from the tube system under the frozen surface to the refrigerant evaporator, where it is cooled again via two semi-hermetic reciprocating compressors in order to be fed back into the tube system again.

The air above the frozen surface and in the auditorium is not affected by the localised refrigeration underneath the frozen surface which means, most importantly, that the audience doesn't have to watch the performance wearing insulated down jackets but instead can dress up for the occasion.

The refrigeration system is managed and monitored by radio via an automated GSM modem. The system can either be controlled manually directly via the integrated control cabinet or fully automatically with the help of a remote control system (remote maintenance). All operating parameters are continually logged by the monitoring unit. The heat from the cooling system's return is used in hot water circuits for sanitation and heating purposes via a heat exchanger.

## GCHV-type Güntner FLAT Vario condenser

The GCHV-type Güntner FLAT Vario condenser is designed for a capacity of 820 kW which, in line with demand, is either transferred from the refrigeration circuit to a hot water circuit or dissipated into the environment. The Güntner condenser, together with the container solution, forms a structural unit named AIRCOOL monoblock.

The refrigerant R-507A has similar thermodynamic characteristics to R-404A and is particularly well suited for use in low and medium-temperature refrigeration applications. As an azeotropic HFC mixture, the refrigerant has no temperature glide. It has been classified in the ASHRAE Safety Group A1 of 2013 and, according to ASHRAE, is also neither toxic nor flammable. The ODP is zero, however the global warming potential is 3 985.

## The Saint Petersburg State Ballet on Ice

The Saint Petersburg State Ballet on Ice was set up in 1967 and performs classic ballets in ballet costumes on ice. The ice ballet entitled "Nutcracker on Ice" was initially intended to be a unique event to celebrate the 300th anniversary of the city of Saint Petersburg, however, the "Nutcracker on Ice" has since become a long-standing event in the Russian ballet metropolis.

Over time, not only have the repertoire and technical abilities of the ice dancers improved, but the design and execution of the sets and costumes involved have also been perfected. Approx. 80 figure skaters have 800 costumes to choose from and some of the ensemble travel the world promoting the idea behind the ice theatre as part of guest performances. The majority of the figure skaters involved today are former national and international figure skating champions and combine classic figure skating with classical ballet.