

# In Touch



## Refrigeration technology for sports and leisure facilities

In touch – efficient solutions for the leisure industry



Snowball fights in the summer and skiing in the desert – GEA Refrigeration Technologies makes all of this possible. GEA systems keep leisure athletes on the go and make it easy for winter-sport pros to train beyond their season. And GEA assures just the right cold in zoos and theme parks – for example, for penguins and polar bears.

° In touch with your processes and requirements

## Pleasantly cool – for sports, fun, and games

*Our goal is to create long-life and cost-effective solutions that save energy and the environment as well. After all, what counts is a maximum of benefits under economic conditions, with optimal environmental and climate protection.*

The specialty of GEA Refrigeration Technologies – since the end of the nineteenth century – is the cooling of processes and products, and the climate control of transported goods. The operators of leisure and sports facilities can also handsomely profit from this experience. We find it difficult to talk about “industrial” refrigeration technology for this target group and for a number of others, even if similar technology is applied to all. But we cannot ignore this market – since we are indeed very good at making ice and snow.

Strolling through the zoo and watching the polar bears play? Ice skating with the grandparents? Rolling in the snow with the whole family on an indoor ski slope? Thank goodness, these activities are not just a privilege of the wealthy: they are now accessible to much of society. One reason for these opportunities is the achievements of modern refrigeration technology – after all, the less energy required, the lower the prices to enjoy such facilities. The leisure industry offers a true wonderland to modern consumers. Social trends also guide the development of the present huge variety of offerings.

As a result, there are many senior citizens nowadays who are by no means tight-fisted with their money – to the satisfaction of the leisure industry. Our seniors are much more athletic and fit than people of the same age were decades ago – and they have a few things to show the younger generation on the ski slopes, for example. Other age groups are of course in the midst of their professional lives. Their leisure time is scarce – which makes it all the more valuable. What could then be closer or more natural than to look for physical and mental recreation in, say, the Ski Dome of the region – or to spend a lunch break in the zoo? Families with children, on the other hand, have other expectations. Being together is the most important thing here – but, then, there should be something for everybody. Both of these are wonderfully combined in a Ski Dome: sledding and snowball fights for the little ones, while their parents get their kick on snowboards. Everyone, though, shares an enhanced consciousness for wellness. This means that movement is all-important, indoors or out under the open sky. The leisure industry offers a tremendous diversity of possibilities here to plan our time off.

In addition to changing social structures, technical innovations have also brought movement into the leisure market – including cooling and freezing technology. A prime example here is our snow cannons, which also function above freezing. They guarantee vacationers the fun on skis that they expect, and they assure a livelihood for ski-slope and hotel operators. Advanced refrigeration technology can also bond cultures. For example, they allow people who live in the desert to experience snow directly at home. In Dubai, GEA Refrigeration Technologies has equipped the Ski Dome with top-class refrigeration technology. This is a special challenge: to maintain temperatures just below freezing in the Dome, with at least 40 °C outside. Such an extravagant project can be cost-efficiently implemented only if the refrigeration technology proves to be energy-efficient – which can be taken for granted with GEA Refrigeration Technologies.

But, at the same time, it’s not only that penguins and polar bears just like the ice. They need it to survive. To make sure that they feel comfortable in warmer climates, we assure the right ambience for them in zoos.

With GEA Refrigeration Technologies at your side, you will never find yourself on thin ice. Wherever you need ice and snow – our engineers commit their enthusiasm for detail to provide you with the refrigeration technology you need.

Ice skating has become a trendy sport over the past years. It trains the entire body, promotes good posture, and is equally fun for young and old. Expensive equipment is not even necessary – you can rent ice skates if you wish. But advanced, reliable, and energy-saving refrigeration technology is indeed required – best by GEA Refrigeration Technologies.

### ° Refrigeration technology for ice stadiums

## Hotly loved: GEA Refrigeration for ice rinks

The history of ice rinks proves that developers at GEA Refrigeration Technologies always have a new innovation up their sleeves. In 1961, the first 400-meter ice rink of the Netherlands was opened and named for the famous Dutch speed skater Jaap Eden. It was designed and built by GEA Refrigeration Technologies. It was the first rink in the world to be cooled by a direct system in which liquid ammonia ( $\text{NH}_3$ ) evaporates in a network of steel pipes embedded in concrete. At that time, it represented an enormous energy saving of 22 to 25 % over the conventional indirect ice systems that used the refrigerant R22. The new cooling system was furthermore really impressive by providing a skating surface with especially uniform temperatures prevailing over the ice. The basic benefits of such systems mean that they are still in use today.

In 2004 GEA scored an additional technical triumph: our engineering team converted the cooling system at the 400-m open-air round Kennemerland Rink in Haarlem, the Netherlands (built in the 1970s), to a modern system with liquid carbon dioxide. This created an additional, highly advanced ice surface. Our experienced technicians even succeeded in this modernization project to save time and money: they kept the old steel pipes, pumps, evaporative condensers, and piston compressors for further use, and added the required technology. The additional systems included an ammonia-carbon dioxide cascade condenser and a compressor.

The Dutch have of course cultivated ice skating as a cultural tradition for centuries now, so it is not surprising that we can call attention to another of our reference projects in the Netherlands: the Eindhoven IJssportcentrum with an ice surface of 8,400 m<sup>2</sup>, which offers three ice rinks – two covered rinks and one 400-meter half-covered rink, in addition to a heated ice-hockey hall with a playing surface of 30 x 60 m. A special attraction here is the largest Disco on Ice in the country, open on weekends. Seven GEA Grasso compressors with a total rating of 2.8 MW assure effective cooling of the ice surfaces. Ammonia is the refrigerant for the round skating areas, with glycol used under the ice-hockey surface. Heat exchangers lower the surface to a temperature of -12°C there. It was not difficult for the contracting parties to decide for GEA: our good customer relations with them have existed for decades now. And reliable and prompt GEA service speaks for itself.

#### Modernization of the Kennemerland ice rink in Haarlem, the Netherlands:

- ° Ice surface expanded to approx. 7,000 m<sup>2</sup>
- ° Total cooling duty: 2,400 kW
- ° Volume of refrigerant in the system: 16,500 kg CO<sub>2</sub> and 1,800 kg NH<sub>3</sub>
- ° Compressors: 3 Grasso RC 911, as well as 1 newly installed Grasso RC 912E



Ice skating trains the entire body, even without minus temperatures outside because of GEA Refrigeration Technologies.



Skiing in the desert: thanks to the cooling and refrigeration technology by GEA Refrigeration Technologies, residents of arid zones can enjoy winter sports virtually in front of their doors.

In the desert city of Dubai, people now have to put on warm clothes at outdoor temperatures around 40°C in the shade – at least when they want to spend a few pleasant hours in the indoor ski slope of the city. It's truly icy cold inside, to ensure absolute winter sports fun. Extreme conditions such as these demand rugged and reliable refrigeration technology.

### ° Refrigeration technology for top snow quality

## GEA refrigeration technology assures snow flurries instead of sandstorms

#### GEA Refrigeration Technologies for indoor facilities:

- ° Planning, delivery, and installation of customized cooling and snow-making systems
- ° Energy-saving cooling of indoor skating and skiing facilities
- ° Top snow quality

Skiing in the desert at 40°C in the shade? No problem with that, thanks to professional refrigeration technology. Ski Dubai, the first Ski Dome of the Middle East, lies in the center of Dubai, United Arab Emirates. The snow surface of 22,500 m<sup>2</sup> offers five ski slopes, with varying heights and slopes. The longest is 400 m. This means that beginners, more advanced skiers, and pros all get what they expect. Newcomers can even reserve a course in the ski school. For snowboarders, the 90-m halfpipe assures sufficient excitement. For more serene activities, the Snow Park offers, for example, snowman building and sledding. It's not only the slopes that excite the visitors, but also the individual charm of the skiing facilities with their natural landscapes, including tall trees and a snow cave. In addition, the guests to the Dubai Ski Dome can expect everything that goes to make up a sophisticated winter-sport facility: e.g., cafés and restaurants for the après-ski scene. Those looking for a suitable outfit can buy one just next door in the shopping center.

Outstanding insulation is of course necessary in light of the extreme temperature differences between indoors and out. The indoor ski slope has walls five meters thick and amounts to one giant refrigerator. The refrigeration technology is just as carefully thought out: three GEA Grasso screw compressors form the key components of the entire refrigeration plant. They assure a temperature of -1°C that enable young and old to move about briskly and forget the roasting heat of their everyday world outside. To save energy, a computer-supported control system adapts the cooling output exactly to momentary requirements.

After midnight, it begins to snow, as if guided by an invisible hand. But GEA is behind it all: 29 GEA air coolers, with a total cooling duty of 2,600 kW, lower the temperature inside the Ski Dome to -10°C. The water blown out of 21 snow cannons crystallizes in the icy air to provide 30 tons of fresh snow – each and every day. Melt water is collected and used for climate-control of the adjacent mall and for watering the plants.

A further reference project of GEA Refrigeration Technologies is the SnowWorld indoor ski center in Landgraaf, the Netherlands. Just as at Ski Dubai, SnowWorld offers a special feature: the center offers an official FIS racing slope on which World Cup ski racing as well as the Snowboard World Cup (2010) have taken place. Here, the quality of the slope has top priority – and this means that the refrigeration systems must assure a temperature of -6°C. If the temperature is higher, snow quality deteriorates; if it is lower, users become unsure. The snow is produced at -15°C by spraying water into the air at high pressure. The operators, SnowWorld Leisure N.V., contracted GEA Refrigeration Technologies to upgrade the existing refrigeration plant to the state of the art, so as to be prepared for upcoming races. It was a special challenge to integrate the heat pump for the adjacent new four-star hotel SnowWorld into the overall plant. This heat pump not only serves heating purposes: it also provides, day after day, hot water for the hotel guests – every day at the same temperature.



*Ski Dubai is the first indoor ski resort in the Middle East and offers an amazing snow setting to enjoy skiing, snowboarding and tobogganing or just playing in the snow. The construction covers an amazing 22,500 square meters covered with real snow all year round.*

Snowboarding, snowball fights, and sled races – when others come back with a sunburn from open-air vacations. This is not magic – it is simply the artificial snow systems from GEA Refrigeration Technologies that let snow fall even above freezing.

### ° Artificial cold for ski slopes

## Winter fun – when it's summer outside

Mild winters mean lean business for many skiing centers. Especially smaller hotels are hardly able to financially survive a poor winter season. Our solution: if you can't depend on the weather, then depend on the snow cannons of GEA Refrigeration Technologies. They assure realistic snowfalls, even when Father Frost decides not to help.

GEA Refrigeration Technologies has equipped the indoor ski slope in Moscow – the Moscow Snowdome – with three snow cannons from the Snowline range by Geneglace (SL 50 Snowline). These cannons, mounted on containers, produce 150 m<sup>3</sup> of snow daily. GEA Refrigeration Technologies has made a name for itself as specialist for the production of industrially used flake ice – and has employed this profound know-how in the production of artificial snow as well. After all, this snow actually consists of crushed ice – without any additives. This ice is produced in advance and is stockpiled in heaps near the indoor ski slopes. When the slope is not being used, the artificial snow is blown under great pressure through a flexible hose up to a distance of 100 m to the required places: for example, in order to compensate for unevenness or to prepare the slope for a new session.

The best of all here: it does not have to be really cold for these snow cannons to properly function. Snowline also functions at temperatures above freezing – whether indoors or out. At a Belgian ski resort near Brussels, professional snowboarders and skiers have tested Snowline snow at summer outdoor temperatures of 20°C. They were excited over the natural loveliness and the good quality of the artificial snow. The SL 50 Snowline snow cannon produces from 50 to 55 m<sup>3</sup> of snow per day – output that suffices to cover an area of 1,000 m<sup>2</sup> with 20 cm of snow in three to four days. Likewise, in the Japanese ski region of Utopia Saioto, GEA snow cannons guarantee a perfect and long skiing season. Indoors or outside in the open, Snowline produces the same results even beyond the winter season: “Great conditions for skiing and tobogganing.”

*Artificial cold as a factor of fun: we'll let it snow for you – indoors or outside in the open, regardless of the temperature.*



At the Océanopolis theme park at Brest, in France, the rockhopper penguins there enjoy visitors. They love the cool ground that our ice machines provide for them.

Polar bears and penguins would never encounter each other in the wild, since the bears live in arctic regions, and penguins are at home in the southern hemisphere. At best, they come closer together in the zoos of the world. There they share their great delight – for ice made by ice machines of GEA Refrigeration Technologies.

### ° Ice machines for zoos and theme parks

## Frosty home for polar bears and penguins

Children love to go to zoos and animal gardens. And adults have their fun as well in observing domestic or exotic animals and to take a little chance to relax. Entirely apart from the fun factor, zoos are important institutions, since they serve to breed and research rare animals. This is reason enough for GEA Refrigeration Technologies to contribute to their well-being with effective refrigeration technology – for example, at the nature theme park Océanopolis in France. Océanopolis is located adjacent to the port of Brest and – in entertaining yet educational manner – acquaints its visitors with oceanic fauna and flora from various climate zones of the earth. The adventure world at Océanopolis centers on the various oceans and is broken down into exhibition areas for tropical, moderate, and polar seas.

Our F90Vim GEA Geneglace flake-ice machines are in operation in the polar section, where they produce up to 3.5 tons of ice daily. The ice machine at Océanopolis produces the flake ice as needed. An ice storage area with a capacity of 4 tons serves as a buffer between ice production and consumption. The two GEA units are located in a machine room 40 m from the penguin area, so that the operational noise does not disturb them. A pneumatic conveyor system – also by GEA – assures plentiful ice supply: the ice moves to the penguins through a 40-m pipe with an internal diameter of 50 mm. This arrangement enhances ice quality, since during transport the ice flakes rub against each other and break into smaller pieces. Once it arrives at the penguin section, the ice is fine enough for the penguins to comfortably walk over it. The penguins at Océanopolis appear to enjoy the quality of the ice: their physical activity and their numerous offspring are surely evidence that these animals feel at home in Brittany, despite the mild climate there.



*Russian animal ice-lovers also enjoy our refrigeration technology: in the Moscow Zoo, the oldest zoo in Russia, a Geneglace ice machine serves for a natural environment in the polar-bear section. Here as well, regular births of offspring lead to the conclusion that the bears are well and healthy there.*



Our products are not merely products. They are solutions to the problems you face. We provide you with a great number of pre-defined as well as individually configurable solutions. This allows us to find the configuration for your application that harmonizes planning and installation expense, functionality, and investment and operating costs.

### ° GEA refrigeration technology for sports and leisure facilities

## Our products for your products



#### Ice machines

Refrigeration at the press of a button – possible with Geneglace ice machines. As the leading European manufacturer of ice machines, GEA Refrigeration Technologies takes advantage of its decades of experience and offers more than 40 models in various sizes. The machines supply ice in various qualities, including the flake ice that is used, for example, in zoos, animal parks, and theme centers.



#### Ice towers

It's not always possible to perfectly coordinate ice production and consumption. That's when it's advisable to stockpile ice – as offered by GEA Refrigeration Technologies with its Geneglace ice towers, available in various versions and volume capacities. These storage silos can be set up indoors or out. A Geneglace pneumatic conveyor system takes the ice to where it is needed.



#### Piston and screw compressors

With its comprehensive portfolio of Grasso piston and screw compressors, GEA Refrigeration Technologies covers all conventional requirements placed on refrigeration – including those for indoor ski slopes and ice stadiums. We'll find the right compressor for you, whether with ammonia, CO<sub>2</sub>, or glycol as refrigerant – of course while observing all legal stipulations and safety regulations.



#### Production of artificial snow

The name says it all: the two models of Geneglace all-weather snow cannons provide for falling snow regardless of temperature or relative humidity. They can be set up indoors or out and guarantee ski-slope operators a good season. The snow that they make lasts for a long time and provides a perfect base, even for professional athletes.

We offer also experience in our sector and in daily operations. This means that we are at your service not only in the planning phase: we support implementation of your projects, initial start-up of facilities, and maintenance of the plant.

### ° In touch with our customers

## With a view to your success

#### Planning and consulting

Finding the optimal solution for your project requirements is a challenge that we gladly accept. From the comprehensive product portfolio of GEA Refrigeration Technologies, we assemble the most suitable plant for your specific needs. We also provide the complete measurement and control technology. Our team also supports the installation of the facilities, supervises assembly onsite, and aids in initial start-up. When everything flawlessly functions from the very beginning, you can rest assured that you can use your facilities over years and decades.

#### Financing

To prevent a technically and economically optimal solution from failing owing to investment problems, we optimize not only the concept for your refrigeration technology, but also consider the financial framework. Or, we support you in applying for and utilizing any subsidies due to you.

#### Service

Do you also love to hear that chugging sound? The continuous purring of equipment? We certainly do. This is why we remain at your service after setting up our units and systems – with an international, highly competent service network. Preventive and remedial service is the key to long service lives of your assets, a maximum of cost effectiveness, and operations as smooth as possible. But, if a malfunction should still occur in your plant, we are there for you – online or with you onsite, we see to the fastest possible elimination of any trouble. Also included is of course a world-wide, spontaneous spare-parts service.

#### GEA Refrigeration Technologies represents:

- ° Comprehensive consulting and responsible project support
- ° Detailed market knowledge and sector know-how
- ° Great investment security
- ° Future-proof solutions
- ° Maximum plant run time
- ° Long plant life cycles
- ° Low energy consumption
- ° Minimum operational expense
- ° Highly competent service
- ° Technologies harmonious with the climate and environment
- ° Fast delivery of spare parts

*Would you like to learn more about us and our solutions?*

*On our Web site you will find contact details, our application and product brochures, and much more: [www.gearefrigeration.com](http://www.gearefrigeration.com)*



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