Explore icy worlds at Hagenbeck Zoo

The polar sea in Hagenbeck Zoo reopened its gates again in summer 2012. Polar bears, walruses, seals and penguins now have a new home. The sophisticated water treatment technology, supported by Speck pumps, ensures that the animals have optimal living conditions.

Large photo: Götz Berlik; small photos: Hagenbeck, Sylvie Bouchard, Fotolia.com

speck pumpen

With the polar sea it's no longer necessary to take a long and arduous trip to the North or South Pole. The arctic animal kingdom at Hagenbeck Zoo has had a new home since summer 2012. Visitors come within reach of the polar inhabitants: face to face with polar bears, with a diving walrus or an excited penguin colony. A 750 m long path leads visitors through the polar sea in approximately an hour and a half with panoramic windows inside the facility allowing a fascinating insight into the underwater world.

The unrivalled, authentic arctic animal kingdom has been created on a total area of 8000 m², 1200 m² of which is water surface. As well as polar bears, walruses, seals and penguins, puffins, guillemots and other types of seabird also belong to the icy world population. The latter are housed in their own seabird aviary.

The wave machine, designed especially for this enclosure, doesn't only make the water, but also the birds

No one should miss out on the walk through this unique and exotic water world: the polar sea at Hagenbeck Zoo is the new home for the arctic residents.

and marine algae dance. A world innovation is also "die Reise der Penguine" (the penguin enclosure). Here the arctic birds can not only swim, but also climb, slide and hop, just like in the wild and much to the amusement of the visitors!

Although the polar sea and its concept are very new, they are also rich in tradition. With the opening of the zoo in 1907, the founder, Carl Hagenbeck, also opened the "Nordland-Panorama" and for the first time worldwide presented an arctic territory with animals that were only separated from visitors by ditches. The zoo was completely destroyed in the Second World War and although a smaller enclosure was later rebuilt to house the seals, polar bears, sea lions and Humboldt penguins, it was never restored to its original form. The original enclosure was much bigger than the polar sea that visitors would come to know over the decades.

The enclosure was torn down in 2009 and the present day polar sea is now closely based on the historical model, but is architecturally modern and above all has the highest level of energy efficiency. The use of rain water, process water, geothermic heat exchangers and solar energy extraction is all part of the energy concept. A building and planning team, together with the zoo manager Dr Stephan Hering-Hagenbeck, were responsible for de-

Photos: Bernhard Becker

signing the new polar sea. Architect Sezai I. Candan from the Hamburg-based architect firm, Geising + Böker, and English zoo designer David Lazenby were also part of the team.

A great deal of effort is necessary for the refrigeration and water technology so that the polar bears, walruses and penguins feel at home on the site. The basic thermal provision for the whole premises comes from waste heat utilization from the refrigerating machines. The waste heat is saved in a recooling plant. The supply of heat energy can be guaranteed up to an ambient temperature of 7° C. If the ambient temperature drops below this level a peek load boiler takes over the supply. 185 tonnes of carbon dioxide are saved each year by not using conventional, gas powered heat generation. In order to save drinking water, rain water is used to flush the visitor toilets and process water is used for cleaning the enclosures.

The water treatment is also designed according to strict ecological standards, as the architect Sezai I. Candan from the Hamburg-based architect firm, Geising + Böker explained - 60% of rinse water is saved with the recooling extraction technique. Furthermore the Hamburg-based consultancy firm, GHP Hesse und Pokoiewski, invested considerable time and effort in the conceptual design of the water treatment technology in order to sustain the living conditions that the animals are used to. The company Wassertechnik Wertheim was then commissioned to install the water treatment technology. A total of five pools are available for the animals and four water cycles were installed to serve them, all of which are powered by Speck pumps. Polar bears and king penguins prefer sweet water in their pools, whereas walruses, seals, Humboldt penguins and seabirds bathe in seawater. "The pumps in the seawater pools have to be seawater-resistant and metal-free," Sezai I. Candan stressed. The Speck plastic pumps used meet these exact requirements perfectly.

Elaborate water technology

In order to keep the huge quantities of water in the animal pools in motion, an extraordinary effort is required in the treatment area. This helps to offer the exotic inhabitants comfortable living conditions. The circulation volume is very large and therefore the Speck pumps are necessary in order to facilitate immaculate water for the arctic animals.

The equipment consists of 26 Speck pumps from the Normblock and BADU®Block series with a total installed motor capacity of 200 kW. The flow rate of the largest pumps amounts to an impressive 450 m³/h. The Speck pumps come in a special seawater-resistant version for the seawater pools, which ensures that they are constantly supplied with freshly treated seawater.

Unlike usual swimming pools, the treatment technology has to be able to react flexibly to the biological substances that enter into the water both from the animals and the environment, as chemicals cannot be added to the water! Disinfecting is carried out by an ozone stage in the treatment course and an additional UV unit, through which the pool water is fed. Therefore high circulation rates are pre-set in the water treatment programme. A large number of Speck pumps are used to facilitate this circulation. Incidentally, the water in the polar bear pool is not filtered, but instead well water which feeds the ponds on the premises is also used to feed the pool. In contrast to conventional swimming pools in which the water has to be heated, the main concern for the polar sea is cooling the water temperature down to values comfortable for the animals. The water is cooled by a closed water cycle with heat exchangers. Only heat, and not water, is exchanged between the Hagenbeck water cycle and that of the Hamburg public utilities company. The use of a traditional refrigerating machine is deliberately avoided. The 11°C raw water in the heat exchangers of the first water cycle comes from the deep well at the Hamburg public utilities company and cools down the warmed water of the Hagenbeck water cycle. In this way the coldness is transported into the polar sea and dispensed via further heat exchangers into the pools. This water cycle is driven by Speck pumps, powered by solar generated electricity.

The zoo only uses "green" energy from renewable sources such as wind, solar energy and water power. One of the largest photovoltaic systems in Hamburg is installed on the roof of the neighbouring farmyard to ensure effective use of the solar energy. In proportion to commonly used industrial water cooling, 215,000 kilowatt hours of electricity and 130 tonnes of carbon dioxide are saved in this way. Ventilation systems are also managed without mechanical support and work in a way which saves energy and resources. Air shafts ensure sufficient fresh air.

Photos: Bernhard Becker

For anyone who wants to see the fantastic polar sea for themselves, here's the address:
Tierpark Hagenbeck
Lokstedter Grenzstraße 2
22527 Hamburg
Germany
Telephone +49 040/5300330

speck pumpen
VERKAUFSGESELLSCHAFT GmbH
Postfach 10 • 91231 Neunkirchen a. Sand
Tel. +49 9123-949-0 • Fax +49 9123-949-260
Hausadresse
Hauptstraße 1-3 • 91233 Neunkirchen a. Sand
www.speck-pumps.com • info@speck-pumps.com

Niederlassungen und Vertretungen in Deutschland / *Branches and Representations in Germany*

15366 HOPPEGARTEN b. Berlin
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Handelsvertretung
Hoppegartener Straße 70 C
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Fax 03342-422536
info@paf-s.de

22342 HAMBURG
E. C. v. Karstedt, Ing. Büro
Postfach 67 02 10
Tel. 040-6448066
Fax 040-6440637
Hausadresse
Farmsener Landstraße 4
22359 Hamburg
www.speck-pumpen-hamburg.de
pumpen@ecvkarstedt.de

40221 DÜSSELDORF
Klaus Schober
Vertretung und Werkslager
Volmerswerther Straße 86
Tel. 0211-30200760
Fax 0211-30200769
www. speck-schober.de
info@speck-schober.de

63110 RODGAU-JÜGESHEIM
Philipp-Reis-Straße 5
Tel. 06106-28578-0
Fax 06106-28578-29
rodgau@speck-pumps.com

70829 GERLINGEN
Postfach 10 04 26
Tel. 07156-43618-0
Fax 07156-43618-18
Hausadresse
Ringstraße 134
70839 Gerlingen
gerlingen@speck-pumps.com

81737 MÜNCHEN
Scherbaumstraße 31
Tel. 089-6701008
Fax 089-6706071
muenchen@speck-pumps.com

Niederlassung für Nord-/Ostbayern/ Sachsen/Thüringen/Sachsen-Anhalt/ Süd-Brandenburg
91233 NEUNKIRCHEN A. SAND
Hauptstraße 1-3
Tel. 09123-949-235
Fax 09123-949-245
neunkirchen@speck-pumps.com

Zweigbüro Sachsen/Thüringen/ Sachsen-Anhalt/Süd-Brandenburg
09456 ANNABERG-BUCHHOLZ
Uranus 1a
Tel. 03733-6765393
Fax 03733-6799879
annaberg@speck-pumps.com

766.0000.045 1' 01/14 LK/BA - GB