



» Akalla-Kista – Swedens science centre with District heating/cooling system and 6 Unitop® heat pumps/chillers

Client

AB Fortum Värme samägt med Stockholms stad
11577 Stockholm, Sweden

Kista Unlimited

Kista and Akalla, two neighbouring suburbs in the north of Stockholm, are linked to the city by underground railway, commuter train and highway. Arlanda airport is only 15 minutes away.

Kista Science City is one of the most important ICT-clusters in Europe. The region extends across four municipalities, where business, academia and communities have agreed on a joint vision for the future.

In 2003, 18,435 people were working in the IT sector in Kista Science City. Ericsson, the telecom giant, is the dominating company with more than 10,000 employees.

Kista is world competence centre in the field of wireless communication and mobile Internet technology. In recent years, this has attracted a large number of international investments. Today, 400 IT companies are based in Kista Science City. More than 60 new ones have been added each year since 2000. Companies like Microsoft, Intel, Sun Microsystems, Nokia, IBM, etc. have established business centres in Kista.

Fortum – Swedens energy company

Fortum, a leading energy company in the Nordic countries, is responsible for heat/cold production and for the



energy distribution in the greater Stockholm area. Alongside good economics for the customer, the products of Fortum also provide added value such as reliable supplies, simplicity and a strong environmental benefit.

Akalla-Kista's heating/cooling system

The district heating/cooling network of Akalla-Kista was always a step

ahead of local urban development and therefore was growing in parallel with Science city. From the beginning, cooling played a vital role as IT companies require cooling of their computers at all times. Therefore the first four Unitop® units delivered were designed just for this purpose.

Today, 6 heat pumps/chiller units are installed. All operating with R134a.

Winter operation

The re-cooling cycle of each heat pump is connected to the district cooling system. Any of the heat pumps is only put into operation at times when absorption of the refrigeration capacity is ensured. In times of low cooling demand, the heat pumps are switched off one after another and heating capacity is provided by combustion or electrical boilers.

Summer operation

Because some heating capacity is required at all times, first the heat pumps are put into operation if there is a demand for cooling capacity. If the requirement for cooling capacity increases further, the chiller units are put into operation and heat rejection takes place in the cooling towers.





6 Unitop® chiller/heat pump units

- **2 Unitop® 33/28CP heat pump units**
The cold water side of both units is led in parallel, the warm side is connected in series.
- **1 Unitop® 33/28CP heat pump/chiller units**
Again, the cold water side is led in parallel. The warm side can either be led in series or in parallel, thus providing high versatility in regard to heating. Further, these units can be used for refrigeration purposes.
- **2 Unitop® 33C chiller units**
Used for refrigeration purposes only.
- **1 Unitop® 33/33CP chiller unit**
Used for refrigeration purposes only.

Main features of a Unitop®

- Open-type compressor
- Refrigerants: halocarbon/hydrocarbon
- Planetary type gears
- Tough industrial design with vertically split casing for easy maintenance
- Suited for all drive systems
- High efficiency (COP) over the entire performance range
- Operating temperatures $-40^{\circ}\text{C}/+82^{\circ}\text{C}$
- Large capacity, small floor space

Plant control system

A Siemens S7 PLC-Type control system is used for local control and supervision of the heat pump units as well as for the superimposed control of the entire Akalla-Kista district heating plant.

Service and maintenance

Specialists of Fortum and Termoekonomi are supervising and maintaining the technical installations. According to special agreements, Friothersm carries out the regular service works on the 6 heat pump/chiller units.

Legend

- 1 View of bustling Kista. In the center the Kista tower.
- 2 Kista Entré, the new high tech centre between Arlanda airport and Stockholm.
- 3 One of the Unitop® cooling units seen from the connecting side. Bottom the chilled water inlet and outlet, top the condenser inlet.
- 4 Arial view of the machine house. Clearly visible the 8 evaporative re-coolers.
- 5 A compact Unitop® type heat pump unit. Top the condenser, below the evaporator and on the left the subcooler.
- 6 View of a Unitop® 33/28CP heat pump unit. On the right the compressor type 33.

Technical Data

2 Unitop® 33/28CP heat pump units	
Heating capacity per unit/s*	8.8 MW
Refrigeration capacity per unit/s	6.0 MW
Power absorbed per unit	2.8 MW
Evaporating/condensing temp.	3/82 °C
1 Unitop® 33/28CP heat pump/chiller unit	
Heating capacity/s	8.6 MW
Refrigeration capacity/s	5.6 MW
Power absorbed/s	3.0 MW
Evaporating/condensing temp.	3/82 °C
Refrigeration capacity/p*	10.8 MW
Heat rejection capacity/p	13.5 MW
Power absorbed/p	2.7 MW
Evaporating/condensing temp.	3/45 °C
2 Unitop® 33C chiller units	
Refrigeration capacity per unit	6.0 MW
Heat rejection capacity	7.0 MW
Power absorbed per unit	1.0 MW
Evaporating/condensing temp.	3/34 °C
1 Unitop 33/33CP chiller unit	
Refrigeration capacity per unit/p	13 MW
Heat rejection capacity/p	16 MW
Power absorbed per unit/p	3 MW
Evaporating/condensing temp.	3/42 °C
*p = parallel s = series	

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