

Solstice[®] zd Chillers To Cool The British/French Tunnel

- The longest tunnel with the largest HFO chiller installation of its kind in the world, will use Solstice[®] zd and replace the existing R-22 chillers serving the Channel Tunnel.
- R134a was considered but this refrigerant, is also under pressure from European HFC phase-down agreements. The efficiency of the Solstice[®] zd, and the technology gains from the new equipment, are expected to return energy savings of a massive 40%.
- The new chillers are designed to keep tunnel temperatures below 30°C and it is said to be up to 10% more energy efficient than the next best chiller available in comparable tonnage, delivering industry-leading efficiencies at both part-load and full-load capacity.

Results

- 8 chillers, each with 1,700-2,000 tons of cooling capacity
- Low pressure centrifugal chillers with refrigerant economiser provide up to 10% more energy efficiency than the next best chiller available
- Low environmental impact with 99.9% reduction on GWP = 1



Large District Heating/Cooling Plant With Solstice[®] ze

- World's first large heating/cooling plant with ultra-low GWP refrigerant Solstice[®] ze in Norway, delivers a hot water of 70-80°C using two heat pumps:
 - District heating/cooling in winter, autumn or spring, 16.5 MW with a COP of 4.8
 - District cooling in summer, 20.1 MW with a COP of 5.0
- The heat pumps using 13 metric tons Solstice[®] ze (GWP < 1), presents a much lower carbon footprint than alternative R-134A (GWP = 1430).



Results

- The first large heating/cooling plant with 13mt Solstice[®] ze refrigerant
- Heat source sea water, indirect
- End-user: Norsk Energi (large Scandinavian energy company)
- Operating for 4 years
- Performance meet expectations and provides ultra-low environmental impact

Cooling mode

- Cooling capacity = 20.1MW
- COP=5.0

Heating mode

- Heating capacity = 16.5 MW
- LWT= 78°C (COP = 4.8)

Heat Recovery In Food Processing With Solstice[®] ze Heat Pumps

- In the food industry, heat recovery linked to refrigeration systems is a key element in delivering hot water at temperatures that enable vegetables to be processed. Traditional ammonia-based systems cannot reach temperatures above 80°C, when desired level is 97°C.
- A heat pump developed with refrigerant Solstice[®] ze not only achieves good overall COP, resulting in excellent efficiency, but also a single process solution offering simultaneous hot and chilled solutions with the lowest possible environmental impact with GWP < 1.



Results

- Food processing application with GWP < 1
- Good overall COP, resulting in excellent efficiency
- Single process solution offering simultaneous hot (97°C) and chilled (2°C)
- Performance meet expectations and provides lower environmental impact

Refrigeration power	150 kW
Fluid	HFO1234ze
Water inlet	+2°C
Heating power	200 kW
Water outlet	+97°C
COP	Hot: 2.8 / Cold: 2.6
ROI	2.5 Years