

# Neatpump

LOW CARBON HEATING...NATURALLY

## Natural Refrigerant Heat Pumps

**Neatpump** is a natural alternative to traditional methods of heating for medium to large capacity applications. **Neatpump** captures waste heat from cooling or refrigeration processes and boosts this to produce high grade heat suitable for generating hot water up to 90°C. This results in a lower carbon footprint heating solution that also reduces running costs.

## Green Credentials

### Carbon Emissions

**Neatpump** uses ammonia, a naturally occurring refrigerant with exceptional efficiency for cooling and heat pump applications. Carbon emissions (kg CO<sub>2</sub> per kW heating) for **Neatpump** are significantly less than those associated with traditional methods of heating such as boilers and hydrofluorocarbon (HFC) heat pumps. **Neatpump** can also be a zero carbon emission solution if electricity is obtained from a renewable energy source (e.g. tidal/wind power) **Neatpump** will increase the heating effect three fold or more for every kilowatt of electrical energy input.

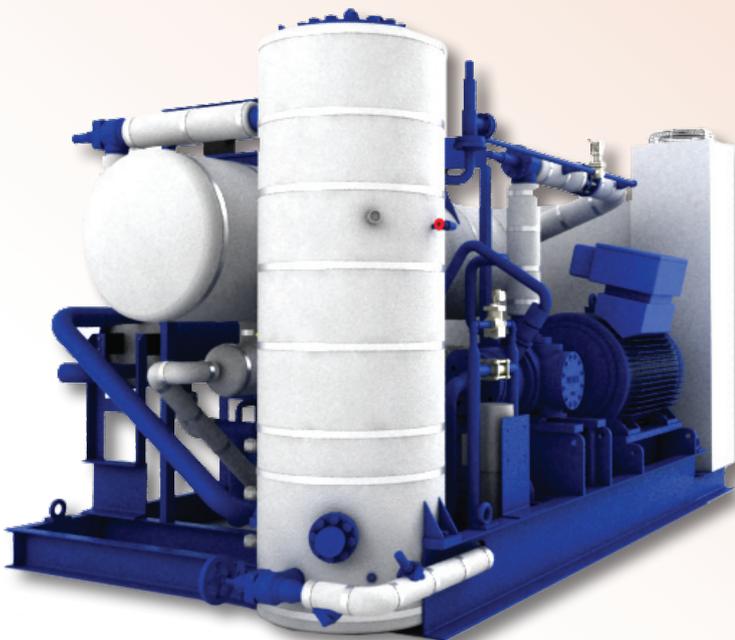


### Zero Global Warming Potential

Most heat pump technologies use HFCs as their working fluid. HFCs are thousands of times more potent than carbon dioxide as global warming gases when released into the atmosphere through leakage or during servicing. For example, 1kg of R134a contributes the equivalent amount of carbon dioxide as 5,000 miles in a family hatchback. A large district heating R134a system could quite conceivably leak 500Kg of R134a per year, roughly equal to 2.5 million miles of car journeys. **Neatpump** uses ammonia, which has zero global warming effect.

### Incentives

**Neatpump** is a sustainable technology that is eligible for Carbon Trust 0% business loans due to the carbon savings it delivers. It has also been developed with the aim of qualifying for Renewable Heat Incentives (RHI) which the UK Government plans to introduce in 2011. Likely RHI benefits include interest free loans and subsidies towards the cost of the electricity.



## Latest Compressor Technology

### *Why Now?*

Although ammonia is a natural refrigerant it has been overlooked for high temperature heat pumps due to equipment limitations. Historically, compressors have been restricted to reciprocating technology requiring significant ongoing maintenance. More recently, twin screw compressors have been developed but these are working close to the limit of their operating envelope putting considerable strain on the rotors and bearings.

**Neatpump** uses the Vilter single screw compressor which offers the following advantages:

- Balanced forces - Forces around the single rotor are balanced, enhancing bearing life when compared to twin screw technology.
- Working pressure - Even when producing hot water at 90°C, the compressor is operating far below its maximum allowable working pressure. This results in improved reliability and reduced maintenance requirements.
- Automatic capacity control - Variable capacity and compressor ratio control, ensuring high part load efficiency all year around at changing condensing and evaporating temperatures.

### *The Neatpump range*

Single stage water to water Neatpump packages are available for both open and closed loop water heating applications. Select from our range of 72 packages suitable for cooling water to +4°C or glycol to -8°C and heating hot water up to 80°C. Capacities range from 380kW to 2600kW. Two stage solutions are available for capacities up to 6MW and can achieve temperatures up to 90°C. Booster systems are also available for connecting into the condensing circuits of existing refrigeration systems.

### *Applications*

These include food production, dairies, breweries, district heating, HVAC, pharmaceutical, petrochemical production and drying processes. Compared to alternative technologies, **Neatpump** offers greater efficiency, reduced maintenance costs and excellent payback on investment both for new installations and retrofits.

Using the warmest possible source of heat and designing for the lowest possible delivery temperature is key to **Neatpump** efficiency. This requires more thought than when designing fossil fuel combustion systems but Star Refrigeration and its partners across the world have the skills and resource to assist in this analysis to deliver the optimum heating solution for your application. The correct deployment can deliver a 40% saving in running costs.

## Success Stories

### *Food processing*

Star **Neatpump** technology has been installed at a food factory in the UK to replace a gas fired steam heating system. Using the site's process cooling water loop as the heat source, **Neatpump** delivers water heating at 60°C and reduces the annual running cost by 40%.

### *District Heating*

A 15MW district heating system in Norway uses **Neatpumps** to extract heat from sea water and generate 90°C supply water for a district heating system. The system achieves a COP of over 3, resulting in a 15% reduction in running costs when compared to alternative heat pumps using HFC refrigerant. The use of ammonia also provides the end user with greater certainty over the longevity of their investment when compared to similar solutions using HFCs.

