

TOROMONT

CIMCO

ECO CHILL

Conserve today for the Future

Fact sheet

CIMCO AMMONIA HEAT PUMP

Maple Leaf Foods—Brandon, Manitoba

CIMCO's proprietary ECO CHILL® program has been using refrigeration waste heat, generated by the refrigeration process, for a number of years by collecting, recycling and re-using this heat for building and product heating. Not surprisingly an ammonia heat pump, using a conventional compressor's discharge heat as the energy source, provides a higher level and quality of heat. This is particularly true where the use of refrigeration and hot water are both in high demand. CIMCO took this concept to Maple Leaf Foods, and in a joint effort the design, construction and implementation of a 1,000 HP CIMCO Ammonia Heat Pump went from a vision to a reality.

While heat pump technology has been in existence for some time, the targets in our development of large-scale heat pumps were specifically geared to the use of this technology in large-scale food and processing plants.

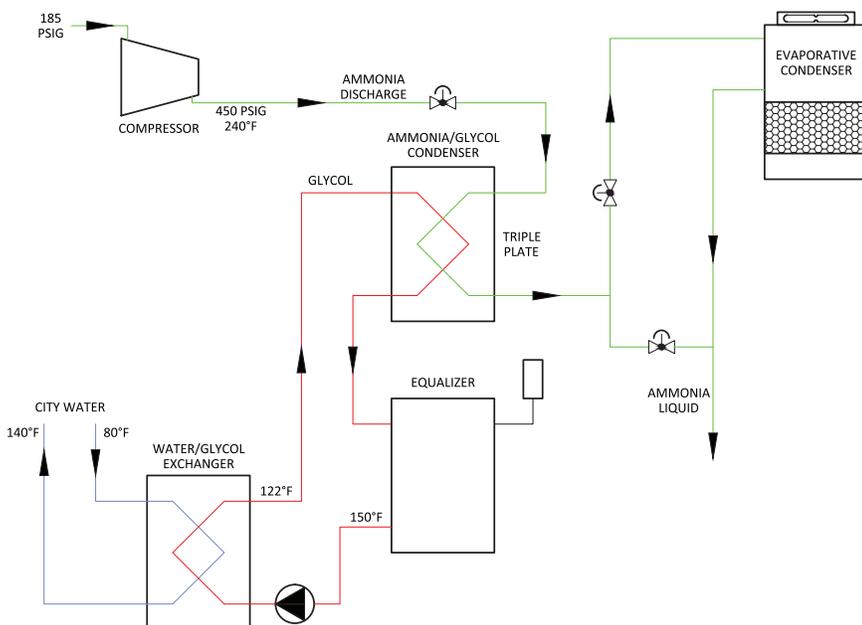
The Maple Leaf Foods plant processes 18,000 hogs per day, 5 days a week, on a yearly basis, and uses upwards of 500 usgpm of 140°F water for up to 22 hours a day. This production level makes it one of the highest capacity plants in North America. Pork production requires water (both cold and hot) and

refrigeration— and both must meet federally mandated standards. So how do we fit them together in an economical and productive manner? The CIMCO ECO CHILL® Ammonia Heat Pump system is the solution.

In this plant, refrigeration requirements are served by a CIMCO multi-temperature 14,000 HP ammonia refrigeration system generating more than 8,600 TR. The hot water requirements are mandated by the Maple Leaf Foods "Hazard Analysis and Critical Control Point" (HACCP) program and can surpass 500 gallons per minute, which traditionally relied on NG boilers and direct contact water heaters. The plant's HACCP program mandated that the hot water be available at no less than 132°F. With the ECO CHILL® Ammonia Heat Pump, the plant discharge ammonia gas at 140 to 160 psi is used as suction gas in the heat pump compressor, boosting it to more than 185°F on the condensing side, and enabling the system to achieve the required water temperature.

The Result?

With the new CIMCO ECO® CHILL Ammonia Heat Pump, Maple Leaf Foods expects to reduce their natural gas consumption by 3 million cubic metres annually... great news for Maple Leaf Foods and great news for the environment!



Our design and development targets included:

- Generate 140°F water output capability
- Make it easily adaptable to existing facilities and users
- Utilize readily available equipment that could operate at the pressures that would be encountered in the 400 – 450 psi range and higher
- Maximize heat transfer and system efficiencies by using such technologies as plate heat exchangers, high thermal conductivity heat transfer mediums and advanced automation strategies
- Be economically viable in hot water flow rates of 75 to 700 usgpm hot water output

MAPLE LEAF FOODS... Brandon, Manitoba

GENERAL INFORMATION

- Owner:Maple Leaf Foods
- Project Type:Pork processing
- Year of Construction:1999
- Operation (per year):12 months/5 days per week/22 hours per day

REFRIGERATION SYSTEM INFORMATION

- Compressors:Frick
- Horsepower:14,000
- Plant Style:Pumped liquid/evap. condenser
- Total System Tonnage:8600 TR
- Refrigerant:R-717
- Evaporator Style:Pumped liquid, hot gas defrost

HEAT PUMP SYSTEM

- Hot water heating
- Frick 1000 HP screw compressor, liquid injection
- Alpha Laval dual plate and frame condensing
- Operating pressure – 150psi/420psi

INTEGRATED CONTROLS SYSTEM DESIGN

- CIMCO Industrial Automation
- Indicates temp/out
- Volume/flow rate
- Controls condensing and run pressures
- Controls water flow rate and bypass
- Controls compression in conjunction with plant refrigeration system

HEAT RECOVERY INTEGRATION

- Hot gas heat for make-up air
- Water preheat
- Now ECO CHILL® Ammonia Heat Pump

THERMAL STORAGE

- Provides to modulate variations in flow rate to avoid starting/stopping
- Approx. 15,000 gallons

ALSO AVAILABLE

Additional designs have been developed for smaller applications. They provide a volume of 75 usgpm and 115 usgpm based on the same 60°F temperature rise. As well, they are best working in conjunction with water preheat plate application and collectively provide the best return on investment.

- A) CIMCO ECO CHILL Ammonia Heat Pump featuring 300 HP Frick HPS 42 high pressure screw compressor, heating 150 usgpm from 85°F to 140°F.
- B) CIMCO ECO CHILL Ammonia Heat Pump featuring two 100 HP Mycom HK series reciprocating compressors, heating 75 usgpm from 85°F to 140°F.

CIMCO's engineering database and custom software can calculate specific savings for your unique application.

EXAMPLE:

Run Time

- Daily: 18 hours
- Weekly: 5 days
- Annual: 52 weeks
- Runtime: 4680 hours

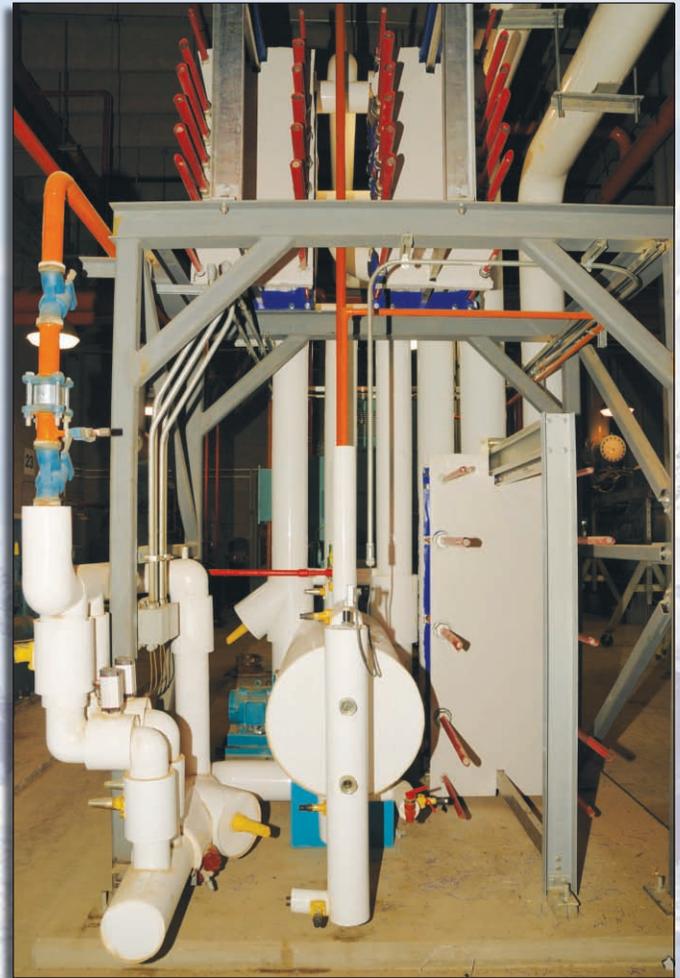
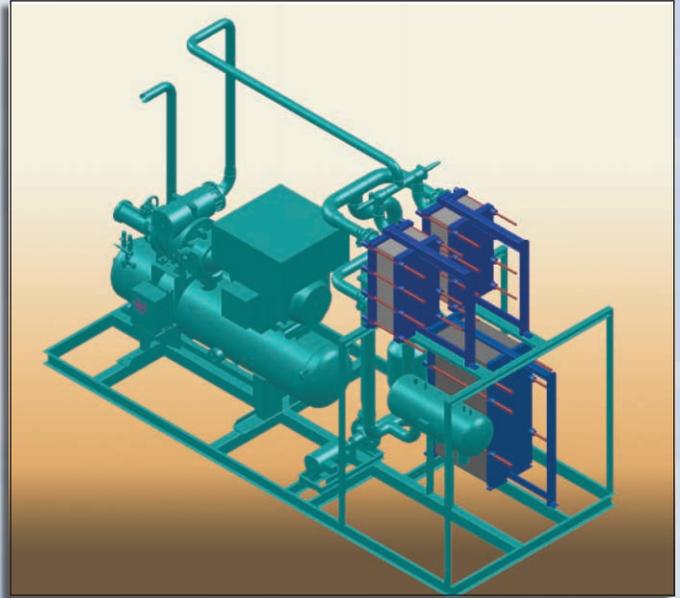
Electrical Input

- Compressor Power Net: *150 HP
- Motor Efficiency: 95%
- Energy Rate: \$0.05/KWH
- Electrical Costs: \$39,800 annually

Natural Gas Savings

- Fluid: Water
- Flow rate: 150 usgpm
- Inlet: 85°F
- Outlet: 140°F
- NG Boiler Eff.: 80%
- Gas Cost; \$0.30/cubic Meter
- Annual Saving: \$223,599.00

Net Savings: \$183,799



*There is a size that fits –
contact your nearest
CIMCO office.*

TOROMONT

CIMCO

www.cimcorefrigeration.com