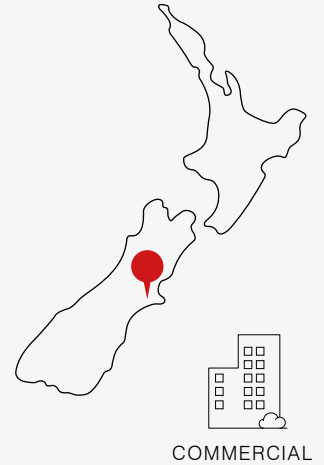


Project Showcase:

Lincoln University Recreation Centre



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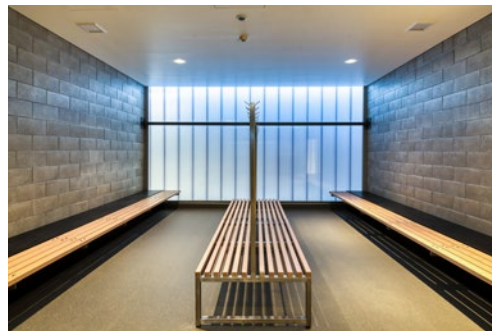
Low Carbon Hot Water for Whare Hākinakina Lincoln University Recreation Centre.
The redevelopment of the Lincoln University gym and recreation centre offers staff and students more space and exercise options while ensuring a low carbon footprint.

EQUIPMENT BREAKDOWN

- QAHV CO₂ Hot Water Heat Pump

The Challenge

When plans were made to bring the Lincoln University Recreation Centre into the 21st Century, a hot water system was needed that could not only deal with the large demand for potable hot water from showers for the onsite gym and surrounding fields, it also needed to withstand the expected growth in memberships and assist with the centre's goals towards a low-carbon future.



Project Showcase: Lincoln University Recreation Centre

The Mitsubishi Electric Hot Water Heat Pump Solution – QAHV CO₂ Hot Water Heat Pump

With the future availability of natural gas clouded in uncertainty and the potential risk to occupants if a leak occurs, the QAHV Hot Water Heat Pump offers a safe, low-carbon alternative to gas water heating with higher efficiencies and compact dimensions to minimise plant space.

Specifically designed to produce high temperature potable hot water up to 90°C, the large 40kW capacity QAHV CO₂ Hot Water Heat Pump was the ideal solution for the recreation centre which experiences high potable hot water demand daily.

CO₂ (R744) Refrigerant for Low Environmental Impact

Utilising CO₂ as an environmentally friendly, safe and natural refrigerant with zero Ozone Depletion Potential (ODP) and a Global Warming Potential (GWP) of just 1, the QAHV Hot Water Heat Pump provides a green, highly reliable and future-proofed alternative to traditional boiler systems for the Centre's potable hot water needs.

Better Security of Hot Water Supply and More Lettable Space

As a single pass high temperature lift machine, QAHV works best with a high water temperature difference and delivers 10l/min or more of full temperature usable hot water in real time.

This directly reduces the amount of storage required to meet the Centre's peak demands, and gives quicker recovery so members will never be caught out with a cold shower - no matter how busy the Centre is that day.

Superior Heating Performance Even at Low Temperatures – Perfect for Canterbury's Cold Winters

As ambient temperatures drop, so too does the capacity of heat pumps. However, the QAHV is able to provide its full heating capacity of 40kW even at ambient temperatures as low as -3°C. Furthermore, the unit operates to supply 90°C hot water in ambient temperatures as low as -25°C.

With an average of 65 ground frost days a year in the Lincoln area*, a system that is reliable on the coldest of days is essential to the facility.

*Ground frost days refers to the mean number of days per year of ground frost according to the NIWA website.



Project Showcase: Lincoln University Recreation Centre

Mitsubishi Electric Flash Injection Circuit Ensures Stable Operation and Helps Meet Legionella Guidelines

The QAHV's superior level of performance is achieved using Mitsubishi Electric's industry-first Flash Injection Circuit which provides the optimum amount of refrigerant to the system via a compressor through a specially designed injection port. This ensures a highly stable operation that at the same time, meets the guidelines for Legionella.

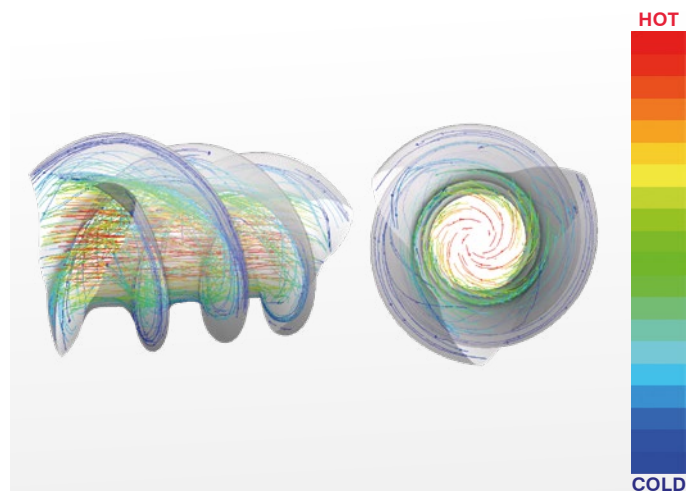


Patented Mitsubishi Electric Technology Offers Unparalleled Efficiency

The Mitsubishi Electric QAHV System utilises a twisted and spiral gas cooler. This patented technology enhances energy efficiency while delivering high temperature hot water.

Using twisted pipes as water pipes and running the refrigerant pipes along their grooves helps to increase the heat-conductive area. The continuous spiral groove design accelerates the turbulence effect of water and helps to reduce pressure loss within the heat exchanger, enhancing efficiency.

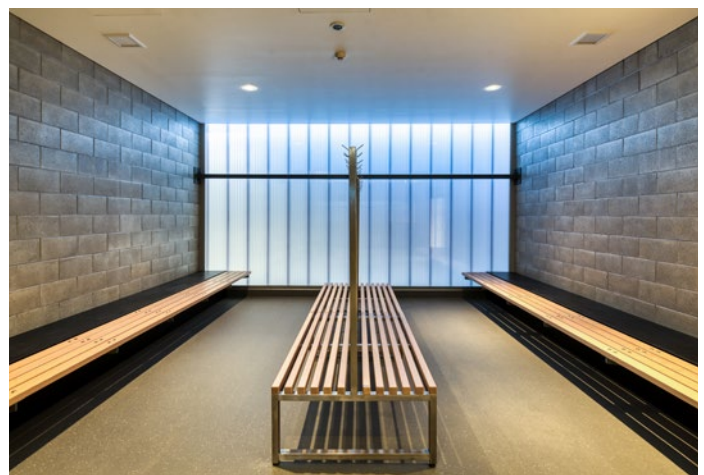
Equipped with the latest inverter scroll compressor, QAHV offers unparalleled efficiency when compared to fixed speed systems.



The Results

The result is a beautifully built \$10 million, 2087m² facility with a QAHV providing potable hot water to the bathrooms in all changing rooms onsite. Lincoln Recreation Centre avoids relying on a high carbon emitting LPG driven plant, now enjoying a high COP unit that utilises CO₂ refrigerant for low environmental impact.

12 months into its stage 1 operation, our data shows that at an ambient air temp of 17°C the unit was delivering around 11l/min of hot water at 71°C – with an amazing efficiency of over 3.6:1.



Project Showcase: Lincoln University Recreation Centre

QAHV-N560YA-HPB Key Features

- ✓ Rated Heating Capacity of 40kW
- ✓ High efficiency (Achieved COP 3.88*)
- ✓ Supplies high temperature hot water of up to 90°C
- ✓ Operable even at low outdoor temperature of -25°C
- ✓ Utilises natural CO₂ refrigerant which has zero Ozone Depletion Potential (ODP) and has a Global Warming Potential (GWP) of 1
- ✓ Uses a unique twisted and spiral gas cooler to enhance energy efficiency
- ✓ Compact dimensions, minimising plant space

* Under normal heating conditions at outdoor temp: 16°CDB/12°CWB, inlet water temp 17°C, outlet water temp 65°C.

Full Equipment Breakdown

Hot Water Heat Pump System

1x QAHV-N560YA-HPB 40kW Heating Capacity CO₂ Hot Water Heat Pump
1x PAR-W31MAA Hot Water Controller
3x TW-TH16-E Thermistors

Installer:



Consultant:

